MANAGING AGRICULTURAL NON-POINT SOURCE POLLUTION IN THE EUROPEAN UNION, NEW ZEALAND, AND VIETNAM

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Abstract

The world population explosion has led to the unprecedented demand for food. To ensure food security for more than seven billion people, the development of intensive agriculture appears to be inevitable. However, these days, excessive intensive farming becomes a leading threat to our environment as non-point sources of pollution. That situation poses an urgent need for a legal management mechanism for the pollution from intensive agriculture. In such developed countries as in the European Union, New Zealand, agricultural production shall comply with stringent environmental regulations. However, though one of the most productive agriculture baskets globally, Vietnam lacks a firm legal basis for agricultural management.

The research's primary objective is to study and propose an optimal legal institution for Vietnam's management of non-point pollution, assuring the harmonization between economic development and environmental protection. The author would respectively address key research questions, including:

1. What is agricultural non-point source pollution? How are the trends of non-point pollution in the EU, New Zealand and Vietnam?

2. What are the approaches of pollution control under international law, and the European Union, New Zealand, and Vietnam systems?

3. What is the difference between the European Union, New Zealand, and Vietnam's pollution legislation? Recommendations for Vietnam's laws.

The research scope would cover two primary fields, including livestock and crop farming, and other water polluters as well. It would then vary from international law to national laws on non-point pollution, with the focus on the European Union and New Zealand systems. Finally, the status of the current law on intensive farming in Vietnam will be concentrated. A comparison would obtain shortcomings of Vietnam's laws compared to the other systems; thus, a feasible approach for Vietnam would be developed.

Acknowledgements

2020 is such a tough year for the world, but it somehow makes me a vast of unforgettable memories. All thanks to amazing New Zealand – Aotearoa.

The thesis was written with the ambition to build up Vietnam's environmental laws. My thesis' completion is attributed to *thầy* professor Alexander Gillespie whose deep expertise had lightened my first steps in the academic career. I am further inspired by his erudition and humility. One more thing, a big hug to the library for hosting me every long night.

My time here should have been soul-destroying without my friends. Thanks for cheering me up and taking drunk me home all the time.

My last words go for my family, especially my wife, back home. I should not have reached the finishing line without your unconditional love and patience.

This is my home away from home.

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LIST OF ABBREVIATIONS

ACVM	Agricultural Compounds and Veterinary Medicines Act (New Zealand, 1997)
CAP	Common Agricultural Policy
CJEU	The Court of Justice of the European Union
DARD	Department Agriculture and Rural Development (Vietnam)
DONRE	Department of Natural Resources and Environment (Vietnam)
EIA	Environmental Impact Assessment
EU	European Union
HSNO	Hazardous Substances and New Organisms Act (New Zealand, 1996)
LEP	Law on Environmental Protection (Vietnam, 2014)
LWR	Law on Water Resources (Vietnam, 1993)
MARD	Ministry of Agriculture and Rural Development (Vietnam)
MDG	Millennium Development Goal
MONRE	Ministry of Natural Resources and Environment (Vietnam)
NER	National Environmental Regulation
NES	National Environmental Standards
NPS-FM	National Policy Statements on Freshwater Management
OECD	Organisation for Economic Co-operation and Development
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (EU, 2006)
RMA	Resource Management Act (New Zealand, 1991)
SDG	Sustainable Development Goal
WFD	Water Framework Directive (EU, 1991)
WHO	World Health Organisation

CHAPTER 1. OVERVIEW

1.1. Water pollution basics

Water pollution is determined when there are "chemical, physical, or biological components or factors" in freshwater bodies, causing the degradation of water quality."[1] All water can be naturally polluted, from a simple cause, such as decaying vegetation; but if the discharges are fitful, the water flow often flushes out contaminants and return water to a clean condition. A more severe form can be naturally – occurring arsenic or salinization in some waters which are unfit for human use. However, anthropogenic activities are the more dominant cause of pollution that exceeds the self-cleaning capacity of natural water.[2]

1.1.1. Classification of water polluters

Each region suffers from different causes of pollution depending on its natural and anthropogenic characteristics. Based on types of water pollutants, the major pollutants are categorized as organic pollutants (such as carbon, hydrogen, oxygen, nitrogen, sulphur), inorganic pollutants (nitrite, ammonium nitrate, heavy metals, phosphates), radioactive pollutants (uranium, thorium, aluminum), suspended solids, pathogens (bacteria, virus, pillow, parasite), nutrients (heavy metal; salts of phosphate, nitrogen, phosphorus, ammonium, potassium) and thermal pollution.[3]

Based on the nature of activity and contamination, OECD studies on water summarize the presence of major polluters as described below:[4]

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[1] Linda Schweitzer and James Noblet "Chapter 36—Water Contamination and Pollution" in Béla Török and Timothy Dransfield (eds) *Green Chemistry* (Elsevier, 2018) 261 at 261.

[2] Claude E Boyd *Water Quality An Introduction* (3rd ed. 2020.. ed, Cham : Springer International Publishing : Imprint: Springer, 2020) at 379.

[3] Jyoti Singh and others "Water Pollutants: Origin and Status" in D Pooja and others (eds) *Sensors in Water Pollutants Monitoring: Role of Material* (Springer Singapore, Singapore, 2020) 5 at 13.

[4] Organisation for Economic Co-Operation and Development (OECD) *Diffuse Pollution, Degraded Waters: emerging policy solutions* (IWA Publishing, London, UNITED KINGDOM, 2017) at 36 to 39.

- Nutrient losses (primarily nitrogen and phosphorus) that largely come from intensive agriculture and partially resident areas, leading to eutrophication and declining ecosystem functioning.
- Microbial contamination caused by discharges from wastewater treatment plants and land use for livestock farming. This type of pollutant might include animal manure, liquid slurry, or untreated wastewater discharged into water bodies both through point source and non-point source, particularly during heavy rainfall.
- Acidification including nitrogen oxides (largely from thermal and fossil fuel) and ammonia (from livestock manure and urine, nitrogen fertilisers). Strong acid wastewater released from mining sites promotes chemical and biological reactions to release heavy metals – a major water contaminant.
- Salinity in groundwater leached from vegetation and irrigation of saltwater and on salt-affected soils. Salinization can lower crops and agricultural yields and contaminate drinking water by its toxicity.
- Sedimentation and organic materials released from dams, food production, manure spreading on livestock farms, and erosion of topsoil due to poor farming, construction and forestry practices. Various water contaminants such as pathogens, heavy metals, toxic organic and chemical compounds can be contained in sediment particles.
- Toxic contaminants, including pesticides, heavy metals, chlorinated solvents, and persistent organic pollutants that are used in the sectors of domestic activities, agriculture and industry.
- Thermal pollution caused by power plants, industrial manufacturers and urban runoff also, which discharges either coolant water or elevated water to the environment. Discharged water after transferring heat may not receive adequate treatment because it is not polluting.[5] However, these occurrences cause sudden changes in natural water temperatures, which have negative

[5] Suresh T Nesaratnam *Water pollution control* (Chichester, West Sussex : John Wiley & Sons, 2014) at 43.

effects on the aquatic environment. In addition, dissolved oxygen in the water and ecological balance, in general, would be degraded under its impacts.

- Emerging contaminants include plastic products, pharmaceuticals, hormones, detergent compounds, caffeine, nanomaterials and others. These pollutants originate from various wastes ranging from agriculture, industry to domestic activities.

The water pollutants might be various, as discussed above, but some representative reasons for pollution are population growth leading to rapid industrialization, urbanization and intensive agriculture practices. Therefore, pollutants can be classified into three main sectors that are residential areas (or domestic wastes), industrial sector and agricultural sector.

(1) Domestic waste: Household wastes seem to be small compared to those in industry or agriculture, but the accumulative amount of household waste would raise a colossal problem. Waste in the form of sewage is the most significant source because it ends up in natural water. Several types of domestic sewage are categorized into greywater (sinks, tubs, showers, laundry), blackwater (urine, faeces, flushed toilets, toilet paper), in which the former accounts for about 70% of the total sewage.[6] Sources of domestic pollutants might be dissolved and suspended organic substances (fats, proteins, carbohydrates, acids) and inorganic substances (sodium, calcium, chlorine, sulphur, phosphorus, ammonia). Municipal sewage is also considered as the leading source of phosphate pollution in river water, with major contributions are human excreta, laundry products and food wastes, respectively.[7] In some regions, the problem caused by domestic sewage is

[6] Paula L Paulo and others "Natural systems treating greywater and blackwater on-site: Integrating treatment, reuse and landscaping" (2013) 50 Ecological Engineering 95 at 95.

[7] Nesaratnam, above n 5, at 41.

more severe in rural areas than in urban areas because of the insufficiency of adequate infrastructure for wastewater treatment.[8]

(2) Industrial waste

The industry has long been known as the largest source of environmental pollution, including water. A vast majority of toxic substances are generated from industrial activities, then reaching water resources. Such contaminants include carbohydrates, organic matter, suspended solids, hydrocarbons, phenols, sulphur, oil and others. In addition to numerous harmful substances, electricity-generating, particularly from nuclear power, can release radioactivity and pollute both surface and groundwater.[9] The industrial sector also uses water to transfer heat which results in thermal pollution referred to in the previous part. More importantly, many major polluters of different sectors, such as detergents in household use or fertilisers used in agriculture, are products of the industrial process. Industrial contaminants range from gas emissions to liquid and solid discharge; but similar to domestic sewage, industrial sewage is among the most dangerous to the aquatic environment because the direct destination of it is natural water.

(3) Agricultural waste

The application of modern technology and practices in agriculture, on the one hand, has helped meet the demand for food supply for the growing population; on the other hand, it has raised many problems, including water quality. Agriculture is the major source of eutrophication, elevated groundwater, siltation of navigational waterways and water contamination with toxic substances, heavy metals, or pathogens. The greater use of fertilisers, and pesticides also, together with intensive livestock farming,

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[8] Nighat Mushtaq and others "Freshwater Contamination: Sources and Hazards to Aquatic Biota" in Humaira Qadri and others (eds) *Fresh Water Pollution Dynamics and Remediation* (Springer Singapore, Singapore, 2020) 27 at 27.

[9] P Literathy "Industrial Wastes and Water Pollution" in PE Rijtema and V Eliáš (eds) *Regional Approaches to Water Pollution in the Environment* (Springer Netherlands, Dordrecht, 1996) 21 at 21.

results in the overabundance of nitrogen, phosphorus, manures and others that are among the largest potential for water pollution.[10] Livestock also contributes to the presence of suspended solids and ammonia which is harmful to aquatic animals and results in algal blooms when converted to nitrate.[11]

The agricultural sector is "cause and victim of water pollution".[12] On the one hand, intensive agriculture practices result in a large proportion of water contamination. On the other hand, the impact of polluted water put agriculture under the pressure of the lack of freshwater for irrigation, living animals and vegetation. A dominant proportion of agricultural pollution occurs as non-point sources through water runoff that would be discussed further in the other part.

1.1.2. Point source and non-point source of water pollution

On the basis of source, water pollution can be divided into two broad groups: point source and non-point source. The first one, point source pollution, is easy to determine because pollutants derive from one single place into water bodies through a medium, for example, a discharge pipe. Factories and wastewater plants are typically the main source dischargers, which suggest that the industrial sector is likely to be among the most common causes of point source pollution.[13] The municipal sewage system is another major point source of pollution. Pollutants of those single point sources are released directly from contaminated activities; therefore, without proper treatment, they ordinarily contain high toxicity.

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[10] PM Haygarth and SC Jarvis *Agriculture, hydrology, and water quality* (New York : CABI Pub, New York, 2002) at 4.

[11] Nesaratnam, above n 5, at 45.

[12] "Agriculture: cause and victim of water pollution, but change is possible | Land & Water | Food and Agriculture Organisation of the United Nations | Land & Water | Food and Agriculture Organisation of the United Nations" <www.fao.org>.

[13] National Geographic Society "Point Source and Non-point Sources of Pollution" (23 July 2019) National Geographic Society <www.nationalgeographic.org>.

The opposite form of pollution is a non-point source, also called a diffuse source, because it comes from many diffuse sources across a broad area.[14] Normally, pollutants on the ground surface are released and washed under water runoff through such natural processes as heavy rain, storm, or snowmelt. Because of that characteristic, it is very challenging to identify and control water pollution from the non-point source. A typical cause of non-point pollution would be the agricultural sector, where runoff from farmland washes such pollutants as animal manure and nitrogen residues of fertilisers, falling directly into water bodies.

Nonetheless, the difference between point source and non-point source is not always straightforward, particularly in urban regions. Means of transport are multiple point sources, contributing to a significant source of pollution; but urban runoff washing away pollutants leaked or released from transportation would be considered as non-point source pollution.[15] Under a broader view, a vast majority of urban runoff has the same destination that is the sewage or drainage system. The system might be seen as a single point source of pollution to apply waste treatment before discharging into the watershed.

The point source of water pollution has attracted more attention from the public than the other one because of its high, direct toxicity and threat to human health; however, the concern has gradually shifted to the non-point polluters.[16] There seem to be two significant reasons for the alteration. Firstly, non-point source is not easily identifiable, then conventional treatment measures and techniques cannot be applied customarily. Secondly, although each amount of non-point pollutant is small, the accumulative effects would

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[14] International Association of Hydrological Sciences *Understanding freshwater quality problems in a changing world* (Wallingford, Oxfordshire, UK : IAHS Press, Wallingford, Oxfordshire, UK, 2013) at 102.

[15] National Geographic Society, above n 13.

[16] Konrad B Krauskopf and Keith Loague "Environmental Geochemistry" in Robert A Meyers (ed) *Encyclopedia of Physical Science and Technology (Third Edition)* (Academic Press, New York, 2003) 519.

be enormous. In practice, point source pollution contributes a minor proportion of five major pollutants of water quality (suspended solids, phosphorus, nitrogen, oxygen demand and dissolved metals). As a consequence, non-point source discharges in the present day are determined as the most severe threats to water bodies.[17]

1.2. Agricultural non-point pollution

As referred to in the above paragraphs, the agricultural sector is among the prominent factor of water pollution. Agriculture even accounts for over 40% of the total pollution of surface water by nitrates in OECD countries.[18] Non-point pollution in the EU, primarily from agriculture, contributes to over one-third of surface water deterioration, and also the main reason why groundwater fails to achieve good status. Meanwhile, New Zealand's rapid extension of dairy farming over the past decades has caused nutrient loads in water to increase. The situation is even more severe in Vietnam, where agricultural pollutants are discharged uncontrollably, and water pollution might obstruct the growth of national GDP. Therefore, it is very important for agricultural pollution to be studied and to seek legal solutions.

First of all, agriculture is a very broad term as defined by the Oxford dictionary:[19]

> "[…] the production of food, fibre, energy, medicines, and other products, primarily from plants and animals. Farmland may be used for the growing of crops, including fruit and vegetables, which constitutes horticulture. […] The crops grown also include grass and other fodder crops for consumption by animals kept for meat, milk, or fibre. Pigs and poultry may be reared intensively […]."

[17] Boyd, above n 2, at 382.

[18] Organisation for Economic Co-operation and Development (OECD) *Water quality and agriculture meeting the policy challenge* (Paris : OECD, Paris, 2012) at 44.

[19] Will Manley, Katharine Foot and Andrew Davis *A Dictionary of Agriculture and Land Management* (Oxford: Oxford University Press, Incorporated, Oxford, 2019).

Accordingly, agriculture shall include crop farming, dairy farming and livestock farming, and does not include aquaculture and forestry. A terminology of 'agricultural pollution' is introduced as below:

> "The liquid and solid wastes produced by any type of agricultural activity. […] Some such pollution (for example, from large feedlots) is a point source, but much (for example, blowing dust, or nutrients from fields) is a non-point source".[20]

As defined, a majority of agricultural pollution is known as a non-point source – "scattered sources of pollutants", such as runoff caused by rainfall or snowmelt.[21] Normally, non – point or diffuse pollution is water pollution associated with land-use activities,[22] particularly related to nitrate and phosphorus concentration, which are the significant ingredients of pesticides and fertilisers or plant residues.[23] Besides, fine sediments, pathogens and nutrients mobilized by livestock are also acknowledged as the 'universal' diffuse pollutants.[24] These chemical elements would eventually be deposited into lakes, rivers, wetlands, coastal waters and groundwaters, therefore pose a risk to the aquatic system.[25] Because runoff is an inevitable natural phenomenon, it is the abundance of nutrients and agricultural waste and chemicals that result in a non-point source of pollution in agriculture; then water bodies need to be protected the most under these circumstances. In addition, toxicological nutrients also contribute to greenhouse gases,

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[20] Chris Park and Michael Allaby *A Dictionary of Environment and Conservation* (Oxford University Press, 2017).

[21] Park and Allaby, above n 20.

[22] MR Carter "Conservation Tillage" in Daniel Hillel (ed) *Encyclopedia of Soils in the Environment* (Elsevier, Oxford, 2005) 306.

[23] PKR Nair, AM Gordon and M Rosa Mosquera-Losada "Agroforestry" in Sven Erik Jørgensen and Brian D Fath (eds) *Encyclopedia of Ecology* (Academic Press, Oxford, 2008) 101.

[24] C Howard-Williams and others "Diffuse pollution and freshwater degradation: New Zealand perspectives" [2010] Issues and Solutions to Diffuse Pollution 126 at 127.

[25] Yi Zheng and others "Chapter 5—Addressing the Uncertainty in Modeling Watershed Non-point Source Pollution" in Sven Erik Jørgensen, Ni-Bin Chang and Fu-Liu Xu (eds) *Developments in Environmental Modelling* (Elsevier, 2014) 113 at 113.

contaminate the air and even boost global warming with some indirect pollutants as methane released the digestive systems of castles.[26]

Based on the type of pollutants, there are three main pollutants of non-point agricultural sources that are pathogens, sediments and nutrients. Firstly, pathogens are invisible microbes that cause diseases, such as bacteria, viruses. A major source of pathogens in agriculture is livestock manure which might be discharged directly into water or washed off land under the rain and effluent runoff. Pathogens are relatively hard to be removed from wastewater by the treatment systems; and once entering water bodies, they can reversely contaminate food and cause diseases to humans and animals.[27]

Secondly, sediments are particles of soil and rock that enter water bodies by erosion. The frequency and scale of erosion these days increase because of deforestation for farming, particularly after farming land is abandoned. Sediment shall cause water murky and deteriorate aquatic life. It is also a major source of heavy metals and phosphorus that leach to soil from agriculture.[28]

Thirdly, nutrients contain the two most dangerous elements that are nitrogen and phosphorus. These are also the most concerning problems in many countries, especially which have excessive consumption of inorganic pesticides and fertilisers. Farm sewage, animal urine and effluent are other significant sources of them. While nitrogen can be easily washed off land through water runoff, phosphorus normally enters water bodies with soil particles.[29] Nutrients occur through chemical forms of nitrogen and phosphorus, which are nitrate, ammonia and phosphate. Exceeding nutrients

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[26] "Industrial Agricultural Pollution 101 | NRDC" <www.nrdc.org>.

[27] New Zealand Office of the Parliamentary Commissioner for the Environment *Water quality in New Zealand: understanding the science* (Wellington, NZ : Parliamentary Commissioner for the Environment, Wellington, NZ, 2012) at 21 to 23.

[28] At 25 to 27.

[29] New Zealand Office of the Parliamentary Commissioner for the Environment *Water quality in New Zealand: land use and nutrient pollution* (Wellington, New Zealand : Parliamentary Commissioner for the Environment, 2013) at 17.

in water will be toxic to water quality and aquatic life, simultaneously leading to eutrophication such as alga blooms.[30]

1.3. Impact of agricultural pollution on water and human health

Agricultural pollution causes a dual impact on water bodies. At first, agriculture exacerbates the water status, then the use of polluted water in farming brings about negative effects on agricultural production. Accounting for 70% of water consumption worldwide, agriculture nowadays has overtaken industry to become the leading factor in the degradation of water resources.[31] As a consequence, agricultural activities have posed pressure on water quality, water quantity, and water habitat.[32] Both aquatic ecosystems and human health shall be the victim of agricultural pollution.

Freshwater is likely to be the most important element of human life when it accounts for over two–thirds of a human body; and the same significance of water occurs in all living organisms on earth.[33] Although over two-thirds of the earth's surface is covered by water, the greatest part of it is the ocean that cannot be used directly for living consumption. Therefore, the scarcity of freshwater is forever a problem with life on earth, not to mention the pressure of water pollution. In 2015, nearly one–third of the world's population is unable to access safe drinking water. The efforts across the world from 1990 to 2015 had increased the access to improved water sources from 76% to 91% of the global population, but that means almost one out of ten people has lived without an improved water source. Unsafe water is still a top threat for deaths, with an estimation of 2.2% of global deaths and 6% of deaths in low-

[30] New Zealand Office of the Parliamentary Commissioner for the Environment, above n 27, at 31 to 34.

[31] "Water pollution from agriculture: a global review - Executive summary" 35 at 2.

[32] Zornitsa Stoyanova and Hristina Harizanova "Impact of Agriculture on Water Pollution" (2019) 4 AGROFOR at 111.

[33] Humaira Qadri and Rouf Ahmad Bhat "The Concerns for Global Sustainability of Freshwater Ecosystems" in Humaira Qadri and others (eds) *Fresh Water Pollution Dynamics and Remediation* (Springer Singapore, Singapore, 2020) 1 at 1.

income countries.[34] It is even more severe to know that most existing diseases are waterborne, with a wide variety ranging from diarrhea diseases to respiratory, cancer, neurological disorder, or cardiovascular disease.[35] Diseases related to water quality might be characterized by different symptoms such as diarrhea, vomiting, fever, stomach cramps, and in severe cases, leading to coma or death.

1.4. Status of water pollution

Water pollution is the most prevalent challenge in contemporary society. It is the global trend that the peak pollution in the developed countries is over, while in developing countries, it still continuously goes up.[36] In other words, the overall trend of water quality in high-income countries has improved over recent years, but unfortunately, it is not the global situation. Although the status of water in EU and OECD countries, mostly upper-middle-income countries, is generally positive, they have kept facing challenges of diffuse pollution sources. Agriculture has been determined as the main source of nutrient pollution, occurring in one-third of water bodies in OECD members,[37] despite a decline in nutrient surpluses and pesticide use recorded during 1990 and mid-2000s.[38] On the other hand, an estimation of half the world's population suffers from water pollutants such as nitrogen, phosphorus, biochemical oxygen demand, which are projected to worsen at least in a few decades, particularly in Asia.[39]

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[34] Hannah Ritchie and Max Roser "Clean Water" [2019] Our World in Data.

[35] Qadri and Bhat, above n 33, at 8.

[36] Michel Meybeck "Heavy metal contamination in rivers across the globe: An indicator of complex interactions between societies and catchments" (2013) 361 IAHS-AISH Proceedings and Reports 3 at 14.

[37] Organisation for Economic Co-Operation and Development (OECD), above n 4, at 20.

[38] Organisation for Economic Co-operation and Development (OECD), above n 18, at 46.

[39] Organisation for Economic Co-Operation and Development (OECD), above n 4, at 15.

1.4.1. European Union

In the EU, the Water Framework Directive introduced the term 'good status' of water bodies that would be used to assess water quality, including ecological status (exclusively for surface water), quantitative status (exclusively for groundwater) and chemical status (for both ground and surface water). The detailed description and regulation of 'good status' will be analyzed in the third part of the thesis. In general, the statuses are used as standards of water quality, for which if any water body fails to qualify, it is either currently or potentially polluted. In 2018, the European Environment Agency presented a relatively comprehensive assessment of European water quality for the period of 2010 and 2015.[40] As reported by the assessment, around 40% and 46% of surface waters in Europe are in good status. The data for groundwater is 74% and 89%, respectively. Besides, European rivers have also experienced a decrease of 20% of nitrate concentration between 1992 and 2015 following a steady decrease in nitrogen emissions over the last few decades.

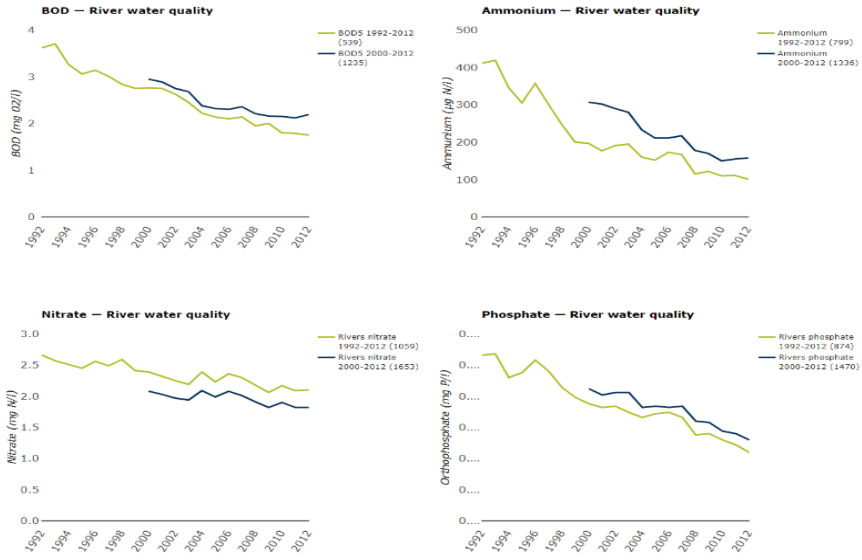

Figure 1.1. Emission trends of nitrogen oxides (Source: EEA)[41]

[40] "European waters -- Assessment of status and pressures 2018 — European Environment Agency" <www.eea.europa.eu>.

[41] European Environment Agency (EEA) "National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)" <www.eea.europa.eu>.

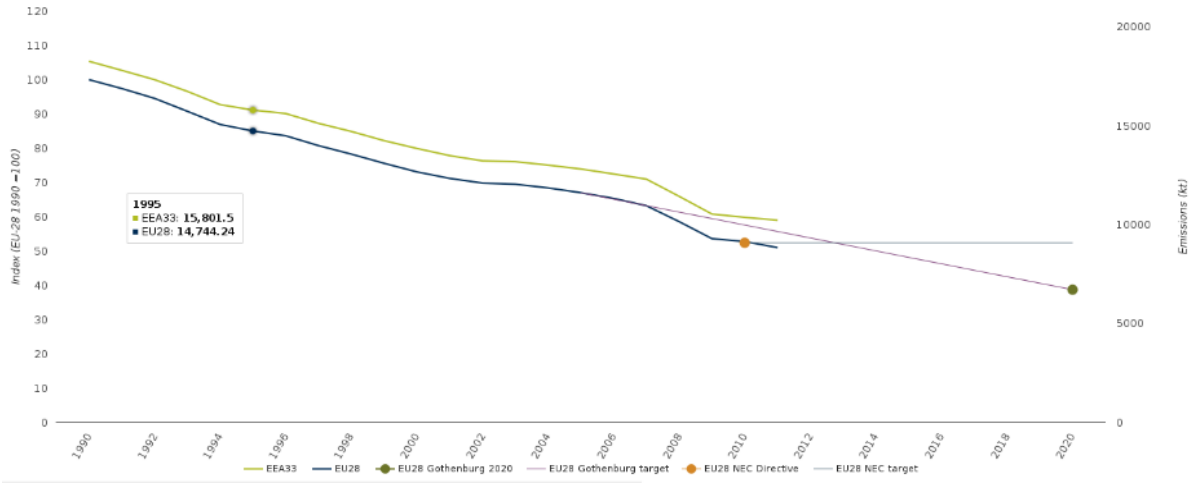

Figure 1.2. River water quality in Europe (Source: EEA)[42]

Although that is a considerable success of European countries, the data for water good status shows a large part of waters has not reached the standard. Non-point sources, particularly from agriculture, are reported to be a major cause, contributing to 38% of poor surface water quality, while point sources constitute 18%. Other causes are hydromorphological pressures and water abstraction. The failure of groundwater to achieve good status has mainly resulted from agriculture's diffuse pollution also. Overall, one of the most challenging threats to water quality in Europe is non-point sources from agricultural practices. Another remarkable point in the assessment is that highland and mid-altitude waters have a better status than lowland waters. Thus, the control of water pollution must take into consideration the use of shared watercourses and the transfer of pollution.

1.4.2. New Zealand

A similar status occurs in New Zealand, where the overall quality of water is high. In 2013 and 2015, the New Zealand Parliamentary Commissioner for the Environment published a report on water quality in this country in relation to land use.[43] It is reported that one of the most major concerns in New Zealand in recent decades has been to mitigate nutrient losses from

[42] European Environment Agency "River water quality (Waterbase—Rivers)" <www.eea.europa.eu>.
[43] New Zealand Office of the Parliamentary Commissioner for the Environment, above n 29.

agriculture, particularly dairying. In addition to nutrients, other leading problems are sediment and bacterial contamination that primarily come from agricultural non-point sources also. As presented in the report, there has been a large and rapid change from forestry and sheep/beef farming to dairy farming in New Zealand since 1996. Between 1996 and 2008, an estimated 300,000 hectares of sheep/beef farming were shifted to dairy farming, while there were around 200,000 hectares of new forestry. During the next four years, dairy farming expanded to other 158,000 hectares that were almost equal to the decrease in the area of sheep/beef farming and forestry combined. A similar trend has kept occurring until 2020, even at a faster pace; and it is considered as the largest problem the country is facing in water quality because dairying causes more nutrient losses than sheep/beef farming and forestry. Consequently, nitrogen loads in waters countrywide increased by 9% from 1996 to 2008, then was supposed to be 6% from 2008 to 2020. It would be more severe when the decreasing trend in the latter period is partly attributed to the fact that a large amount of nitrogen has not leached to rivers or groundwater yet.[44]

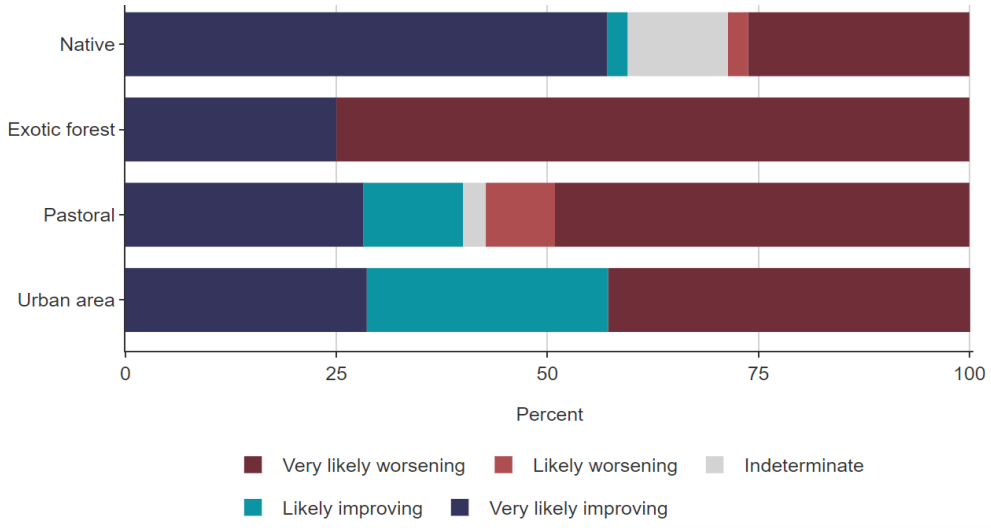

Figure 1.3. River total nitrogen concentration trend direction measured at sites in New Zealand 1998-2017 (Source: StatsNZ)[45]

[44] ST Larned and others "Water quality in New Zealand rivers: current state and trends" (2016) 50 New Zealand journal of marine and freshwater research 389.

[45] StatsNZ "River water quality: nitrogen" <https://secure.livechatinc.com>.

A positive indication is showed in the phosphorus loads which have been very stable on the national scale since 1996, particularly compared with the period 1989 – 2000 when all nutrients significantly increased and deteriorated water quality.[46]

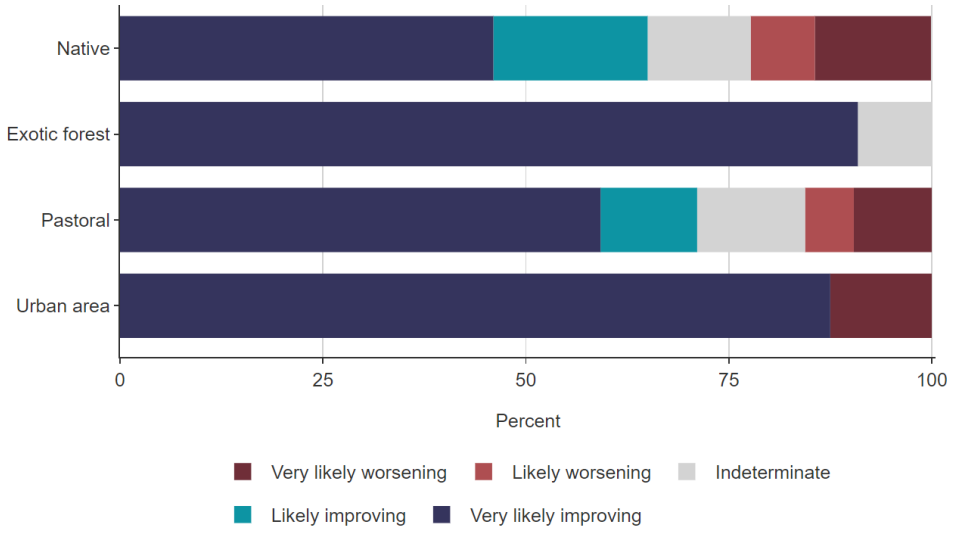

Figure 1.4. River total phosphorous concentration trend direction measured at sites in New Zealand 1998-2017 (Source: StatsNZ)[47]

1.4.3. Vietnam

In a reserve situation, most Asian countries have been facing a tremendous increase in water pollution in the 21st Century. A large proportion of rivers in Asia are highly polluted with domestic and industrial wastes, which are also the most dangerous threat to water quality in this region.[48] The above picture of water pollution in Asia partly reflects the current situation in Vietnam. One obstacle in Vietnam is that an overall water quality evaluation with comparisons of different monitoring sites in Vietnam has not been conducted

[46] Deborah J Ballantine and Robert J Davies-Colley "Water quality trends in New Zealand rivers: 1989–2009" (2013) 186 Environ Monit Assess 1939.

[47] StatsNZ "River water quality: phosphorus" <https://secure.livechatinc.com>.

[48] "Water pollution in Asia: The urgent need for prevention and monitoring" (9 June 2012) Global Water Forum <https://globalwaterforum.org>.

because of the deficiency of evaluation tools and financial resources.[49] Therefore, the data on water quality in Vietnam remains very limited. In general, there are many problems in the bodies of both ground and surface water in Vietnam. The average concentration of heavy metals and arsenic in groundwater in the two most populated deltas, the Red River Delta and the Mekong River Delta, exceeds the WHO drinking water guidelines.[50] Besides, a tremendous increase was seen between 2000 and 2011 in two water quality indicators that are total suspended solids (largely from metal industry) and biological oxygen demand (largely from agriculture, fishery, and forestry).[51] Despite the lack of quantitative data on water pollution, an overall picture of Vietnam status could be seen from the pattern of polluting activities.

On a report toward Vietnam's water system of the World Bank, various data has raised an alarm on potential water pollution by sectors in this country. It is reported in 2019 that under half of the households had connections to drainage systems, which was also the proportion of industrial zones and clusters that had wastewater treatment plans, not to mention untreated wastewater from 5,000 craft villages. Consequently, only 12,5% of municipal wastewater (2019) and 71% of industrial wastewater (2018) were treated before discharge to the environment. Therefore, urban and industrial wastes constitute the largest share of water pollution in Vietnam.[52]

On the other hand, agriculture is the second-largest source of total greenhouse gas emissions in Vietnam.[53] Consuming 90% of water, agriculture

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[49] Pham Thi Minh Hanh and others "Development of Water Quality Indexes to Identify Pollutants in Vietnam's Surface Water" (2011) 137 Journal of Environmental Engineering 273 at 273.

[50] Tran Le Luu "Remarks on the current quality of groundwater in Vietnam" (2017) 26 Environ Sci Pollut Res 1163 at 1164.

[51] Hoa Thi Nguyen and others "Structural analysis of the interrelationship between economic activities and water pollution in Vietnam in the period of 2000–2011" (2018) 20 Clean Techn Environ Policy 621 at 634.

[52] World Bank *Vietnam Toward a safe, clean and resilient water system* (World Bank, Washington, DC, 2019) at XXII.

[53] Emilie Cassou and others *An Overview of Agricultural Pollution in Vietnam* (World Bank 2017) at 15.

has largely exacerbated the water status, particularly with non-point sources. Accordingly, the leading contributors to agricultural non-point pollution in Vietnam are fertiliser/pesticide residues and livestock waste. From the 1990s to 2015, Vietnam is a large importer of inorganic fertilisers and pesticides to fulfil the demand for agricultural intensification. Only rice farming raised from 100,000 ha in 2000 to 867,000 ha in 2015. It is followed by the seven-fold increase in fertiliser consumption during 1983-2013. Meanwhile, the average consumption of pesticides in farming also surged, from 0.3 kg a.i/ha between 1981 and 1986 to 2.54 kg a.i/ha during 2001-2010.

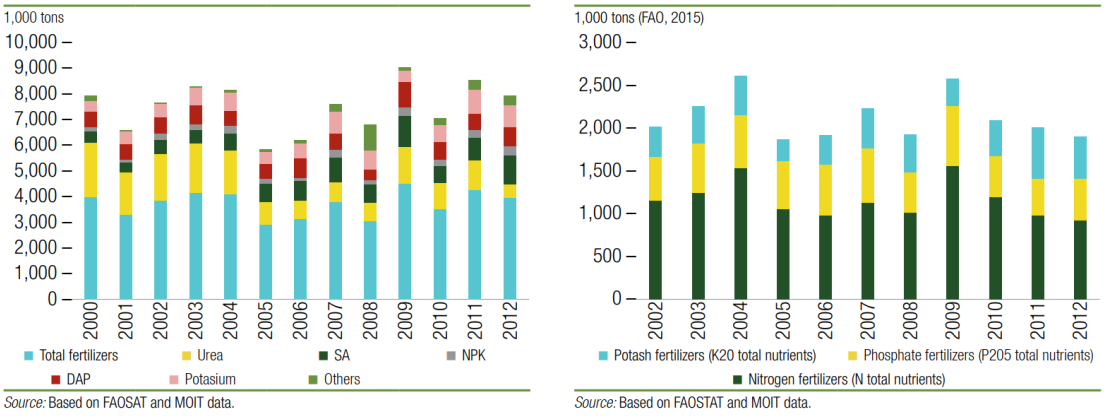

Figure 1.5. Fertiliser imports into Vietnam 2000-2012, and Fertiliser consumption, 2002-2012[54]

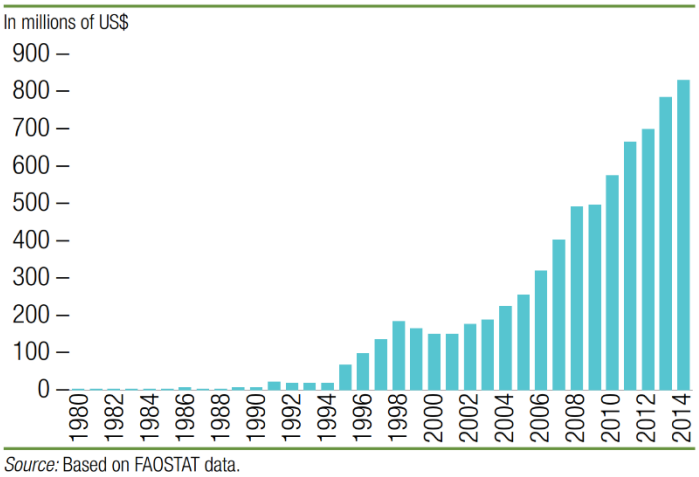

Figure 1.6. Value of pesticide imports into Vietnam, 1980-2014 [55]

[54] Tin Hong Nguyen *An Overview of Agricultural Pollution in Vietnam: The Crops Sector* (World Bank 2017) at fig 18,19.

[55] At fig 21.

By estimation, overfertilization wasted around 150 million USD per year, while 10-30% of pesticides are residues.[56] Besides cop farming, livestock plays a major role in water deterioration, with approximately 80 million tons of animal waste per year, mainly nutrients, pathogens and pharmaceuticals, of which 36% is untreated.[57] More importantly, the continued dominance of smallholder farming in Vietnam has severely aggravated the pollution status. Household scale accounts for a vast majority of both crops and livestock farming. The average farm size for rice is fairly over 1 hectare in the Mekong Delta and 0.2 hectares in the Red River Delta, or 640,000 coffee farms are below 1 hectare.[58] Similarly, the proportion of livestock smallholders is so high that it generates 80% of the manure.[59]

Small farmers often fail to comply with laws and guidelines. For example, 40% of smallholder farms discharge animal manure directly into the environment, compared to 16% in intensive farms.[60] Another study found over 70% of farmers in Mekong Delta to dump chemical waste into canals or fields, or 90% of farmers frequently wash their pesticide sprayers at the fields, canals or rivers.[61]

[56] At 19, 22.

[57] Tung Xuan Dinh *An Overview of Agricultural Pollution in Vietnam: The Livestock Sector* (World Bank 2017) at 15.

[58] Cassou and others, above n 57, at 12.

[59] Dinh, above n 61, at 15.

[60] At 15.

[61] Cassou and others, above n 57, at 14.

1,000 tons

Regions/ farm types	RRD	NMM	NSCC	CH	SE	MRD	Country
Pig							
Smallholder	2,469	2,993	1,901	334	554	1,140	8,755
Intensive	392	181	190	48	185	253	1,606
Poultry							
Smallholder	1,835	2,097	1,804	292	221	399	5,668
Intensive	197	74	100	9	111	177	677
Cattle							
Smallholder	360	1,495	4,182	394	337	706	6,025
Intensive	—	66	116	49	20	12	207
Buffalo							
Smallholder	221	4,375	1,761	195	108	96	5,913
Intensive	—	38	—	—	—	—	—
All							
Smallholder	4,885	10,960	9,647	1,214	1,220	2,340	26,361
Intensive	—	360	406	106	315	443	1,630

Note: Author's calculations.

Table 1.1. Volume of animal waste discharged to the environment by the regions in Vietnam[62]

As a consequence, nitrogen and phosphorus pollution have risen rapidly in the past decades under the form of chlorophyll concentration. Water pollution is now the greatest challenge of Vietnam that threatens to constraint the growth of GDP by 0.8% annually, with the agricultural sector suffers the hardest of a 3.6% decrease.[63] Furthermore, there are two characteristics of water bodies in Vietnam that need to be noticed. Firstly, Vietnam's watershed heavily depends on international rivers such as Mekong rivers. Secondly, downstream areas in Vietnam suffer from water pollution more severely than in upstream areas.[64] Therefore, it is very important for the control of water pollution in Vietnam that the international principle of sharing watershed and transferring pollution shall be applied to both domestic and transboundary waters.

[62] Dinh, above n 61, at fig 2.

[63] World Bank, above n 56, at 47.

[64] At 87.

1.5. Features of agriculture production in the EU, New Zealand and Vietnam

Three selected subjects show a large discrepancy in agriculture features regarding the average farm size and farmer income. In New Zealand, there were over 51,000 farm holdings with an average area of 270 hectares in 2018.[65] For dairy farming, the average herd size was 435 cows in 2018-2019.[66] A farm manager earns an annual average of 65,000 NZD (2018)[67], and the farm owners should earn significantly more than such amount.[68]

The statistics of the EU are much varied based on each country. In 2016, most farms in the EU were small, of which two-thirds are less than 5 hectares.[69] Though, some other countries presented a more considerable mean size, for example, the United Kingdom (around 68 hectares), Luxembourg (62 hectares), Denmark (52 hectares), or Germany and Finland (43 hectares).[70] The average income of a family farmer in the EU was just under 15,000 EUR[71] (2017), varying from the highest of 50,000 EUR in the Netherlands to the lowest of below 10,000 EUR in the other ten countries.[72]

In Vietnam, 35% of farms in 2011 were less than 0.2 hectares, 34% were from 0.2 to 0.5 hectares, while only 6% of farm holdings were above 2 hectares.[73] A Vietnamese farmer's average income was 1,450 USD per year, which was

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[65] Beef&Lamb New Zealand (Firm) Economic Service "Compendium of New Zealand: Farm Facts 2020" [2020] NoP20001 at 5.

[66] At 11.

[67] Approximately 47,000 USD (15/02/2020 by Morningstar for Currency and Coinbase for Cryptocurrency)

[68] "Farmer/Farm Manager—About the job" <www.careers.govt.nz>.

[69] Haptic "Distribution of EU farms and EU farmland according to farm size" (1 July 2018) Haptic <www.haptic.ro>.

[70] "File:Figure 2 - Average size of family farms, 2016 (hectares per farm).png - Statistics Explained" <https://ec.europa.eu>.

[71] Approximately 18,200 USD (15/02/2020 by Morningstar for Currency and Coinbase for Cryptocurrency)

[72] DG Agriculture and Rural Development, Unit Farm Economics "Agricultural and farm income" [2018] at 12.

[73] World Bank Group *Transforming Vietnamese Agriculture: Gaining More for Less, Vietnam Development Report* (2016) at 10.

lower than an average of 2,200 USD per person nationwide in 2018.[74] Compared to farmers in New Zealand and the EU, most farmers in Vietnam fall within a poor and vulnerable group. Those small farmers - or peasants - have contributed to the most remarkable feature of Vietnamese agriculture that is so-called smallholder farming. Some scholars consider smallholders "the guardians of ecological and environmental sustainability" because of their minor consumption of chemicals on farming compared to large farmers.[75] Though, it might turn into a nightmare for a developing country where the number and density of smallholder farming are relatively high. The accumulation of chemical residues from millions of smallholders can beat any corporate farming discharges, making agriculture the leading source of non-point pollution. Therefore, the management of non-point pollution in Vietnam should take such features into account, which makes the problem even more challenging than in the EU and New Zealand.

1.6. Summary

Chapter one introduces an overview of water pollution, particularly from non-point agricultural sources. Water pollution results from a multitude of causes, as the consequences of industrialization, urbanization, and intensive agriculture. It is the global trend that developing countries face more challenges in water protection than developed countries do. The statistics can be viewed through the water status of the EU and New Zealand compared with Vietnam, even though Vietnam's status has not been measured adequately. One standard classification of water pollution divides it into point source and non-point source, in which the latter nowadays attracts more concerns because it is very challenging to identify the diffuse sources. Non-point pollution is primarily caused by agriculture, including crops and livestock farming that leach nitrogen and phosphorous through sediments

[74] "Vietnam strives to double farmers' income—Xinhua | English.news.cn" <www.xinhuanet.com>.
[75] UNCTAD "The role of smallholder farmers in sustainable commodities production and trade" [2015] 17 at 11.

and nutrients. Fertiliser overusing and animal manure discharges are considered the leading reasons for the increase of non-point pollution. Accordingly, non-point source management should focus on monitoring chemical uses in agriculture and farming waste discharges. Furthermore, most Vietnamese farmers are vulnerable smallholders, compared to farmers in the EU and New Zealand, posing another challenge to the management of non-point pollution in Vietnam.

CHAPTER 2. PRINCIPLES OF WATER POLLUTION CONTROL UNDER INTERNATIONAL LAW

2.1. Introduction

National environmental laws of States members of the international community are positively affected by a range of general principles and rules obtained from various sources such as soft law (e.g., international treaties) and arbitral and judicial decisions (e.g., the International Court of Justice).[76] Although it is not straightforward to recognize the extent to which those principles have been applied to national laws, their significance in global environmental protection, including water pollution control, has been indisputable.

International principles shall be both standards and guidelines for State members to establish and assess the degree of sufficiency of their domestic laws.[77] One of the essential principles to be referred to these days is sustainable development, which is the fundamental background of most other environmental principles. Indeed, sustainable development has been the common objective of modern environmental protection that aims to balance with economic interests. The establishment of the Millennium Development Goals and Sustainable Development Goals has been a remarkable instrument. Further, such fundamental principles as prevention, precaution and polluter-pays are considered to ensure that objective. Moreover, three principles of prevention, precaution and polluter-pays have been developed to directing principles that should be displayed through a *sui generis* course.[78] The directing principles make environmental law become a separate branch of law

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[76] Nicolas de Sadeleer *Environmental principles: from political slogans to legal rules* (Oxford University Press, Oxford ; New York, 2002) at 243.

[77] Daud Hassan *Protecting the marine environment from land-based sources of pollution: towards effective international cooperation* (Aldershot, Hants, England, Aldershot, Hants, England, 2006) at 49.

[78] Sadeleer, above n 80, at 265.

by distinguishing it from other bodies of law, providing the policymakers and courts with maximum flexibility to solve divergent interests.[79]

2.2. The principle of sustainable development

2.2.1. Overview

A primitive concept of sustainable development was introduced by the 1972 Stockholm Declaration of the United Nations Conference on the Human Environment. Principle 1 promotes that humans must be liable for protecting the environment for "present and future generations".[80] Then, Principle 2 covers all natural resources from air, water, land to flora and fauna to be safeguarded for "the benefit of present and future generations".[81] The term 'sustainable development' began to appear in treaties during the 1980s, notably becoming the "catch-cry" through the World Commission on Environment and Development in 1987.[82] The role of sustainable development was more secured in the 1990s.[83] It was the 1992 Rio Declaration on Environment and Development that the principle has become an essential global policy, and "could no longer be ignored".[84] To ensure environmental sustainability is one out of eight Millennium Development Goals of the United Nations that have been considered as an unprecedented global effort by all member states.[85]

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[79] At 259.

[80] Report of the United Nations Conference on the Human Environment, UN A/CONF48/14/Rev1 (1972), Principle 1.

[81] Report of the United Nations Conference on the Human Environment, Principle 2.

[82] Alexander Gillespie *The Long Road to Sustainability: The Past, Present, and Future of International Environmental Law and Policy* (Oxford: Oxford University Press, Oxford, 2018) at 115.

[83] At 161.

[84] Christina Voigt *Sustainable development as a principle of international law: resolving conflicts between climate measures and WTO law* (Leiden, Leiden, 2009) at 17.

[85] "Millennium Development Goals (MDGs) | Office of the Special Adviser on Africa, OSAA" <www.un.org>.

In terms of this, sustainable development is the first principle of the 27 principles introduced by the 1992 Rio Declaration.[86] This principle places humans at the centre, then the whole system of sustainable development is designed to meet human needs and aspirations in harmony with nature.[87] While developing countries want the free development of the economy, environmental protection aims to constraint the use of natural resources. Therefore, the principle of sustainable development seeks the balance of interests by implying limitations on using natural resources. Accordingly, that use shall be preserved for future generations by pursuing sustainable and equitable use. Another critical element of sustainable development proposed by the 1992 Rio Declaration is to integrate environmental protection into the development (Principle 4).[88] This rule appears to be the most legalistic, leading to the significant changes since the 1980s; for example, the establishment of an Environmental Department at the World Bank, the convergence of trade with the environment at the GATT and the WTO, the adoption of required environmental assessments, and other environmental jurisprudence in competition or intellectual property law.[89] As for domestic laws, New Zealand was among the first countries to incorporate sustainable development into her domestic regime with the Resource Management Act 1991.[90]

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[86] Report of the United Nations Conference on Environment and Development, UN A/CONF151/26 (1992), Principle 1.

[87] "Review of implementation of Agenda 21 and the Rio Principles - Synthesis : Sustainable Development Knowledge Platform" <https://sustainabledevelopment.un.org> at 5.

[88] Report of the United Nations Conference on Environment and Development.

[89] Philippe Sands *Principles of international environmental law* (fourth edition. ed, Cambridge, United Kingdom, 2018) at 216.

[90] Voigt, above n 88, at 179.

2.2.2. Sustainable Development Goals (SDGs)

2.2.2.1. Pre-Sustainable Development Goals

It was a long road from the 1992 Rio Summit to the birth of SDGs in the 2030 Agenda for Sustainable Development. As previously referred to, the 1992 Rio Declaration has established the fundamental tenet of sustainable development, particularly Principle 1 and 4. At the turn of the new millennium, the United Nations unanimously adopted a set of objectives in the 21st century that is called the Millennium Development Goals (MDGs) for poverty eradication by 2015. In the interest of environmental protection, the objective of ensuring environmental sustainability (Goal 7) was introduced, with the essential legislative target was integrating sustainable development into country policies and programmes. Overall, although the efforts had resulted in profound achievements, eight development goals, particularly Goal 7, exposed various limitations.[91] Many experts have viewed the MDGs as "overambitious" (or "unambitious") and "unrealistic" without the initial participation and consultation of developing countries. The structure of MDGs lacked the harmonization of local capacities, making it too challenging for low-income countries.[92] Accordingly, such local challenges as infrastructure, distance, security, costs, understanding of hygiene and sanitation have not been considered for Target 7C of increasing access to safe drinking water and basic sanitation.[93] As a consequence, although the global target for drinking water was met, the world missed the target of sanitation, with 2.4 billion people had been using unimproved sanitation facilities by 2015.[94] On the other hand, with Goal 7 as the only objective concerning sustainable developments, MDGs majorly concentrated on social problems,

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[91] United Nations *The Millennium Development Goals Report 2015* (2015) at 8.

[92] Maya Fehling, Brett D Nelson and Sridhar Venkatapuram "Limitations of the Millennium Development Goals: a literature review" (2013) 8 Global public health 1109 at 1114.

[93] At 1116.

[94] United Nations, above n 95, at 58.

for instance, education, gender equality, health, while placing minimal emphasis on environmental issues.

The 9/11 terrorist attack in the United States was supposed to greatly attract the UN members' attention from environment and sustainable development to peace and security in the 2002 Rio +10 Summit, resulting in challenging years for sustainable development after the summit.[95] Although the Rio+10 (Johannesburg Plan of Implementation) has been criticized for not making significant progress from the 1992 Rio Declaration, it is still a fundamental legal background of sustainable development.[96] The plan further developed an obligation to protect and manage the natural resources, including water, for sustainable development. In detail, the plan sought to intensify water pollution prevention in which agriculture plays a crucial role. Good agriculture practices were recommended to advance the long-term sustainability of freshwater and water resources in general.[97] It could be seen that agricultural pollution had been a remarkable concern at the international level.

2.2.2.2. Sustainable Development Goals

Realizing the limitation of MDGs, during the preparatory process of the 2012 UN Conference on Sustainable Development (Rio+20), the concept of SDGs integrating economic, social and environmental dimensions was born with the vision to be universally applicable.[98] The SDGs have then been concise, easily understandable and measurable, and more importantly, involved relational targets.[99] Nevertheless, the Rio+20 Summit had not adopted SDGs

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[95] Felix Dodds, David Donoghue and Jimena Leiva Roesch *Negotiating the sustainable development goals* (Routledge, London ; New York, 2017) at 13.

[96] Voigt, above n 88.

[97] "Johannesburg Plan of Implementation" <www.unescwa.org> at ch 4.

[98] "Transforming our world: the 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs" <https://sdgs.un.org> at pt Preamble.

[99] Dodds, Donoghue and Leiva Roesch, above n 99, at 34.

yet. Five years after the 2012 Rio+20, the United Nations General Assembly adopted the 2030 Agenda with 17 SDGs at the heart of the agenda.[100] As a result of the largest consultation process, the 17 Goals have been considered 'transformative', and 'ambitious'. Firstly, while MDGs aimed at developing countries that would pursue the targets with aid from developed countries, SDGs will be universally and equally applied to all countries.[101] But SDGs are non-binding, each country is projected to follow their own national (and lower levels) plans, which can give them more autonomy in accordance with their local capacities.[102] Secondly, the Agenda seeks a comprehensive objective that covers all major social, economic and environmental problems, resulting in a very complex set of 17 goals and 169 associated targets[103], and 231 unique indicators.[104] Though the integration of three dimensions – economic, social and environmental – is a global commitment, the way to achieve such integration has still been under question.[105] Thirdly, with a 15-year lifespan, the 2030 Agenda is ambitious and places a huge challenge over all member states. Fifteen years is not a long period, particularly without a thoroughly planned approach and a colossal investment (an estimated 2% of the global GDP).[106] In terms of planned implementation, the set of indicators

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[100] A/RES/70/1 - Transforming our world: the 2030 Agenda for Sustainable Development, UN General Assembly.

[101] Simon Mair and others "A Critical Review of the Role of Indicators in Implementing the Sustainable Development Goals" in Walter Leal Filho (ed) *Handbook of Sustainability Science and Research* (Springer International Publishing, Cham, 2018) 41 at 44.

[102] Ranjula Bali Swain "A Critical Analysis of the Sustainable Development Goals" in Walter Leal Filho (ed) *Handbook of Sustainability Science and Research* (Springer International Publishing, Cham, 2018) 341 at 341.

[103] "Transforming our world: the 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs", above n 102, at [18].

[104] 247 indicators in total, but twelve indicators repeat under different targets. "SDG Indicators—SDG Indicators" <https://unstats.un.org>.

[105] ESCAP *Integrating the Three Dimensions of Sustainable Development: a framework and tools* (United Nations Publication, 2015) at 7.

[106] Zafar Adeel "A renewed focus on water security within the 2030 agenda for sustainable development" (2017) 12 Sustainability Science 891 at 892.

is designed to generate specific points and criteria within very broad concepts of SDGs and sub-targets. However, such essential measurements can be oversimplified sometimes, thus limiting, or even conflicting with, the understanding of SDGs concepts.[107]

2.2.2.3. Water-related SDGs

In the interest of water problem, the primary goal is SDG 6 – ensure availability and sustainable management of water and sanitation for all, particularly the target to reduce pollution and untreated wastewater, eliminate dumping, mitigate the discharge of hazardous chemicals and materials.[108] This target will be measured by the proportion of domestic and industrial treated wastewater and the proportion of water bodies with good quality.[109] Besides domestic and industrial areas, the agricultural sector is also referred to in Target 2.4 of Goal 2 that projects the increase of agricultural productivity together with ensuring the use of resilient and sustainable agricultural practices. The 2030 Agenda further establishes a foundation for water security through a range of other goals, including Goal 3 (water-borne diseases and water-related deaths and illness), Goal 9 and Goal 11 (sustainable industrialization and urbanization), Goal 12 (sustainable management and efficient use of natural resources), Goal 14 (marine resources), and Goal 15 (sustainable use of freshwater).[110]

As reported in the Sustainable Development Goals Report 2020 by the UN, the progress has been not on track to reach the 2030 Agenda even though

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[107] Mair and others, above n 105, at 54.

[108] "Transforming our world: the 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs", above n 102, Goal 63.

[109] *Global indicator framework adopted by the General Assembly (A/RES/71/313), annual refinements contained in E/CN3/2018/2 (Annex II), E/CN3/2019/2 (Annex II), and 2020 Comprehensive Review changes (Annex II) and annual refinements (Annex III) contained in E/CN3/2020/2*, 6.3.1, 6.3.2.

[110] "Transforming our world: the 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs", above n 102.

one-third of the route was passed.[111] According to the report, the agricultural intensification was supposed to be a major obstruction for reducing global water stress. Further, the whole ecosystem was threatened by the combination of population growth, agricultural intensification, urbanization and industrial production. One of the reasons for the above circumstances was the poor record of implementation of integrated water resources management.[112] Consequently, all countries need to highly accelerate the progress, otherwise failing to meet the 2030 Agenda.

2.3. The preventive principle

Non-point pollution is very difficult to reverse once it has occurred; therefore, prevention should be better than cure regarding environmental damage. The preventive principle was derived from the concept of the no-harm rule, but it was barely used before the 1972 Stockholm Declaration.[113] The purpose of the preventive approach is to anticipate the environmental damage before it occurs; thus, seeking all feasible measures to circumvent that damage. Therefore, one important rule is that the principle of prevention is taken at an early stage of each project related to the environment. Nevertheless, the preventive principle does not guarantee that all harms would not take place. In case of actual damage that has already happened, though the role of this principle becomes less significant, its application would still be necessary to minimize such environmental damage. Under this principle, a State should prevent environmental damage both within its own jurisdiction and its transfer of damage to other States, as described by the 1992 Rio Declaration (Principle 14).[114] Besides international treaties, a source of preventive principle is such 'soft law' as the International Court of Justice's documents that can

[111] United Nations *The Sustainable Development Goals Report 2020* at 2.

[112] At 37.

[113] Leslie-Anne Duvic-Paoli *The prevention principle in international environmental law* (Cambridge : Cambridge University Press, 2018) at 24.

[114] Report of the United Nations Conference on Environment and Development.

support the prevention approach as political declarations and technical documents.[115]

The most legalistic regime for the preventive principle was also suggested by Principle 11 of the 1992 Rio Declaration that required member States to propose effective environmental legislation, including environmental standards, management objectives and priorities.[116] The EU appears to integrate the principle into its legal system with serious approaches at an early stage. A number of Directives related to environmental protection have recognized the prevention, particularly the Integrated Pollution Prevention and Control Directive. Other instruments, such as Directive 75/442/EEC on waste, Directive 94/62/EEC on packaging and packaging waste and Directive 96/82/EC on the control of major accident hazards involving dangerous substances, also serve to implement the principle.[117]

2.4. The precautionary principle

Principle 15 of the 1992 Rio Declaration requires member States to apply the precautionary principle in environmental protection widely. It has also been recognized in many international environmental treaties since the 1980s, particularly recent treaties such as the 2001 Stockholm Convention on Persistent Organic Pollutants.[118] Prevention and precaution are customarily referred to as two separate principles of international environmental law, but they present an intertwining relation. Indeed, the precautionary approach is an effective supplement to the preventive approach under the circumstance of the insufficient scientific evidence of the potential damage. This is so-called 'scientific uncertainty' in which the law should act in a precautionary and anticipatory manner to avoid the harms in the first place. A significant

[115] Duvic-Paoli, above n 117, at 175.

[116] Report of the United Nations Conference on Environment and Development.

[117] Sadeleer, above n 80, at 69.

[118] Thomas Boyer "Is the Precautionary Principle really incoherent?" (2017) 37 Risk Anal 2026 at 2026.

advantage of the approach is that it would shift the burden of proof for potential damage from the objector to the person proposing the environment's act. The techniques to implement the precautionary principle appear to be similar to those of the preventive principle, which is applying common standards or best practices. However, the principle has not been well supported in domestic laws due to a number of challenges that are financial ability, scientific competence and the willingness of the authority.[119]

2.5. Environmental Impact Assessment (EIA)

The most important instrument to implement the preventive and precautionary principles is Environmental Impact Assessment. It is a process of weighing environmental effects with economic benefits; thus, the EIA is also considered a tool to achieve sustainable development. EIA was first recognized in Principle 7 and Principle 11 of the 1982 World Charter for Nature.[120] However, it was not until Principle 17 of the 1992 Rio Declaration that EIA becomes a fundamental prevention instrument in most countries.[121] Normally, an adequate EIA process involves seven stages: (1) scoping, (2) environmental baseline studies, (3) impact prediction and evaluation, (4) mitigation planning, (5) comparison of alternatives, (6) decision making, (7) study documentation through the preparation of EIA.[122] It is important that the preparation of EIA shall be conducted at the early stage of a project so that the authority can suspend the one with outweighed harms.

In principle, the process of EIA requires transparency, certainty, accountability, credibility, cost-effectiveness, flexibility, practicability, and participation.[123] Public participation plays a key role, consisting of the right to information, the right to participate in the decision-making process, and

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[119] Hassan, above n 81, at 61.

[120] World Charter for Nature A/Res/37/7, UN National Assembly.

[121] Report of the United Nations Conference on Environment and Development.

[122] Anji Reddy Mareddy, Anil Shah and Naresh Davergave *Environmental Impact Assessment: Theory and Practice* (Oxford: Elsevier Science & Technology, Oxford, 2017) at 568.

[123] At 11.

the right to justice.[124] Such participatory rights with regard to environmental protection have given birth to the concept of environmental democracy.[125] To that end, public involvement should be taken into account in all seven stages of an EIA process. From a prevention instrument, EIA is now considered as an independent principle under international environmental law.

2.6. The equitable utilization and the prevention of significant harm

This principle closely relates to international watercourses and transboundary water pollution. Water itself is shared among countries it crosses. The water, like a river, is a moving flow across the boundary from upstream to downstream, and then becomes a factor in the status of the water quality when its flow brings along contaminants. Therefore, an upper State must take into account that its actions can affect the natural water in a lower State. The purpose of international law in using shared watercourses is to maximize the right to the water use of a state while preventing the transfer of pollution, especially non-point pollution, which is difficult to determine the diffuse sources. International treaties have long introduced several principles for the sharing of water. For example, it is prescribed as the sovereign right to exploit their own resources with the responsibility not to cause environmental damage to other States, according to Principle 21 of the 1972 Stockholm Declaration[126]/Principle 2 of the 1992 Rio Declaration.[127] The principle is also recognized in many environmental treaties, significantly the 1996 Helsinki Rules, the 2004 Berlin Rules, the 1989 Basel Convention and the 1997 UN Convention.[128]

The equitable utilization is a fundamental theory of international law on watercourse today, according to which all States sharing a watercourse shall

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[124] Sumudu A Atapattu *Emerging principles of international environmental law* (Ardsley, NY: Transnational Publishers, 2006) at 354.

[125] At 294.

[126] Report of the United Nations Conference on the Human Environment.

[127] Report of the United Nations Conference on Environment and Development.

[128] Sands, above n 93.

have equivalent rights to use the water.[129] It is also essential to notice that nothing under the principle entitles each State to an equal share in the waters. The equality of right means an equal right to an equitable share of watercourse benefits depending on various factors, for example, the natural allocation of water.[130] However, the utilization of water is limited by environmental protection, which is a central issue to constitutes this principle.[131] Accordingly, all States using watercourses must conduct adequate protection and prevention of potential pollution.

The prevention of significant harm is not a separate principle, but consistent with equitable utilization doctrine.[132] The UN Convention 1997 requires States to "take all appropriate measures to prevent the causing of significant harm to other watercourse States," including specific methods such as setting objectives and criteria, establishing techniques and practices to address point and non-point pollution.[133] A similar obligation is also prescribed under the Helsinki Rules through which any existing or new form of water pollution must be prevented in an international drainage basin.[134] Compared to the environmental protection besides the principle of equitable utilization, the significance of this principle is to provide a framework to prevent activities that are not directly related to a watercourse but may harm the downstream State (i.e., agriculture practices).

The significance of the 'double' principle must be recognized in a union like the EU, where lower rivers have been reported to be more contaminated than

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[129] Owen McIntyre *Environmental Protection of International Watercourses under International Law* (Taylor and Francis, 2016) at 23.

[130] At 77.

[131] At 68.

[132] At 90.

[133] Convention on the Law of the Non-navigational Uses of International Watercourses, UN A/51/49 (adopted 21 May 1997, entered into force 17 August 2014), Art7 and 21.

[134] Owen McIntyre, above n 133, at 89.

upper areas.[135] Vietnam also needs this principle to safeguard their watercourse towards their most important river Mekong. As a downstream riparian country, Vietnam is dependent on the upper states, China and Myanmar, for their vulnerable water supply.[136] A preferred approach to implementing the principle is setting the appropriate water pollution control level that can be applied in domestic and international watercourses. For example, the river basin level is adopted if the transboundary pollution affects neighbouring communities. Where the impact occurs in other countries, the level should be an international river basin commission.[137]

2.7. The Polluter-Pays Principle

The Polluter-Pays Principle is a fundamental rule recommended by major international treaties and organisations, particularly the OECD, to control water quality. The OECD was the first to expressly introduce the polluter-pays principle in the 1972 OECD Council Recommendation that encourage rational use of natural resources while preventing distortions in international trade and investment.[138] Besides, the principle has been adopted in other international treaties, such as the EEC Treaty 1986 requires the polluter to pay for environmental damage.[139] The 1992 Rio Declaration further recognized it under Principle 16 that makes the principle globally binding to national authorities. In short words, "those who generate pollution should bear the costs that the pollution imposes on others."[140] In detail, public authorities must decide the polluter's measures to bear the expenses of

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[135] See Chapter 1, page 11.

[136] World Bank, above n 56, at 24.

[137] H Larsen, N H Ipsen, L Ulmgren "Chapter 1: Policy and Principles" in *Water Pollution Control A Guide to the Use of Water Quality Management Principles* (1st ed, St Edmundsbury Press, London, 1997) at 1.3.

[138] Recommendation on Guiding Principles Concerning International Economic Aspects of Environmental Policies, OECD C(72)128 (adopted 1972).

[139] Treaty establishing the European Community (Nice Consolidated Version), (adopted 1992).

[140] Report of the United Nations Conference on Environment and Development.

pollution prevention and control in the cost of goods or services. [141] The polluter-pays principle aims to cure and compensate for the environmental damage bypassing the preventive and precautionary principle. Therefore, this approach can be considered a dual filtering system if the prevention fails to stop the harmful acts in the first place.

As an economic rule of cost allocation, the polluter-pays principle shall be an incentive for farmers to adopt good practices that mitigate the diffuse pollution sources. The principle is customarily applied by establishing an environmental taxation system. Accordingly, the manufacturer of products causing pollution shall pay the charge; thus, the tax may reduce the manufacturers' incentives to produce environmentally harmful goods. On the other hand, consumers eventually suffer from the supplementary cost of goods or services that is added by producers to heighten their profit. However, Nicolas de Sadeleer believes that the trade competition, in the long term, will protect consumers because the largest polluters will gain the lowest market share.[142] Another instrument is discharge fees that shall be directly imposed on polluter's waste, aiming to encourage producers to install optimal pollution control if they do not want to be burdened with such fees.[143] Moreover, the polluter-pays principle is also a useful tool for civil liability law in compensation for environmental damage victims. When it comes to liability for non-point pollution, the identification of polluters held liable would not be straightforward if there are many sources of pollutions. Basically, all polluters contributing to the damage will be liable because the polluter-pays principle supports the concept that each party produces the same risk. In practice, there is, however, no consensus on how much a party shall pay.

[141] Organisation for Economic Co-operation and Development (OECD), above n 18, at 21.

[142] Sadeleer, above n 80, at 46.

[143] Hassan, above n 81, at 62.

One shortcoming of the polluter-pays principle is that though it may discourage polluters' incentives, it does not oblige them to reduce the amount of pollution in the first place. For that reason, the principle must incorporate the preventive and precautionary approach that plays the role of a first filter. On the other hand, this principle shall face challenges in the determination and permissible level of polluted discharges and the equivalent environmental cost, which must be based on a firm and consistent scientific background.

2.8. Policy instruments for pollution control

2.8.1. Introduction

There are two fundamental policy instruments to tackle the water problem, including regulatory and economic instruments, which are reflected in various forms under different environmental law systems. The regulatory approach can be seen as the most common that States apply to control water pollution. Meanwhile, to a lesser extent, economic instruments contribute to the minority of environmental approach, but the trend has increased recently.[144] Both instruments have their own advantages and disadvantages exposed during the implementation. Although environmental regulations provide governments with the predictability and overseeing of pollution, they are not efficient economically. On the other hand, economic instruments can serve as incentives for the polluter to adjust their activities in the interest of the environment, but the authorities may find many technical challenges to apply this manner.[145] Besides the above instruments, some other approaches, such as information and persuasion, are also useful for the purpose of environmental protection. Indeed, no policy instrument can be used as a sole measure to control water pollution, but it is necessary to combine many different measures as instrument mixes. The introduction of any instrument must comply with essential criteria that are "cost-benefit", "cost-effectiveness"

[144] Ashar Aftab, Nick Hanley and Giovanni Baiocchi "Integrated regulation of non-point pollution: Combining managerial controls and economic instruments under multiple environmental targets" (2010) 70 Ecological Economics 24 at 24.

[145] H Larsen, N H Ipsen, L Ulmgren, above n 141.

and "environmental effectiveness".[146] Moreover, their combination must be conducted in a precautious manner to ensure their compatibility for the gap between different instruments.

2.8.2. Regulatory instruments

The most widespread approach to be applied by States are regulatory instruments that prescribe compulsory conditions for all entities to oblige, otherwise being subject to penalties. This approach can be established as overall input regulations, pesticide regulations, nutrient regulations, regulations concerning the scale of production, or regulations concerning buffer strips and catch crops.[147] In more detail, there is a range of standard instruments that are summarized by an OECD publication:[148]

- Prohibitions on the discharge of pollutants into watercourses (i.e., livestock manure, toxic chemicals).

- Limits on certain products (i.e., inorganic pesticides and fertilisers).

- Regulations on the location of polluting sources (i.e., farming and industrial areas) towards the watercourses.

- Permits for polluting activities (i.e., large-scale livestock)

- Restrictions of polluting management practices (i.e., using and storing pesticides)

Applying the above manners often achieves high performance in controlling the point source of water pollution that can be easily identified. The point sources shall be controlled through the systems of water quality objectives and environmental standards that set minimum indicators to be met for

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[146] Organisation for Economic Co-operation and Development (OECD) *Instrument Mixes for Environmental Policy* (Paris: OECD Publishing, Paris, 2007).

[147] Kevin Parris "Impact of Agriculture on Water Pollution in OECD Countries: Recent Trends and Future Prospects" (2011) 27 International Journal of Water Resources Development: Water Quality Management: Challenges and Expectations 33 at 46.

[148] Organisation for Economic Co-operation and Development (OECD), above n 18, at 93.

different purposes in corresponding areas, so-called outcome-based regulations. Besides, a process-based approach is the uniform discharge conditions in which the same requirements are established regardless of the impact on the environment.[149]

On the other hand, the referred approach faces difficulty in controlling non-point pollution with the problem lies in the identification of sources. In this area, the preventive principle is a traditional but feasible approach through permits, guidance, codes of practice, and others. The initiative of the catchment inventory approach has been applied in some countries that set up an information system to investigate and supervise the effect of polluting activities.[150]

As referred previously, the regulatory approach dominates worldwide environmental policymaking. Environmental regulations provide the State with the strengthening of power and the predictability of overall pollution control. This is the first and foremost background for applying any other instruments. However, the effect of regulations will be limited without adequate funding because it is required to supervise and inspect the whole process. The transparency of this approach is called into question when market leaders, also the largest polluters, may have a voice in the legislation in the interest of their benefit.[151] Overall, the regulatory instruments have been a fundamental foundation in environmental protection, such a supplementary mechanism as economic tools should be used to strengthen the power.

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[149] PA Chave "Chapter 5: Legal and Regulatory Instruments" in *Water Pollution Control A Guide to the Use of Water Quality Management Principles* (1st ed, St Edmundsbury Press, London, 1997) 526, 5.3.

[150] At s 5.5.

[151] UNEP *The use of economic instruments in environmental policy: Opportunities and Challenges* (1st ed, United Nations Publication, 2004) at 25.

2.8.3. Economic instruments

Since the polluter-pays principle became a worldwide approach in environmental protection, governments have widely applied economic instruments, particularly in the area of water quality. This is a market-based instrument that aims to modify the behavior of polluters for achieving pollution control objectives. Bernstein has introduced a range of manners that can be applied as below:[152]

- Pricing: the cost of freshwater shall cover the expense of wastewater treatment, thus encouraging polluters to save and recycle water themselves.

- Pollution charges: this is the price that polluters must pay for their use of water and other natural resources. It can be charged on the amount of effluence, environmentally contaminating products, or the use of available treatment facilities.

- Marketable permits: setting the maximum limits on the total emissions of pollutants that shall be issued through permits and then trading between polluters.

- Subsidies: tariff and other financial incentives will be granted to polluters provided that they invest in adequate measures of pollution control.

- Deposit-refund systems: a refundable surcharge shall be deposited as a requirement to purchase and use durable and reusable polluting products, such as plastic and battery.

- Enforcement incentives: any violations of the environmental standards and regulations shall be subject to equivalent penalties such as fines and environmental liability.

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[152] JD Bernstein "Chapter 6: Economic Instruments" in *Water Pollution Control A Guide to the Use of Water Quality Management Principles* (1st ed, St Edmundsbury Press, London, 1997) 526.

The application of economic instruments provides polluters with the flexibility to choose the most feasible options to meet the pollutant objectives. In contrast, authorities also benefit from the flexibility, because unlike regulatory instruments, it is easier for governments to adjust such economic instruments as fees, fines, or permits whenever they find them insufficient. Moreover, the economic approach is supposed to encourage polluters' investment in pollution control technology in the long term. An adequate economic measure shall lead to its consistent result that the accumulation of extra taxes or fees, if applied, will shortly exceed such cost of investments. In addition, this instrument is appreciated by its inherent transparency when the market and all stakeholders can oversee all measures.[153]

As mentioned previously, however, the economic instruments face a technical challenge that can constrain them from achieving objectives, particularly in the area of agricultural non-point pollution. The most important part is to measure a reasonable level of cost, whether a fine, a fee, or a tax, which can balance pollution control and economic development. The expense must be neither too low to be ignored, nor too high that burden such low-income polluters as farmers. An inadequate calculation of cost can result in circumventing the law, leading to even more severe problems. For example, a nitrogen tax could shift to a less-nitrogen practice on the surface that eventually causes groundwater nitrogen pollution.[154]

2.8.4. Instrument mixes

Both regulatory and economic instruments have their inherent advantages and disadvantages. Rather than replacing, each of them should be viewed as complementary components of a collection of environmental policies. Without an adequate regulatory system, it is impossible to adapt economic instruments in a smooth manner. While the regulations provide a threshold

[153] UNEP, above n 155, at 24.

[154] Organisation for Economic Co-operation and Development (OECD), above n 18, at 83.

of emissions, the other can further strengthen incentives for polluters to comply with stringent standards in a more flexible mechanism. By allocating the resources from polluters in the market, the economic approach shall share the government's burden of compliance cost.[155] Therefore, it is encouraged to adapt the mix of policy instruments for the purpose of controlling water pollution.

The instrument mix will be appropriate to deal with such a multifaceted problem as environmental protection; however, the choice of instruments combined should be thoroughly considered. Under some circumstances, one measure may hamper another; thus, the harmonization of combined instruments will be far more critical than their number. Indeed, it is reported that some OECD countries have suffered an increase in compliance costs due to the redundant instrument mix.[156]

2.9. Summary

Chapter two presents a range of underlying principles in water pollution control that influences the national laws. The first and foremost is the sustainable development concept that is the primary principle under the 1992 Rio Declaration, which is then developed to 17 SDGs, 169 associated targets, and 231 indicators. Secondly, the principle of prevention and precaution takes effect in most national laws to tackle non-point pollution. The most important tool for prevention is EIA – which nowadays becomes another independent principle in environmental protection. Thirdly, the equitable utilization and prevention of significant harm are essential to protect downstream riparian against upstream polluting activities. Lastly, the polluter-pays principle is another fundamental rule promoted by the OECD to shift the expenses of pollution control to polluters' responsibility. Moreover, a mixed approach is encouraged to apply, including regulatory and non-regulatory instruments, especially economic incentives in dealing with water

[155] UNEP, above n 155, at 4.

[156] Organisation for Economic Co-operation and Development (OECD), above n 18, at 82.

pollution. The above principles may not directly influence non-point pollution control, but they suggest a feasible approach to protect the watercourse. The next three chapters will show how international principles are adapted under the EU, New Zealand, and Vietnam systems.

CHAPTER 3. THE EUROPEAN UNION'S LEGISLATION

3.1. Introduction

3.1.1. The Common Agricultural Policy and agri-environment schemes

The foundation of the Common Agricultural Policy (CAP) in the EU was established in the Treaty of Rome 1958 (EEC Treaty) that principally agreed on adopting a common policy in the sphere of agriculture.[157] Although the term was vague, the treaty indeed created a framework for the policy with a range of objectives, notably increasing agricultural productivity by technology, ensuring a fair standard of living for farmers, stabilizing the market, and ensuring supplies at reasonable prices.[158] Such later amendments as the treaty on the Functioning of the European Union (TFEU) further developed at Article 38 that set the establishment of a CAP to support the internal market for agricultural products, including fisheries.[159] The treaty establishing the European Community also integrated these provisions, promoting the intensification of agriculture throughout Europe.[160] The Member States unanimously have set high agricultural commodities prices that allow farmers to apply intensive production and high-cost technology for maximum productivity. To utilize land and other natural resources, modern agriculture has gradually become a major source of environmental damage in the EU.[161]

Unfortunately, environmental protection was not a vital part of the EEC Treaty in the first place. In contrast, it was not until the 1980s that there appeared a number of legislative reforms of the CAP before the appearance of reform packages.[162] Besides, one of the EU's most significant responses concerning the community awareness of environment has been recognized

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[157] Treaty establishing the European Economic Community, (adopted 1958), s 3.

[158] Treaty establishing the European Economic Community, s 39.

[159] Treaty on the Functioning of the European Union, s 38.

[160] Treaty establishing the European Community (Nice Consolidated Version), ss 33–34.

[161] Brian Jack *Agriculture and EU Environmental Law* (Routledge, 2016) at 21 - 22.

[162] At 41.

in its Environmental Action Programmes (EAP), although these programs do not have direct legal effects. The first EAP was introduced in 1972 and the latest was adopted in 2013 for the period to 2020. The EAP functions as a way for sustainable development targets based on a mix of instruments, including legislative, economic, financial instruments, and horizontal tools (education, research, information).[163]

Since the mid-1980s, the EU's policy reforms have introduced the integration of agri-environment schemes into the CAP that was first referred to in a Green Paper published in 1985. [164] Thus, measures for environmental protection and other requirements for all Member States were prescribed in such statute as the EEC Regulation 797/85[165] and Regulation 2078/92.[166] This concept's overall principle is to financially compensate farmers for their loss of income because of applying measures of environmental protection. Such income support is conducted through direct payments for sustainable farming: greening payment and cross-compliance.

(1) Greening payment: farmers can receive the payment if applying the agricultural practices beneficial for the climate and the environment that are: crop diversification, maintaining existing permanent grassland, or having ecological focus area on the agricultural area.[167] Moreover, farmers that

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[163] Elisabeta-Emilia Halmaghi "Environmental Action Programmes of the European Union – Programmes Supporting the Sustainable Development Strategy of the European Union" (2016) 21 Scientific Bulletin 87 at 3.

[164] David Kleijn and William J Sutherland "How effective are European agri-environment schemes in conserving and promoting biodiversity?" (2003) 40 The Journal of applied ecology 947 at 948.

[165] Council Regulation (EEC) No 797/85 of 12 March 1985 on improving the efficiency of agricultural structures.

[166] Council Regulation (EEC) No 2078/92 of 30 June 1992 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside.

[167] Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009 347 OJ L § 43-46 (EP, CONSIL US 2013).

conduct the organic farming systems shall benefit from the greening payment regardless of any above conditions.[168]

(a) Crop diversification: at least two different crops for the farm of under 30 hectares, and three crops for farms with more than 30 hectares. The main crop must not exceed 75% of such farm's land.

(b) Maintaining permanent grassland: farmers shall not convert or plough the areas that are designated as permanent grasslands by all Member States.

(c) Ecological focus area: at least 5% of the farmland with more than 15 hectares shall be dedicated for the benefit of biodiversity.

(2) Cross-compliance: The second approach to encourage sustainable farming in the EU is cross-compliance, which sets out basic rules for farmers to receive income support. The rules on cross-compliance include the statutory management requirements and the good agricultural and environmental condition of land under the national level.[169] Accordingly, to receive CAP support, all farmers must follow the law on public, animal and plant health, animal welfare and the environment.[170] Moreover, in case the beneficiaries from CAP support fail to comply with the rules, they may suffer financial consequences, for example, the reduction of payment or administrative penalty.[171]

The future of the CAP beyond 2020 has been prepared since 2018 with legislative proposals setting out nine objectives reflecting economic,

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[168] *Ibid* para 38.

[169] Regulation (EU) No 1306/2013 of the European Parliament and of the Council of 17 December 2013 on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008 347 OJ L, s 93 (US 2013).

[170] "Cross-compliance, Linking income support to respect for European Union rules" European Commission - European Commission <https://ec.europa.eu>.

[171] Regulation (EU) No 1306/2013 of the European Parliament and of the Council of 17 December 2013 on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008, 347 OJ L s 64.

environmental and socio-territorial multifunctionality.[172] More importantly, the proposal aims for higher ambition on environmental protection, in which water quality is one of the most concerns through obligatory nutrient management tools to reduce ammonia and nitrous oxide levels.[173]

3.1.2. The EU's approach on water pollution

Environmental matters were not a vital part of the Treaty of Rome in the first place. It was 1987 when the Single European Act introduced a set of regulations on the environment to be added to Part Three of the EEC Treaty to preserve, protect, and improve the environmental quality associated with human health and sustainable use of natural resources.[174] Thus, environmental protection was prescribed to be integrated into the community policies and activities in the Treaty of Amsterdam.[175] Further, with a view to promoting sustainable development, all policies must apply precautionary and preventive principles.[176]

Since environmental protection was recognized in the EEC Treaty, the EU has adopted many approaches to problems. On the one hand, regarding water pollution, as for non-point agricultural pollution, the EU's policies have simultaneously applied direct regulations and pricing policies (such as the CAP subsidies).[177] On the other, there are three statutory systems, including water quality targets, substance management, and waste management.[178]

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[172] "Towards a post-2020 common agricultural policy | Fact Sheets on the European Union | European Parliament" <www.europarl.europa.eu>.

[173] "Future of the common agricultural policy" European Commission - European Commission <https://ec.europa.eu>.

[174] Single European Act No L 169, s 25 (European Community 1987).

[175] Treaty of Amsterdam amending the Treaty on European Union, the Treaties establishing the European Communities and certain related acts, (adopted 1997), s 2(4).

[176] Treaty of Amsterdam amending the Treaty on European Union, the Treaties establishing the European Communities and certain related acts, s 2(34).

[177] S Peña-Haro and others "Fertiliser standards for controlling groundwater nitrate pollution from agriculture: El Salobral-Los Llanos case study, Spain" (2010) 392 Journal of hydrology (Amsterdam) 174 at 175.

[178] David Taylor "There is a Conflict at the Heart of EU Water Pollution Policy" (2015) 6 Eur j risk regul 426 at 427.

(1) Substances management: regulating which substances can be used, such as Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals.[179]

(2) Waste management: regulating how waste shall be treated, such as Directive 2008/98/EC on waste.[180]

(3) Environmental targets: setting environmental quality targets for sustainable development, such as Nitrate Directive[181], Water Framework Directive.[182]

Besides three above branches, Environmental Impact Assessment is another indispensable instrument in protecting the environment and water resources under the preventive approach. In the EU, EIA is regulated under the EIA Directive 2011/92/EU (amended by Directive 2014/52/EU).[183]

3.2. Substances management

3.2.1. REACH

Based on the precautionary principle, the management of substances aims to rectify the environmental damage at its initial sources, the so-called source-oriented approach. In contrast, for contaminated substances that have already reached the environment, such other measures as waste management and water quality targets should be applied. Concerning the source-oriented

[179] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)(2006).

[180] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance) of 2008 EP, CONSIL 32008L0098, EP, CONSIL (European Community EP, CONSIL 2008).

[181] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources of 1991 CONSIL 31991L0676, CONSIL (European Economic Community CONSIL 1991).

[182] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy of 2000 EP, CONSIL 32000L0060, EP, CONSIL (European Community EP, CONSIL 2000).

[183] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance of 2012 CONSIL, EP 32011L0092, CONSIL, EP (2012).

approach, Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is the most comprehensive piece of legislation in the EU.[184] Before REACH, the EU's policies were criticized for inadequate protection of human health and the environment because of almost no data on emissions, toxicity and effects of thousands of commercial chemicals in the market.[185] Therefore, the purpose of REACH is to ensure no substance shall be produced or placed on the EU's market without registering first (no data, no market).[186] Accordingly, a request associated with relevant documents must be submitted to the competent agencies for authorisation decisions.[187] More importantly, REACH also greatly affects agricultural pollution control because two major pollutants, fertilisers and pesticides, are prescribed dangerous substances. Such substances shall comply with further conditions of the restriction process, in which the preparation of a chemical safety report or a risk assessment is legally binding.[188]

3.2.2. Fertilisers and pesticides management

Being a significant agricultural source of non-point pollution, fertilisers' circulation in the EU market is restricted by Regulation 2003/2003.[189] The purpose is to monitor inorganic (mineral) fertilisers placed on the market, which means organic fertilisers, accounting for half of the commercial

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[184] Linda Molander and others "Are chemicals in articles an obstacle for reaching environmental goals? — Missing links in EU chemical management" (2012) 435–436 Sci Total Environ 280 at 282.

[185] Henrik Selin and Stacy D VanDeveer "Raising Global Standards: Hazardous Substances and E-Waste Management in the European Union" (2006) 48 Environment: Science and Policy for Sustainable Development 6 at 9.

[186] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC 396 OJ L, s 5 (European Community 30122006).

[187] *Ibid* s 62.

[188] *Ibid* s 69.

[189] Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers s 5 (CONSIL, EP US 2003).

fertilisers in the EU, have not been covered by such regulation.[190] It is not the only flaw of the existing regulation. Further, the EU legislation lacks specific quantity limits in fertiliser use, resulting in national legislation dependence.[191] For that reason, a new Fertiliser Regulation 2019/1009 has been adopted and will come into effect in 2022, repealing Regulation 2003/2003.[192] The new regulation is expected to be more comprehensive when covering all types of fertilisers. Beyond this, the EU has adopted the precautionary approach and stand-still principles to introduce limit values in the production and use of fertilisers throughout the Community market.[193] For example, the quantity of cadmium must not exceed 1,5 mg/kg dry matter for organic fertiliser, 3 mg/kg dry matter for an organo-mineral fertiliser.[194]

Similarly, pesticides and other plant protection products throughout the EU must comply with conditions under Regulation 1107/2009 concerning the placing of those products on the market. With the precautionary principle, rules for the authorisation of plant protection products and their active substances have been set out to ensure the benefit of the human and animal health and the environment.[195] Further, one of the most important measures to achieve that objective is applying environmental risk assessment prior to

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[190] "The new fertiliser regulation – consequences for farmers | NUTRIMAN" <https://nutriman.net>.

[191] Michele Marini, Dario Caro and Marianne Thomsen "The new fertiliser regulation: A starting point for cadmium control in European arable soils?" (2020) 745 The Science of the total environment 140876 at 4.

[192] Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 (Text with EEA relevance) 170 OJ L, s 51 (CONSIL, EP US 2019).

[193] Marini, Caro and Thomsen, above n 195, at 6.

[194] Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 (Text with EEA relevance), 170 OJ L s Annex I.

[195] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC 309 OJ L, s 1 (CONSIL, EP US 2009).

pesticides' authorisation.[196] Generally speaking, the systems of fertilisers and plant protection products management appear to be similar in both the fundamental approaches and measures. Controlling those input means reducing and preventing the risk of non-point pollution in the first place.

3.3. Waste management

3.3.1. Directive 2008/98/EC on Waste

It is evident that such substance management law as REACH is impossible to prevent all the risks at their source; therefore, waste management is essential when the pollutants have already reached the environment. To this end, the most crucial piece of legislation is the Directive 2008/98/EC on waste that can be considered the Waste Framework Directive in the EU. This directive marked a significant move in the EU's approach to waste management from preventing uncontrolled disposal to preventing waste and encouraging the recovery of waste.[197] On that basis, a waste hierarchy has been introduced, respectively in a priority order: prevention, preparing for re-use, recycling, recovery, and finally, disposal as a last resort.[198] The European Parliament has further strengthened such recovery objectives with a new concept of a circular economy aiming to turn waste into resources.[199] Although Members shall take measures for the best overall environmental outcome, there is no specific legal binding in case of the violation of the hierarchy.[200]

In short words, the directive generally controls all forms of wastes, including from agricultural sources, to prevent its adverse impacts on the environment.

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[196] Sebastian Stehle and Ralf Schulz "Pesticide authorisation in the EU—environment unprotected?" (2015) 22 Environ Sci Pollut Res 19632 at 19633.

[197] Chris Backes "The Waste Framework Directive and the Circular Economy" in *Research Handbook on EU Environmental Law* (Edward Elgar Publishing, Cheltenham, UK, 2020) at 329.

[198] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance) of 2008 EP, CONSIL 32008L0098, EP, CONSIL, s 4 (European Community EP, CONSIL 2008).

[199] Giovanni Marin, Francesco Nicolli and Roberto Zoboli "Catching-up in waste management Evidence from the EU" (2018) 61 Journal of Environmental Planning and Management 1861 at 1862.

[200] Backes, above n 201, at 334.

Therefore, it also takes effect on the management of non-point pollution. Besides, not all agricultural waste will fall within the Directive' scope, for example, animal carcasses, straw and other non-hazardous farming material which do not harm the environment.[201]

3.3.2. Directive 86/278/EC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture

The Waste Directive clearly indicated the status of 'end-of-waste' in which waste ceases to be waste if it has undergone a recovery.[202] To that end, sewage sludge, which is the residue from the wastewater treatment process, is encouraged to be used in agriculture provided that all potential harmful effects must be prevented under the Directive 86/278/EC.[203] The purpose of this directive is to prevent adverse effects on soil, vegetation, animals and man by recommending the proper utilisation of sewage sludge.[204] In detail, the directive provides the upper yearly quantities of heavy metals and prohibits its member states from using sewage sludge where the concentration of such heavy metals exceeds the limit values.[205] Although setting out target-specific for sewage sludge uses as organic fertiliser, the directive does not rule the use of other organic and inorganic fertilisers.[206]

The Sewage Sludge Directive aims for agricultural purposes, therefore, it should be useful for mitigating water pollution. On the one hand, the Directive helps prevent the waste residues from entering water bodies. But if the sewage sludge used is contaminated, it otherwise exacerbates the water pollution status through non-point sources. To this end, the upper limit of

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[201] EP, CONSIL 32008L0098 s 2.

[202] *Ibid* s 6.

[203] D Fytili and A Zabaniotou "Utilization of sewage sludge in EU application of old and new methods—A review" (2008) 12 Renewable & sustainable energy reviews 116.

[204] Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture of 1986 CONSIL 31986L0278, CONSIL, s 1 (European Economic Community CONSIL 1986).

[205] *Ibid* ss 4, 5.

[206] Marini, Caro and Thomsen, above n 195, at 4.

heavy metals is established to control the sludge quality. Overall, such regulations could recycle the waste residues, thereby, reducing the fertiliser consumption which contribute to the management of non-point pollution.

3.4. Water quality targets

3.4.1. Nitrates Directive

Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources (or Nitrates Directive) adopted in 1991 is one of the EU's earliest statutes on water quality. This Directive is also the precursor of the Water Framework Directive that has then been considered flagship legislation in water protection.[207] The Directive's ultimate objective aims to improve water quality by reducing and preventing further nitrates contamination caused or induced by the agricultural sector.[208] Besides, it also contributes to the Sustainable Development Goals in the EU regarding water quality and pollution mitigation.

3.4.1.1. Regulatory approach

The Nitrate Directive solely concerns the protection of waters against agricultural sources of nitrate pollution. In detail, 'pollution' is defined as the discharge of nitrogen compounds from agricultural sources into the aquatic environment.[209] As can be seen, the above definition expressly shows the specific scope and subject of the Directive. Generally, the Directive provides member states two approaches to prevent nitrate pollution:

(1) Identifying specific vulnerable zones which could be, either currently or potentially, affected by pollution (nitrates content exceeds 50mg L^{-1}); or

[207] Cathal Buckley "Implementation of the EU Nitrates Directive in the Republic of Ireland—A view from the farm" (2012) 78 Ecological Economics 29 at 29.

[208] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources of 1991 CONSIL 31991L0676, CONSIL, s 1 (European Economic Community CONSIL 1991).

[209] *Ibid* s 2.

(2) Establishing and applying action programmes throughout the nationwide agricultural land.[210] This approach includes: Austria, Denmark, Finland, Germany, Lithuania, Ireland, Malta, Romania, Slovenia, the Netherlands, the Region of Flanders and Northern Ireland.[211]

The Nitrate Directive adopts a means-oriented regulation with a mixture of regulatory and non-regulatory instruments.[212] In both approaches, the water monitoring and identification of polluted water are the first steps to be exercised. The Directive merely set general provisions for designating nitrate vulnerable zones, national laws hold the responsibility for specific criteria. The Member States must implement mandatory action programmes that set minimum standards for farming to reduce nitrate pollution levels.[213] The action programmes should consist of a range of measures, such as, closed periods, balanced nitrates fertilization, limiting manure nitrogen application and N fertilisers on certain surfaces based on their geological conditions.[214] Precautionary principle is applied; thus, some detailed limitation has been set, such as a threshold of 170 manure-N/ha/year for vulnerable zones.[215] Besides, voluntary codes of good agricultural practice are also prescribed by the Directive to be available for all farmers in each national territory. Beyond this,

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[210] *Ibid* s 3.

[211] European Commission *Report from the Commission to the Council and the European Parliament on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2012–2015* (COM(2018) 257 Final 2018) at 9.

[212] Hans JM Van Grinsven, Aaldrik Tiktak and Carin W Rougoor "Evaluation of the Dutch implementation of the nitrates directive, the water framework directive and the national emission ceilings directive" (2016) 78 NJAS - Wageningen journal of life sciences 69 at 72.

[213] Jack, above n 165, at 173.

[214] GL Velthof and others "The impact of the Nitrates Directive on nitrogen emissions from agriculture in the EU-27 during 2000–2008" (2014) 468–469 Sci Total Environ 1225 at 1226.

[215] JJ Schröder and others "Permissible manure and fertiliser use in dairy farming systems on sandy soils in The Netherlands to comply with the Nitrates Directive target" (2007) 27 European journal of agronomy 102.

obliging the Nitrates Directive is one of the statutory requirements for farmers to receive subsidy payments from the CAP.[216]

However, the directive was supposed to not reach the expected achievements after 30 years of implementation due to many shortcomings. Although establishing vulnerable zones functions as the core concept, there are no unanimously agreed criteria and methodology for the adequate designation.[217] Difference in the way of designating vulnerable zones may result in unsatisfactory outcomes from this country to another.[218] There remain polluted areas that are not included in the system of Nitrate Vulnerable Zones.[219] Without common standards, disputes between the European Commission and Member States are inevitable. In Case C-69/99 *Commission v United Kingdom*, the Court of Justice of the European Union (CJEU) rejected the UKUK's intention to limit the vulnerable zones within water bodies for drinking uses.[220] When designating such zones, arguments have been on the source of nitrates contamination also, whether it shall be caused by agriculture alone or just a significant contribution of agricultural sources also counts. For Case C-293/99, where farmers challenged the United Kingdom, the CJEU rejected the farmers' interpretation which stated that vulnerable zones only apply to the contaminated area exclusively from agricultural sources.[221] A similar judgment was also adopted by the CJEU in Case C-416/02 *Commission v Spain*, re-confirming that the designation of

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[216] "Cross-compliance, Linking income support to respect for European Union rules", above n 174.

[217] Mercedes Arauzo and María Valladolid "Drainage and N-leaching in alluvial soils under agricultural land uses: Implications for the implementation of the EU Nitrates Directive" (2013) 179 Agriculture, ecosystems & environment 94 at 95.

[218] Mercedes Arauzo "Vulnerability of groundwater resources to nitrate pollution: A simple and effective procedure for delimiting Nitrate Vulnerable Zones" (2017) 575 Sci Total Environ 799 at 800.

[219] European Commission, above n 215, at 9.

[220] Barbara A Beijen "The implementation of area protection provisions from European environmental directives in the Member States" (2009) 5 Utrecht law review 101 at 109.

[221] Jack, above n 165, at 174.

those sites is mandatory if agriculture is a significant nitrate level source.[222] After 30 years, some research on study areas has shown that the effect of Nitrates Directive was insufficient either to mitigate the contaminated zones or to preserve the other high-quality water bodies.[223]

3.4.1.2. Non-regulatory approach

The Nitrate Directive adopts a means-oriented regulation with a mixture of regulatory and non-regulatory instruments. Besides regulatory measures, voluntary codes of good agricultural practice are also prescribed by the Directive to be available for all farmers in each national territory.[224] A code of practice should focus on reducing nitrate pollution by monitoring the fertiliser application, including procedures for fertiliser application, inappropriate periods, land conditions and terrain for applying fertiliser, livestock manure storage.[225] All certain provisions aim to prevent nitrates run-off into water bodies that are the primary factor of diffuse pollution. This is also the reason why the Nitrates Directive should play a key role in managing agricultural non-point pollution.

3.4.2. Water Framework Directive (WFD) and its daughter directives

The WFD is an EU's flagship legislation that provides the common principles and overall framework for the protection and sustainable use of all waters throughout Europe (inland surface waters, transitional waters, coastal waters and groundwater). By providing a comprehensive set of water quality objectives, the WFD approaches to the receptor-oriented principle, focusing on the point of impact, as opposed to the source-oriented principle, which

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[222] Beijen, above n 224, at 109.

[223] Arianna Musacchio and others "EU Nitrates Directive, from theory to practice: Environmental effectiveness and influence of regional governance on its performance" (2019) 49 Ambio 504 at 511.

[224] Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources of 1991 CONSIL 31991L0676, CONSIL, s 4 (European Economic Community CONSIL 1991).

[225] *Ibid* pt Annex II.

aims to the source of pollution.[226] The purposes of this Directive are extensive, but the centre is preventing further deterioration (non-deterioration principle), promoting the improvement and sustainable use of water bodies.[227] Among those purposes, surface waters and groundwater are two main focuses based on non-point pollution characteristics. The Directive introduces 'water status' to assess surface waters and groundwater based on different standards for each subject as below:

- Surface water status: determined by its *ecological status* and *chemical status*.[228]
- Groundwater status: determined by its *quantitative status* and *chemical status*.[229]

The norm of *'ecological status'* should be viewed as the core legal concept because it accurately assesses the structure and function of the aquatic ecosystems associated with surface waters. The ecological status of surface water is classified based on three quality elements: biological elements, hydromorphological elements and chemical (and physio-chemical) elements supporting the biological elements.[230] The ecological status classification shall be represented by the lower values of quality elements.[231] In other words, once any quality element fails to achieve 'good status', the whole body of water will fail too; therefore, that is the so-called "one out-all out approach".[232] Besides ecological status, the WFD also sets out the

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[226] Werner Brack and others "Towards the review of the European Union Water Framework Directive: Recommendations for more efficient assessment and management of chemical contamination in European surface water resources" (2017) 576 Sci Total Environ 720 at 722.

[227] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy of 2000 EP, CONSIL 32000L0060, EP, CONSIL, s 4 (European Community EP, CONSIL 2000).

[228] *Ibid* § 2(1)(7).

[229] *Ibid* § 2(1)(9).

[230] *Ibid* § Annex V, 1(1)(1).

[231] *Ibid* § Annex V, 1(4)(2).

[232] Henrik Josefsson and Lasse Baaner "The Water Framework Directive—A Directive for the Twenty-First Century?" (2011) 23 Journal of environmental law 463 at 472.

environmental objectives and quality standards to assess two other indicators: 'quantiative status' and 'chemical status'.

In order to achieve the requirements of good status, all member states must prevent pollution forms, including agricultural non-point sources, using the concept of river basin planning. It can be said that river basin management is a key approach under the WFD. For that reason, a programme of measures, including basic measures and supplementary measures where necessary, must be established for each river basin district. Such basic measures consist of the minimum requirements under other Community legislation, most notably the Nitrate Directive. [233] Further, the prevention and control of non-point pollution sources based on pollutants' input are also prescribed as a primary measure. It can be a prohibition on the input of certain pollutants into the watercourse, but if the EU's legislation does not contain such a requirement, general binding rules should be applied.[234] Beyond this, where a mere set of basic measures fails to reach environmental objectives, supplementary measures should be designed to provide additional protection and improvement of water bodies.[235] WFD's monitoring programmes and network will determine the compliance with three types for different objectives: surveillance monitoring, operational monitoring and investigative monitoring (only for surface water).[236]

A noticeable question is how the river basin management is structured. The case of Italy should be a good example, particularly for Vietnam to imitate. Italy used to run a decentralization system, in which the central government prescribed the legislative framework and various local actors held responsible for environmental issues. Under the WFD, Italy conducted an institutional reform with the Environmental Code dividing their territory into eight River

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[233] *Ibid* § 11(1), 11(2), 11(3).

[234] *Ibid* § 11(3)(h).

[235] *Ibid* § 11(4).

[236] JG Ferreira and others "Monitoring of coastal and transitional waters under the EU Water Framework Directive" (2007) 135 Environ Monit Assess 195 at 196.

Basin Districts. Each basin authority consists of an institutional committee (with a General Secretary, representatives of all relevant ministries, regional administrations) and a technical committee.[237]

Generally speaking, WFD helps compensate the Nitrate Directive's flaw, which is considered a lack of target-orientation.[238] More importantly, while the Nitrogen Directive solely refers to managing nitrogen sources of pollution, the Water Framework Directive broadly covers all aspects of water pollution, which might include phosphorus and other sources of eutrophication. However, WFD has also exposed a number of shortcomings during its implementation in the EU. The WFD has been criticized for concentrating on restoring pristine states of water bodies instead of aiming for the future.[239] The conflict occurred in the United Kingdom case when the UK believed that 90% of its freshwaters would meet WFD requirements; but the actual number turned out to be only 30% because the Member States later agreed on the criteria of pristine status.[240]

WFD provided many inadequate definitions of its norms that have led to disagreements between the Member States during the implementation.[241] For example, WFD did not contain a threshold for good quality status and non-deterioration principle.[242] In Case C-461/13 Bund v Germany (Weser case), a German court requested the Court of Justice of the European Union (CJEU) ruling on a permit for deepening the river Weser which might endanger the surface water status. The case was whether the preventing deterioration

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[237] Emilia Pellegrini, Lucia Bortolini and Edi Defrancesco "Unfolding the Water Framework Directive Implementation at the River Basin District Scale: An Italian Case Study on Irrigation Measures" (2019) 11 Water 1804 at 4.

[238] William Howarth "Diffuse Water Pollution and Diffuse Environmental Laws" (2011) 23 Journal of environmental law 129 at 132.

[239] Henrik Josefsson and Lasse Baaner, above n 236, at 476.

[240] Taylor, above n 182, at 428.

[241] At 428.

[242] Henrik Josefsson "The Environmental Liability Directive, the Water Framework Directive and the Definition of 'Water Damage'" (2018) 20 Environmental Law Review 151 at 157.

concept under Article 4(1)(a) should be applied only to the whole river basin classification or within a class also? Eventually, the CJEU judged that as soon as one quality element fell by one class, a violation of the non-deterioration threshold had occurred.[243]

Other problems are also called into question. For instance, whether the 'one out – all out' approach complies with the WFD's ecosystem approach while the whole status depends on a single indicator. Lacking a precise structure, it takes significant time and effort for the Member States to implement required programmes and the number of water bodies under monitoring has been limited. Besides, the environmental objectives are supposed to be too narrow to integrate or even conflict with other policies.[244] Eventually, the overall progress has failed to achieve the expectation,[245] particularly the objective of all waters in good status by 2015.[246]

WFD has its daughter directives triggering extensive monitoring on water bodies in Europe, including Environmental Standards Directive (ESD) and Groundwater Directive.[247] Accordingly, those directives focus on assessing the chemical status of surface water and groundwater in line with the WFD's approach and objectives. With respect to surface water, ESD set out quality standards for priority substances and pollutants that have been prescribed under WFD, aiming for good surface water chemical status.[248] The

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[243] Tiina Paloniitty "The Weser Case: Case C-461/13 BUND V GERMANY" (2016) 28 Journal of environmental law 151 at 156.

[244] Theodoros Giakoumis and Nikolaos Voulvoulis "The Transition of EU Water Policy Towards the Water Framework Directive's Integrated River Basin Management Paradigm" (2018) 62 Environ Manage 819 at 825, 826.

[245] See further *1.3. Status of Water Pollution* of this Thesis.

[246] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy of 2000 EP, CONSIL 32000L0060, EP, CONSIL, s 4(1)(a)(ii) (European Community EP, CONSIL 2000).

[247] Brack and others, above n 230, at 722.

[248] Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending

concentration of listed substances and pollutants, particularly metals, cadmium, hydrocarbons and some pesticides as well, are limited with two types of thresholds that are 'average concentration' over a 1-year period and 'maximum allowable concentration'.[249]

Another statute, Directive 2006/118/EC on the protection of groundwater against pollution and deterioration (Groundwater Directive), was adopted as a response action to fulfil Article 17 of WFD.[250] This Directive aims to protect groundwater against pollution, a valuable natural resource and the most sensitive body of freshwater in the EU. The Directive further interprets WFD in terms of the good groundwater chemical status through specific sets of criteria.[251] Subsequently, the pollutants regulated under WFD are identified and listed in points 1-6 of Annex VIII of the Groundwater Directive. Further, these statutory pollutants include nitrates and phosphates, which are significant elements of fertiliser production.[252] In order to achieve the above objective, it is required by the Directive to establish the programme of all essential measures to prevent inputs of hazardous substances into groundwater.[253] Indeed, despite the water quality standards, the potential emission reduction at the source is often used to assess the non-point pollution control, rather than based on the reduction in contamination concentration in water bodies.[254]

Directive 2000/60/EC of the European Parliament and of the Council of 2008 EP, CONSIL 32008L0105, EP, CONSIL, s 1 (European Community EP, CONSIL 2008).

[249] "Environmental quality standards applicable to surface water" <https://eur-lex.europa.eu>.

[250] "River basin management - Water - Environment - European Commission" <https://ec.europa.eu>.

[251] Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration of 2006 EP, CONSIL 32006L0118, EP, CONSIL, s 1 (European Community EP, CONSIL 2006).

[252] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy of 2000 EP, CONSIL 32000L0060, EP, CONSIL (European Community EP, CONSIL 2000).

[253] EP, CONSIL 32006L0118 s 6.

[254] Peña-Haro and others, above n 181, at 174.

3.5. Environmental Impact Assessment

The preventive principle can be conducted through many techniques, among which an EIA shall be a cornerstone. Accordingly, the EIA can contribute to non-point pollution management when it is applied to agricultural projects. The EU's EIA legislation has been through some reviews and amendments,[255] before the current system under the Directive 2011/92/EU (amended by the Directive 2014/52).[256] The EU has developed EIA as part of consent procedures regarding projects likely to impact the environment significantly.[257] During the process, one requirement that must be fulfilled at the early stage is public participation and consultation – among the most important part to qualify a proper EIA.[258] Accordingly, the competent authority must make the EIA report available with other efficient information to the public for review within reasonable time-frames.[259] Whether to grant or refuse, the decision needs to be promptly informed to the public.[260] The public here refers to every non-governmental organisation and individual interested in, without any restriction to anyone.[261] More importantly, public opinion should be taken into account because anyone may challenge the legality of EIA decisions before a court or another body of law.[262] The regulations above shall take effect in managing non-point pollution when it comes to an agricultural project. For that purpose, if a project is likely to cause diffuse sources such as livestock manure or fertiliser residues, the

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[255] Matthias Keller "EU Environmental Impact Assessment: frequently asked questions by domestic legal practitioners" (2019) 19 ERA Forum 551 at 553.

[256] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance of 2012 CONSIL, EP 32011L0092, CONSIL, EP (2012).

[257] Agustín García-Ureta "Environmental Impact Assessment in the EU: More than only a Procedure?" in (Edward Elgar Publishing, Cheltenham, UK, 2020) at 165.

[258] Qiaoling Chen, Yuanzhi Zhang and Ari Ekroos "Comparison of China's Environmental Impact Assessment (EIA) Law with the European Union (EU) EIA Directive" (2007) 132 Environmental Monitoring and Assessment 53 at 63.

[259] CONSIL, EP 32011L0092 s 6.

[260] *Ibid* at 9.

[261] *Ibid* s 1.2.

[262] *Ibid* s 11.

developer must apply all available measures to control them; otherwise, the project shall be rejected.

3.6. Summary

The European legislation has long established a framework for managing non-point pollution with three branches: substance management, waste management, and environmental targets. A number of essential acts are introduced, such as REACH, Waste Directive, Sewage Sludge Directive, and two flagship pieces, Nitrates Directive and Water Framework Directive. Nitrates Directive is the means-oriented regulations with the Nitrate Vulnerable Zone tool. Meanwhile, the WFD provides target-oriented regulations to set the status standard for both surface and underground water. The role of ND in managing non-point sources is substantial. It promotes a voluntary code of practices restricting major activities that are likely to cause diffuse pollution. Vietnam may need this form of code of practices to prevent non-point pollution. Although the ND and WFD is an ideal combination, several problems have been exposed. For example, the ND raised disputes in the designation of vulnerable zones, while WFD similarly contains many inadequate definitions, such as a water status threshold. WFD further has its daughter directives that provide extensive monitoring on water bodies, including Environmental Standards Directive and Groundwater Directive. Though, the ND and WFD contain inadequate criteria leading to some disputes. For example, the cases of the vulnerable zone designation, cases of the 'one out – all out' approach. Those disputes are valuable lessons for other countries like Vietnam if they want to imitate the EU's system. The EU has also suggested an instrument to apply the preventive principle that is EIA. Particularly, the EU's EIA regulations empower public participation which seems to be very weak in Vietnam's (and even New Zealand's) systems.

CHAPTER 4. NEW ZEALAND'S LEGISLATION

4.1. Introduction

New Zealand water management experienced a shift from the matrix of Maori customary law and English common law to statutory law.[263] The very first statutory responses of New Zealand government to the water problem dated back in the 1870s with the Public Health Act 1872, the Municipal Corporations Act 1876, the Forests Acts 1874 and numerous drainage acts.[264] The system had been reformed since the 1940s under the pressure of industrialised farming, and a number of actions were released such as the Soil Conservation and Rivers Control Act 1941, the Waters Pollution Act 1953.[265] So far, New Zealand legislation has adopted her approach to water pollution through three systems that are water quality target, substance management, and waste management. Such a three-layer approach can be compared to the regulatory system in the EU. However, that separation of three layers in New Zealand is unobvious because the Resource Management Act (RMA) 1991 is sufficiently extensive and comprehensive to cover all major environmental components (land, air, water) and activities. In other words, the RMA plays the central role in water pollution control with additional instruments from other acts such as the Hazardous Substances and New Organism Act 1996, the Agricultural Compounds and Veterinary Medicines 1997, the Waste Minimisation 2008.

4.2. Resource Management Act 1991 and its planning framework

4.2.1. Resource Management Act 1991

In 1991, New Zealand enacted the Resource Management Act (RMA), which became an integrated and comprehensive statute of environmental

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[263] Nicola Wheen "A natural flow—a history of water law in New Zealand" (1997) 9 Otago law review 71 at 72.

[264] New Zealand Institute of Economic Research [NZIER] *Water management in New Zealand: A road map for understanding water value* ((NZIER, Public Discussion Paper, Working Paper 2014/01, March 2014)) at 18.

[265] At 19.

management that repealed "more than 20 major statutes and 50 other laws relating to the environment" by that time.[266] Prior to the RMA 1991, land and water management in New Zealand was regulated under a horizontal system with different statutes, such as the Soil Conservation and Rivers Control Act 1941 (amended 1967), the Clean Air Act 1972 the Town and Country Planning Act 1977.[267] Therefore, the birth of RMA was also viewed "groundbreaking" when integrating land, air and water under a single statute and then becoming model legislation for other countries.[268] Moreover, the act has an obligation to respect the interest of Maori - a constitutional principle in New Zealand under the Treaty of Waitangi that should be a part of the decision-making process under the RMA.[269] The first and foremost RMA's principle is managing resources with the approach of sustainability. At Section 5, the Act expresses its ultimate objective to advance the sustainable exploitation of natural and physical resources, safeguarding the life-supporting capacity of air, water, soil, and avoiding/remedying/mitigating adverse effects on the environment.[270] With sustainable management, the RMA creates "a bottom line protection" for water (and other resources), where some activities of environmental exploitation shall be rejected regardless of benefit they may bring to humans.[271]

Under the RMA, the underlying rule for managing sources of non-point pollution is described as followed: any activities towards the use of land, water and the discharges of contaminants into the environment are prohibited

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[266] Barbara H Valentine "New Zealand farmers and environmental legislation" (Masters, Massey University, 2015) at 29.

[267] Connie Bollen "Managing the adverse effects of intensive farming on waterways in New Zealand—regional approaches to the management of non-point pollution" (2015) 19 New Zealand Journal of Environmental Law 239 at 213.

[268] Peter Salmon and David Grinlinton *Environmental Law in New Zealand (2nd edition)* (Thomson Reuters New Zealand Ltd, Wellington, AUSTRALIA, 2018) at 583.

[269] At 603.

[270] Resource Management Act 1991, s 5.

[271] Nicola R Wheen "The Resource Management Act 1991: A 'Greener' Law for Water?" (1997) 1 New Zealand journal of environmental law 165 at 182.

unless expressly allowed under other by-law regulations as policy statements, national standards or plans.[272]

4.2.1.1. Hierarchy of responsibilities

By introducing sets of standards to monitor the outcome effects of activities, the RMA's approach has been so-called an effect-based system.[273] The RMA establishes a hierarchy of responsibilities and planning framework from national to regional scale:

- National level: National Environmental Standards, National Policy Statements, National Planning Standards.
- Regional level: Regional Policy Statements, Regional Plans
- District level: City and District Plans.[274]

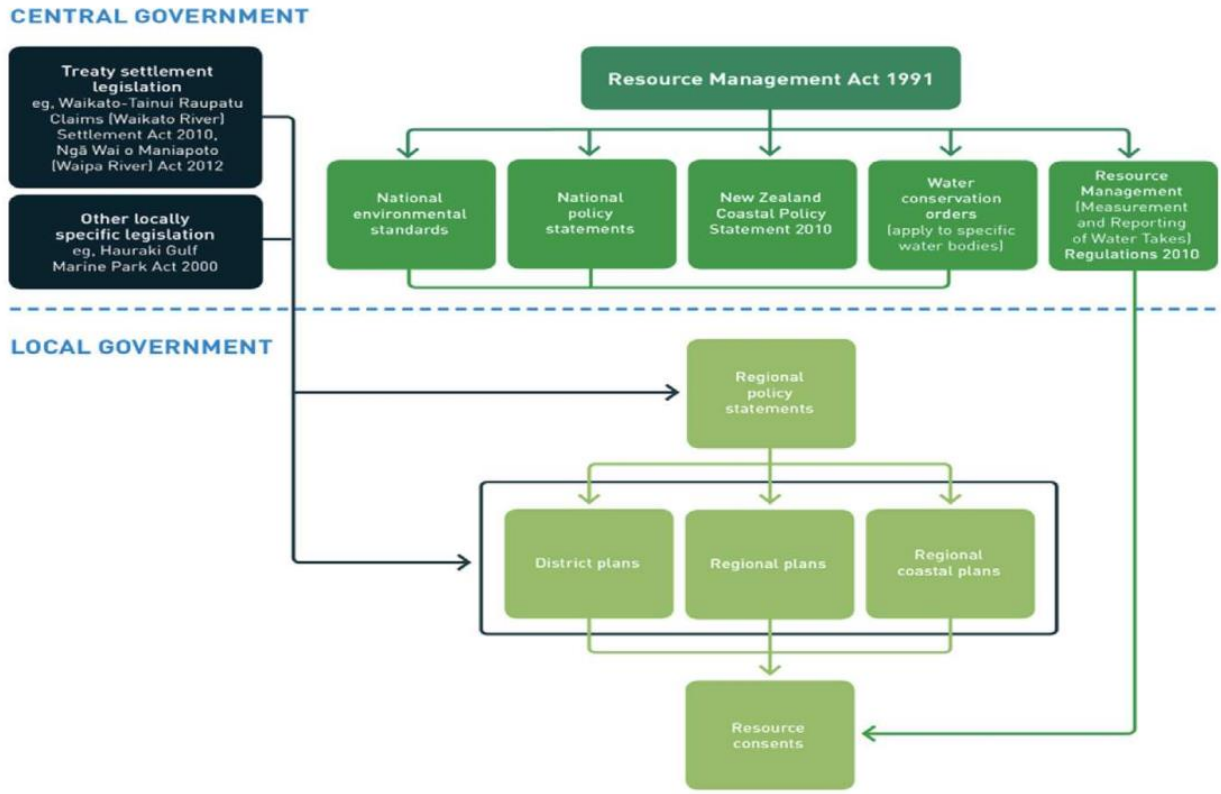

Figure 2.1. Water governance framework in New Zealand (Source: Andrew Fenemor[275])

[272] Resource Management Act 1991 s 9,14,15.

[273] Catherine Dearsley "Cadmium levels from fertiliser in soil and food: The adequacy of New Zealand's law and policy" (2015) 19 New Zealand Journal of Environmental Law 241 at 254.

[274] Salmon and Grinlinton, above n 272, at 611.

[275] Andrew Fenemor "Water governance in New Zealand – challenges and future directions" (2017) 3 New water policy & practice 9 at 14.

Structurally, the central government takes charge of setting out national bottom lines according to which regional authorities shall respect. Thus, the water quality of specific bodies is monitored and preserved under correspondingly regional plans and policies.[276] Those policies and plans have different objectives and operation, providing an overview of the resource management in each region or area and assisting territorial authorities to conduct their functions. At the local level, integrated management of the resources is a mandatory requirement by the RMA, further emphasizing the control of land use for the purpose of maintaining and improving water bodies.[277]

Despite the environmental improvements in some areas, B.R. Jenkins has indicated two significant problems of the RMA regarding non-point pollution. The first shortcoming is that government under the RMA functions as "the regulator of effects rather than the planner of activities" which has not contributed to strategic water management. Secondly, the RMA fails to tackle accumulative effects from multiple or diffuse sources. It is because of the separation of power in land-use decisions, and further, the resource consent is insufficient to monitor cumulative contamination in intensive farming.[278] The RMA has lately gone through substantial changes under the Resource Management Amendment Act 2020. Overall, the amendment aims to reduce the complexity of the RMA 1991, strengthen the enforceability, notably through the consenting process and environmental court. A new freshwater planning process came into force from 1 July 2020 that allows competent authorities to review multiple resources concurrently. Besides, fertilisers are

[276] Bollen, above n 271, at 215, 216.

[277] Resource Management Act 1991 s 30(1)(a),(c).

[278] Bryan R Jenkins and Bryan R Jenkins *Water management in New Zealand's Canterbury region: a sustainability framework* (Dordrecht, The Netherlands : Springer, 2018) at 27.

also more strictly controlled with the required report on their sales in the market.[279]

4.2.1.2. Resource consent and Environmental impact assessment

Water quality shall be protected through permitting process both land-use activities and waste discharges, including from non-point sources. Such process is prescribed under the RMA as a resource consent that is mandatory for most activities towards natural resources, notably a land-use permit, a water permit and a discharge permit regarding non-point pollution.[280] The application for resource consent must include an assessment of environmental effects.[281] In other words, EIA or assessment of environmental effects is compulsory in New Zealand, because the authority will reject an application for resource consent unless it is accompanied by an EIA.[282] As an underlying principle of the RMA, public participation is also essential for the EIA process in New Zealand. Generally, public participation must be conducted at the early stage and in a transparent and two-way process.[283]

A permitted activity, which complies with the requirements under the RMA Act and its daughter regulations and plans, needs not to go through a resource consent.[284] Basically, the duration of consent shall not exceed 35 years; but if a period is not specified on the permit, a default duration of five years shall be applied.[285] Although such flexibility in the duration may be essential for any project to adapt, it has raised controversial arguments. On the one hand, the legal basis for a short-term permit is vague, bringing before the court if sufficient reasons are not provided. On the other, short-term consent may

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[279] Ministry for the Environment "Overview of changes introduced by the Resource Management Amendment Act 2020" [2020] 3.

[280] Resource Management Act 1991 s 87(a),(d),(e).

[281] *Ibid* s 88(2),(3).

[282] Ministry for the Environment *A Guide to Preparing a Basic Assessment of Environmental Effects*.

[283] "An everyday guide: Consultation for resource consent applicants | Ministry for the Environment" <www.mfe.govt.nz>.

[284] Resource Management Act 1991 s 87A(1).

[285] *Ibid* s 123.

discourage sustainable management because the permit holders are unwilling to invest in permanent facilities for the benefit of the environment.[286] Further, the flexibility in resource consent also allows the transfer of water permits in the same catchment[287], and of discharge permits in the same region[288]; but a land use consent shall attach to the permitted site.[289]

4.2.2. National Environmental Standard

A critical piece of national direction under the RMA 1991 is the national environmental standards (NES) that set out technical standards, methods or requirements regarding all environmental components.[290] The standards enacted by the Ministry for the Environment may include prohibition or allowing provisions (permitted activities) involved with resource consent.[291] Before 2020, there have been six NESs in effect. However, none of them related to freshwater quality including (1) Air quality, (2) Sources of Human Drinking Water, (3) Telecommunication Facilities, (4) Electricity Transmission Activities, (5) Assessing and Managing Contaminants in Soil to Protect Human Health and (6) Plantation Forestry. The most relevant management of non-point pollution should be the NES for managing contaminants in soil that ensures the land safe for human use by "providing a nationally consistent set of planning controls for contaminated land".[292] It was not until 2020 that the National Environmental Standards for Freshwater was established and came into force on 3 September 2020.[293] The NES for Freshwater is an overarching approach to protect water quality by proposing

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[286] Bal Matheson and David Alley "Please, sir, I want some more" [2015] Resource Management Act 1991 (New Zealand) 1 at 4.

[287] Resource Management Act 1991 s 136.

[288] *Ibid* s 137.

[289] *Ibid* s 134.

[290] *Ibid* s 43.

[291] *Ibid* s 44.

[292]." Dearsley, above n 277, at 258.

[293] "National Environmental Standards for Freshwater | Ministry for the Environment" <www.mfe.govt.nz>.

standards for farming activities and other activities relating to freshwater mainly through sets of permitted/restricted or discretionary activities.[294] More importantly, further agricultural intensification shall be restricted by temporary standards until 1 January 2025 under the NES for Freshwater 2020. Such standards cover a range of intensive farming activities that are converting plantation forestry to pastoral land use, or land on farm to dairy farmland, irrigating dairy farmland and using dairy support land. [295] Such NES deeply concerns the discharge of synthetic nitrogen fertiliser that must not exceed the nitrogen cap.[296] Other activities that do not comply with the condition, so-called non-complying activity, shall report their use of synthetic nitrogen fertiliser as a requirement for granting resource consent.[297]

Stock Exclusion Regulations 2020 is another remarkable piece of legislation recently passed regarding non-point pollution.[298] The regulations set 3-metre setback rule in which stock must not come closer than 3 metres to the edge of a lake or river bed. Non-compliance with the regulations might be subject to a fine of 100 NZD per animal (up to 2,000 NZD), or 2000 NZD per person, or 4,000 NZD per non-natural person.[299] The Stock Exclusion is supposed to stop animal waste and manure from entering water bodies, thereby the water health is restored.

4.2.3. National Policy Statement

The implementation of the RMA 1991 had been criticised for lacking national support until the set of National Policy Statements (NPS) were enacted

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[294] Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (LI 2020/174) pts 2, 3 (New Zealand).

[295] "National Environmental Standards for Freshwater | Ministry for the Environment", above n 297.

[296] Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (LI 2020/174) (as at 28 August 2020) Contents – New Zealand Legislation s 33.

[297] *Ibid* s 34.

[298] Resource Management (Stock Exclusion) Regulations 2020 (LI 2020/175) Contents – New Zealand Legislation (New Zealand).

[299] *Ibid*.

according to Section 52(2) of the RMA.[300] These regulations are recommended by the Minister for the Environment to achieve the purpose of the RMA Act; therefore, although they may be in wide-ranging circumstances, an NPS must relate to the national significance.[301] The list of national policy statements in effect consists of (1) Urban Development Capacity, (2) Freshwater Management, (3) Renewable Electricity Generation, (3) Electricity Transmission, and (4) Coastal Policy Statement. In terms of agriculture as non-point pollution sources, the most significant NPS shall be the NPS on Freshwater Management (NPS-FM).

The NPS-FM was first introduced in 2011 to support regional councils to preserve watercourses.[302] Three years later, the second NPS-FM 2014 (then amended 2017) brought about new changes aiming to overcome existing shortcomings in the previous statement.[303] The objective to be achieved under the NPS-FM was relatively overarching, involving to (1) safeguard the health of the ecosystem and human, (2) maintaining and improving water quality within the management unit, (3) ensure suitable freshwater for primary contact, and (4) enable the economic well-being and opportunities.[304] The most notable provision – National Objective Framework - has connected regional councils and communities with a transparent and reliable relation which has helped achieve the objectives.[305] By identifying freshwater management units within every region, the NOF guided each unit to reach at least the national bottom lines with a nationally

[300] Fenemor, above n 279, at 15.

[301] Salmon and Grinlinton, above n 272, at 612.

[302] "History of the National Policy Statement for Freshwater Management | Ministry for the Environment" <www.mfe.govt.nz>.

[303] National Policy Statement for Freshwater Management 2014 (Ministry for the Environment) s CA (New Zealand).

[304] *Ibid* s A.

[305] Bollen, above n 271, at 217.

consistent approach.[306] Specific targets and implementation methods shall be applied. It can be regulatory methods to set the target for water quality or contaminant limits before allowing discharges; for example, the maximum quantity of nutrients that may be discharged into the water.[307] Other non-regulatory methods, such as good management practice, catchment works, were also encouraged. Overall, the NPS-FM provided regional councils with a standard specific process to develop their regional objectives for water management.[308]

The latest piece – NPS-FM 2020 – has replaced the NPS-FM 2014 (amended 2017) and come into force on 3 September 2020. Besides two existing compulsory values – ecosystem health and human health, the new statement has added two additional values that are threatened species and Mahinga kai (freshwater species are safe to harvest and eat).[309] The national bottom line maintains its core role under the NPS to preserve and improve water bodies within management units; and for such contaminants like ammonia and nitrate toxicity, the lines are multiple times tougher compared to the previous standard.[310] Further, a range of new attributes has been introduced, for example, submerged plants, river fish, macroinvertebrates, sediment, dissolved oxygen, reactive phosphorus, and ecosystem metabolism.[311] Those attributes contribute to the ecosystem health, therefore, requiring action plans that can be prepared for part or whole or multiple FMUs to achieve environmental outcomes.[312] Moreover, the NOF also develops the concept of

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[306] National Policy Statement for Freshwater Management 2014 (Ministry for the Environment) s CA1.

[307] Valentine, above n 270, at 42.

[308] Marija Batistich and Natasha Garvan "What is new for freshwater?" (2014) 88 New Zealand winegrower 78 at 78.

[309] National Policy Statement for Freshwater Management 2020 (Ministry for the Environment) s Appendix 1A (New Zealand).

[310] *Ibid* § Appendix 2A: Table 5,6; as compared to Appendix 2 National Policy Statement for Freshwater Management 2014.

[311] *Ibid* s Appendix 2B.

[312] *Ibid* s 3.15.

environmental outcomes that must be included as objectives in regional plans.[313]

4.2.4. Regional and district level

In the hierarchy of administration, the regional and district councils have the responsibility to interpret and administer the legislation. Therefore, the practice of agriculture in terms of controlling non-point pollution can be under those regulations. At the regional and territorial level in New Zealand, it is required by the RMA 1991 for the authorities to adopt regional policy statements, regional plans and city/district plans. The principal obligation of 16 regional councils is to "give effect" to the NPS (to achieve the purposes) within their territories through establishing integrated management of the region's resources.[314] A regional policy statement shall conclude the objectives, policies and methods to achieve the targets, particularly when relating to cross-boundary issues.[315] Under the regional policy statement, regional and district plans are supportive instruments to implement the policies. Because the RMA and the national/regional policies are typically described in extensive terms, many specific matters akin non-point pollution shall be handled by such local plans. A regional plan could include the restriction of land use (i.e. pastoral or dairy farming), or the management of specific activities like fertiliser use. Some remarkable approaches can be seen in two major agriculture hubs Waikato and Canterbury region.

4.2.4.1. Waikato

The Waikato Regional Plan has proposed specific regulations on watercourses and non-point discharges in Chapter 3 of the water module.[316] The Waikato Council uses three following fundamental policies:

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[313] *Ibid* s 3.7.

[314] Fenemor, above n 279, at 16.

[315] Resource Management Act 1991, s 61.

[316] Bollen, above n 271, at 222.

(1) Land use effects: identifying land-based activities the origin of non-point discharges, then minimizing their adverse effects such as contaminant leaching and run-off (from fertilisers, agrichemical, residues, sediment, faecal matter), and bank erosion.
(2) Streamside management: improving water quality through enhancing aquatic ecosystems, adopting appropriate riparian vegetation, strengthening bank stability.
(3) Livestock access to water bodies: restricting the livestock access to water bodies because it is attributed to a cumulative deterioration of aquatic habitat. Streamside management can be applied here by planting tree fences and managing grazing.[317]
A set of non-regulatory methods and permitted activity rules to conduct the above policies. Non-regulatory methods can include good practices, environmental education, economic incentives, nutrient research and others. Meanwhile, permitted activity rules mostly apply to fertiliser application.[318] Accordingly, the discharge of fertiliser to land is permitted provided that it complies with certain conditions. In case the fertiliser rate exceeds 60kg/N/ha/year, a nutrient management plan must be prepared. Also in that plan, nitrogen fertiliser is a core component to be handled under a further guidance note for its use.[319]
A non-regulatory approach is a long-term direction for changing behaviour that Waikato Regional Council is taking apart from Lake Taupo Catchment. Due to Taupo's importance, a regulatory approach is combined, notably with the nitrogen cap-and-trade scheme.[320] The cap places limits on the annual average amount by enabling low nitrogen leaching activities (with specified

[317] Waikato Regional Plan s 3.9 (New Zealand).
[318] *Ibid* s 3.9.4.11.
[319] *Ibid* s 3.9.7.
[320] Bollen, above n 271, at 226.

limits) and managing other activities through OVERSEER model.[321] Each property is subject to a nitrogen discharge allowance determined by OVERSEER; and consents shall be granted with a common expiry date of 31 July 2036.[322] More importantly, Waikato council introduces an initiative of nitrogen trading that allows landowners to trade their allowances. Such mechanism enables flexibility through redistributing nitrogen allowances, while ensuring the overall discharge limits in Lake Taupo catchment.[323]

Education and advocacy are key approaches under the Waikato Regional Plan. Waikato Council promotes environmental education programmes to raise community awareness about water management. To prevent non-point source discharges, a program's content should cover the need for streamside management, the livestock exclusion from rivers, methods of fertiliser application, or appropriate plants for riparian areas.[324] That information are useful for local communities and groups to tackle diffuse pollution.

4.2.4.2. Canterbury

Canterbury was put under a special paradigm when the Government passed the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 to re-structure the water management regime. The Act brought the Canterbury Natural Resources Regional Plan into effect after an eight-year delay.[325] Non-point pollution is an important part of the Plan with Policy WQL (Water Quality) 5.1 and 10 on non-point discharges to surface and groundwater. Both policies aim to minimize the non-point source contaminants by promoting the change of land-based activities, such as, all

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[321] A science model, owned by the Ministry for Primary Industries, the Fertiliser Association of New Zealand and AgResearch Limited, helps farmers and growers understand the effects of their nutrient management practices on-farm. *See further* Ministry for Primary Industries "Overseer | MPI - Ministry for Primary Industries A New Zealand Government Department" <www.mpi.govt.nz>.

[322] Waikato Regional Plan s 3.10, Policy 3.

[323] *Ibid* s 3.10, Policy 14.

[324] *Ibid* at 3.9.4.2.

[325] Peter Constantine and others "Integrated land and water planning in a challenging environment" 5 at 2.

livestock should be restricted from all water bodies if it is practicable. Best management practices are also encouraged to mitigate the nutrient leaching rates.[326] The policies are further supported by Rule WQL 19 and 25 that control the discharge of fertiliser and animal effluent onto land.[327] In general, the Canterbury's plan chose a similar approach with the Waikato Regional Plan through the mixture of permitted activity rules and non-regulatory methods.

However, the Natural Resources Regional Plan was considered inadequate to improve the water quality.[328] Therefore, the Canterbury Land and Water Regional Plan have replaced since 2018, covering separate policies and rules for ten catchment areas within Canterbury region.[329] Non-point pollution control keeps playing a significant role under the new plan, and the fundamental principles in managing such pollution also remain unchanged.

4.2.5. Controversy on changes in 2020

New Zealand Government has introduced significant changes to the NES for Freshwater, NPS-FM and new Stock Exclusion Regulations. Those together provide more integrated rules on water bodies, wetlands, intensive winter grazing, intensification, and stock farming. New rules strengthen national bottom lines to increase the rate of water species protection from 80% to 95%. Livestock must be kept out of certain waterways. Dairy farmers shall comply with a nitrogen cap of 190 kg/ha/year and need to report their fertiliser use to the regional council once a year. Though, the delay of a national bottom line for dissolved inorganic nitrogen has raised public criticism from those fighting for environment.[330] Conversely, agricultural

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[326] Canterbury Natural Resources Regional Plan 51, 79 (New Zealand).

[327] *Ibid* at 229, 234.

[328] Constantine and others, above n 329, at 2.

[329] Canterbury Natural Resources Regional Plan.

[330] "Government unveils freshwater reforms; delays controversial decision on nitrogen bottom line; allocates more funding towards the programme than it would've pre-covid" (28 May 2020) interest.co.nz <www.interest.co.nz>.

producers, particularly the dairy sector, also opposed the over-stringent rules. Some predicted the nationwide production would suffer a large cutback when farmers simultaneously handle with a cap on inputs and restrictions on outputs of nitrogen.[331]

4.3. Management of substances and waste

4.3.1. Hazardous Substances and New Organisms Act (HSNO) 1996 and Agricultural Compounds and Veterinary Medicines Act (ACVM) 1997

These two acts of law have been in a very close relationship since they were adopted because they are complementary to each other. Specifically, a range of areas is linked to both acts, for example, if an agricultural compound also includes hazardous substances.[332] The purpose of the ACMV is to control the risks of using agricultural compounds and veterinary medicines for public health, trade, animal welfare and agricultural security.[333] The ACVM's enactment has replaced the Stock Foods Act 1946, the Animal Remedies 1967 and the Fertilisers Act 1982. As previously referred, there are two major concerns of the ACVM that are agricultural compounds and veterinary medicines; but indeed, the former also includes any veterinary medicine according to its interpretation.[334]

Some classes of such compounds that may contribute to agricultural non-point pollution are agricultural chemicals, soil conditioners, plants biostimulants, and most notably, fertilisers. The use of the major source, fertilisers, is regulated under the ACVM Act 1997 as a group of agricultural compounds. The common principle to follow is that all compounds must be authorised under the ACVM before placing on the market. Accordingly, the mechanism of assessment and registration shall be applied to those products,

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331 "Some improvements seen in freshwater policy" (17 June 2020) Otago Daily Times Online News <www.odt.co.nz>.

332 W Hughes "The outlook for regulatory control of agricultural compounds" (2000) 53 Agricultural Compounds and Veterinary Medicines Act 1997 (New Zealand) 441 at 441.

333 Agricultural Compounds and Veterinary Medicines Act 1997, s 4.

334 *Ibid* s 1(a).

though there are certain exemptions provided with specified conditions. Moreover, additional conditions regarding substances, systems, customer's behaviours, may be imposed, if necessary, to manage the risks.[335] Generally, it is the Ministry for Primary Industries' responsibility to manage the risks of such contaminant compounds as fertiliser and ensure the food safety standards.[336]

On the other hand, the purpose of the HSNO Act is to protect the environment, with human health and safety at the centre, by preventing or managing the harmful effects of new and existing hazardous substances. The Act introduces a preventive approach to hazard management, such as pesticides, based on their characteristics.[337] Beyond this, the precautionary approach is also expressly prescribed to follow where there is scientific and technical uncertainty about the hazardous effects.[338] Like the ACVM Act's main instruments, assessment and registration play an essential role under the HSNO Act, particularly with the establishment of the Environmental Risk Management Authority to decide on applications.[339] Accordingly, one substance can be manufactured or imported only if it is approved through the HSNO assessments. Moreover, some agricultural compounds may be considered hazardous substances, and that is where the ACVM Act and HSNO Act overlap with each other. In that case, it is mandatory for such product to get permission under both acts. On that basis, the HSNO Act is able to contribute to the management of contaminants obtained in the agricultural sector.

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[335] *Ibid* s 4A.

[336] Catherine Dearsley "Cadmium levels from fertiliser in soil and food: The adequacy of New Zealand's law and policy" (2015) 19 New Zealand Journal of Environmental Law 241 at 272.

[337] Catherine J Iorns Magallanes “Permitting Poison: Pesticide Regulation in Aotearoa New Zealand(Regulation of Pesticides - A Need for a Paradigm Shift)” (2018) 35 Environmental and Planning Law Journal 490 at 25.

[338] Hazardous Substances and New Organisms Act 1996, s 7.

[339] *Ibid* pt 5.

Substance management may not have a direct influence on controlling water pollution. Yet, the ACVM and HSNO's importance is to manage those hazardous substances before they enter the market. Therefore, the risk of chemical residues washed through water runoff as non-point sources shall be minimized.

4.3.2. Waste Minimisation Act 2008

The management of waste is an essential piece of legislation that will functions as the second filter when the contaminants have reached the environment. For this reason, waste in New Zealand is managed under the Waste Minimisation Act 2008, proposing the ultimate objectives, including waste minimisation and reducing waste disposal.[340] The act approaches through two underlying instruments regarding product stewardship and waste disposal levy.

(1) Product stewardship refers to the responsibility of stakeholders in controlling all harms from the product after turning into waste and ensuring an effective process of reduction, reuse, recycling and recovery if available.[341] The concept of 'priority product' has been proposed for those posing a risk of a high level of environmental damage; thus, once being declared as a priority product, its manufacturer must develop an accredited scheme of product supervision.[342]

(2) Waste disposal levy must be imposed at the disposal facility and can be exempted if the waste is reused, recycled, recovered or removed from land within a prescribed period.[343] Revenue from levy shall be spent and distributed for the purpose of achieving waste minimisation and compensating the cost of waste disposal.[344]

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[340] Waste Minimisation Act 2008 No 89 2008, s 3.

[341] *Ibid* s 8.

[342] *Ibid* s 10.

[343] *Ibid* ss 25, 26.

[344] *Ibid* s 25.

Furthermore, the Act 2008 prescribed the establishment of Waste Advisory Board to independently consult the Minister regarding the declaration of priority product and its steward schemes, waste disposal levy as well as other matters as upon request.[345] On the other hand, territorial authorities (district and city councils) also take an essential responsibility to implement the Act through the waste management and minimisation plan in place.[346] The plan must include all necessary objectives and policies for achieving the Act's purposes within its territory.

Similar to substance management, waste management may not directly influence the control of water pollution. However, they are together the pre-and-post management of non-point sources. Agricultural waste, particularly manure from livestock and dairy farming in New Zealand, is a hazardous source of diffuse pollution without the proper treatment. Therefore, Waste Minimisation Act aims to discourage farmers from discharging waste into water bodies.

4.4. Summary

Environmental law in New Zealand has been influenced by the Treaty of Waitangi and for Maori's interests. To that end, non-point pollution control is vital because it protects the spiritual relationships between Maori and their water bodies. Management of substances and waste is an important approach with the HSNO 1996, ACVM 1997, and Waste Minimisation Act 2008. All compounds must be authorised before placing them on the market, and waste shall be prevented, reduced and recycled; otherwise, product stewardship and disposal levy might be imposed. Since 1991, the RMA has become a groundbreaking statute of environmental management. In principle, all water and land use, and waste discharges are prohibited unless expressly allowed by laws or resource consents. The RMA 1991 further enacted the NES and NPS for freshwater, particularly the national bottom lines, and empowers

[345] *Ibid* s 90.

[346] Salmon and Grinlinton, above n 272, at 570.

regional/district councils to introduce their specific frameworks in managing pollution. Agricultural hubs such as Waikato and Canterbury are deeply concerned about the non-point pollution impacts strictly controlled under the Waikato Regional Plan and ECan Act. Education and advocacy are promoted, for example, Waikato Regional Plan, for the prevention of non-point pollution in the long term. Compared with the EU's legislation, New Zealand introduces a similarly advanced system to manage diffuse sources. However, one shortcoming falls within the EIA in which New Zealand's law does not prescribe public participation as strictly as the EU does. To strengthen public participation in the environmental decision-making process, New Zealand seems not to be a suitable paradigm for Vietnam to take after.

CHAPTER 5. VIETNAM'S LEGISLATION

5.1. Overview of the institutional structure governing environmental protection

The primal state governance of environmental issues in Vietnam was conducted in the 1960s but only applied to the North of Vietnam due to the Vietnam war. During the period between 1960 and 1980, the Vietnam war and post-war reconstruction attracted most national resources; therefore, there was very little concern for environmental protection.[347] Although the environment's significance was first recognized in the 3rd Constitution of the Socialist Republic of Vietnam 1980, it was not until the Constitution 1992 that the first comprehensive foundation appeared. Article 29 of the Constitution 1992 merely allowed "the appropriate utilization of natural resources" and strictly prohibited "all acts resulting in depletion and destruction of the environment".[348] On that basis, the first acts of law on environmental protection and water resources were enacted in 1993 and 1998, respectively, introducing an integrated approach to the said concerns. Beyond this, the latest Constitution 2013 has inherited the spirit of the previous constitution; thus, environmental protection is now the immediate obligation of the state and all individuals and organisations.[349]

In Vietnam, a range of state agencies is held responsible for protecting the environment and natural resources based on horizontal and vertical structures.

(1) Horizontal structure: since its establishment in 2002, the Ministry of Natural Resources and Environment (MONRE) has played a central role in coordinating the whole governance of environmental issues. Besides, many sectoral ministries participating in the process are Ministry of Science and

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[347] Nguyễn Văn Phương and Vũ Duyên Thủy *Giáo Trình Luật Môi Trường Việt Nam* (NXB Giáo Dục, 2010) at 37. *(*Translation: *Textbook of Environmental Law in Vietnam)*

[348] The Constitution of the Socialist Republic of Vietnam 1992 s 29 (Vietnam).

[349] The Constitution of the Socialist Republic of Vietnam 2013 ss 43, 50, 63 (Vietnam).

Technology (for technical and scientific affair), Ministry of Agriculture and Rural Development (MARD)(agricultural and aquaculture sector), Ministry of Industry and Trade (industrial sector), Ministry of Construction (infrastructure), and others. Regarding water pollution from agricultural sources, MONRE and MARD would be the main actors whose functions and responsibilities sometimes overlap. As previously referred to, MONRE is the lead agency in environmental protection, supervising all causes of water pollution. However, since MARD takes charge of the agricultural sector, the management of non-point sources of pollution must be conducted within this ministry's authorisation. Such intertwined network creates a complex and challenging process that cannot be operated without smooth coordination.[350]

(2) Vertical structure: at the local level, each said ministry has its own department (provincial level), division (district level), and public servants in charge (commune level) that function as the regulator within its authorisation or the consultant for the corresponding committee. The so-called corresponding committee can be found in the below figure.

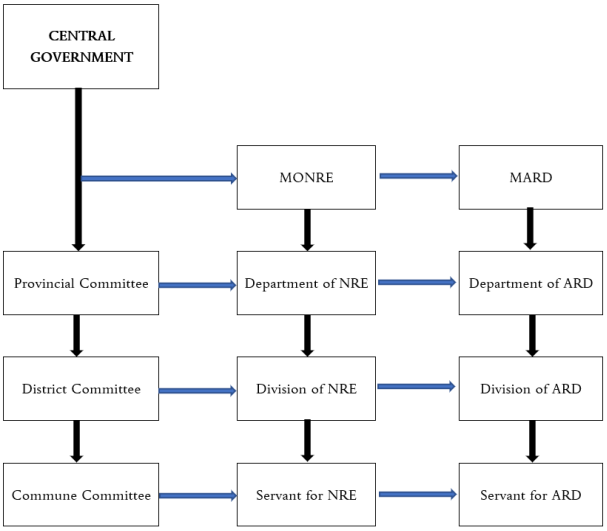

Figure 3.1. Structure of water resource governance in Vietnam (created by the author)

[350] Stephan Ortmann "The Failure to Implement Environmental Policies" in Stephan Ortmann (ed) *Environmental Governance in Vietnam: Institutional Reforms and Failures* (Springer International Publishing, Cham, 2017) 99 at 106.

The appearance of local committees, which also have power over their corresponding unit akin department and division, is where the institutional conflict arises. Although a department is under the ministry according to the vertical structure, those departments are indeed more accountable to the provincial People's Committees. Such power paradigm is also applied to the district and commune levels; therefore, S.Ortmann has re-drawn a more precise figure of Vietnam's governance structure.

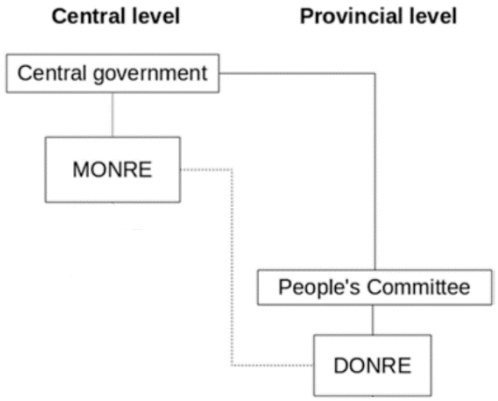

Figure 3.2. Vietnam's environmental state (Source: Stephan Ortmann[351])

5.2. Overview of law on non-point pollution

5.2.1. Law on Environmental Protection (LEP)

A range of environmental acts was premised on the Constitution of the Socialist Republic of Vietnam 1992, among which the most important one was the Law on Environmental Protection 1993. The first - but inadequate - statute has developed to more integrated legislation after two subsequent revisions in 2005 and 2014.[352] This law has illustrated the progress of legal development and becomes a fundamental act for protecting all environmental aspects, including water and soil, which are the most affected by non-point

[351] Stephan Ortmann "The Vietnamese Government and Institutional Reforms" in Stephan Ortmann (ed) *Environmental Governance in Vietnam: Institutional Reforms and Failures* (Springer International Publishing, Cham, 2017) 67 at 76.

[352] Đinh Phượng Quỳnh "Pháp luật về bảo vệ môi trường ở Việt Nam—Thực trạng và giải pháp" (Thesis, Vietnam National University, 2011) at 3. (Translation: *Laws on Environmental Protection in Vietnam – Reality and Solution*)

pollution. Three underlying principles have been, either directly or indirectly, integrated into this act:

(1) Sustainable development: environmental protection must harmonize with the economic benefit, ensuring that natural resources are properly exploited with minimum waste and damage.[353]

(2) Prevention and precaution: the prevention and control of environmental pollution and degradation must be prioritized.[354]

(3) Polluter-pays principle: all polluters are reliable for compensating damages and remedial solutions, and all resource consumers shall financially contribute to the environmental protection task.[355] To implement the polluter-pays principle, Vietnam's law has applied economic instruments, notably environmental protection fees, environmental protection tax, and severance tax. The difference between environmental protection fees and tax is that polluters shall pay the fees charged on their waste discharge, while end consumers shall indirectly pay the tax through purchasing polluting products. Regarding severance tax, it covers the exploitation of watercourse, including both surface water and groundwater.[356]

Environmental pollution control is divided into several sets of measures involving environmental information, planning for environmental protection, environmental technical regulations and standards, waste management, environmental sanctions and liability, and prevention/remediation of environmental damage.[357] Among those, planning, regulations and standards,

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353 Law on Environmental Protection 2014 s 4.2, 4.3 (Vietnam).

354 *Ibid* s 4.6.

355 *Ibid* s 4.7, 4.8.

356 Võ Trung Tín "Về nguyên tắc người gây ô nhiễm phải trả tiền—Kinh nghiệm nước ngoài và những vấn đề pháp lý đặt ra đối với Việt Nam" (2014) 06/2014 Tạp chí Khoa học Pháp lý Việt Nam 26 at 31. (Translation: *On "the polluter pays" principle – International experiences and legal matters raised for Vietnam*)

357 Lê Hồng Hạnh and Vũ Thu Hạnh *Giáo trình Luật Môi trường* (13th ed, NXB Công An Nhân Dân) at pt 2.2. (Translation: *Textbook of Environmental Law*)

and waste management are the most concerned in this writing. Planning under this act covers crucial provisions on establishing the environmental protection schemes of the state and each stakeholder. Accordingly, the Ministry of Natural Resources and Environment shall establish the national planning and strategy for environmental protection, followed by provincial authorities' local plans.[358] On the other hand, either an environmental impact assessment or environmental protection plan must be introduced by a project owner and approved by authorised state agencies based on that project's scale.[359]

Environmental regulations and standards are another feasible approach to manage pollution at the national and provincial levels. The latter must comply with the bottom line set out by the national standards, making it comparable to the National Objective Framework in New Zealand.[360] Vietnam's MONRE has issued many vital regulations, among which, some notable regulations are about surface and groundwater quality, water quality for irrigated agriculture. Although waste management is prescribed a primary instrument in environmental protection, it is guided in detail under a governmental order rather than the law itself. The Decree 38/2015/ND-CP regulates waste of all sources, including the agricultural sector. Both environmental standards and waste management would be further discussed in the later parts.

It is noticeable that the law spends one separate article for the environmental protection in agricultural production, in which the use of fertilisers, pesticides, other products and the discharge of waste must comply with this law.[361] However, that article's actual effect and the whole statute have been called into question because of its weak enforceability. A vast majority of Vietnam's agricultural production is at the household scale, which almost

[358] Law on Environmental Protection 2014 s 10.

[359] *Ibid* ss 19, 29.

[360] *Ibid* s 114.4.

[361] *Ibid* s 69.

disables the implementation of those provisions in practice. Recently, a new bill of environmental law has been passed by Vietnam's National Assembly despite the public criticism on information transparency. Under the LEP 2020 which comes into effect on 1st January 2020, it shall not be legally binding to announce the environmental impact assessment for public access that raises corruption anxiety.[362] However, the new law has made progress in managing agricultural production by requiring an environmental permit for livestock farming and encouraging sustainable agriculture. Further, the use of livestock manure and other waste for irrigation must comply with MARD's requirements.[363] Under the tradition of law implementation in Vietnam, it would take some time for the new law to take into actual effect.

5.2.2. Law on Water Resources (LWR)

Water protection is an important content in all versions of LEP in 1993, 2005, and then 2014 that have prescribed the strict planning, assessment, and responsibility toward watercourses. Recognizing the importance of water resources, mainly freshwater, an independent act on that issue was first introduced in 1998 before replaced by a modern and more comprehensive version: Law on Water Resources 2012. Sustainable development is likely to be the underlying approach in building up this law because its ultimate purpose aims to the appropriate and effective exploitation of water resources. This conclusion can be drawn from a range of principles described under the LWR 2012 that is supposed to reform the previous version thoroughly.[364] Besides the watercourse utilization, LWR also focuses on preventing and mitigating water pollution and remedying water damage (i.e., flood, flood-tie).

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[362] Tiến Long "Luật Bảo vệ môi trường được thông qua dù chuyên gia còn băn khoăn" (17 November 2020) TUOI TRE ONLINE <https://tuoitre.vn>. (Translation: *Bill of Law on Environmental Protection has been passed despite experts' doubt*)

[363] Law on Environmental Protection (amended) 2020/QH14, pt 3 (Vietnam).

[364] Hoàng Văn Bảy "Hoàn thiện chính sách, pháp luật về tài nguyên nước" <http://lapphap.vn:80>. (Translation: *Improve the Policy and Law on Water Resources*)

There are four water types covered under the law, including surface water, groundwater, rainwater, and seawater.[365] Excluding seawater, all others are the research's interest because they are freshwater sources that will either be used in agriculture or become victims of agricultural non-point pollution. Although the discharge of waste into water is referred to under several provisions, the most significant part of the act regulates water resources exploitation in human activities. As for the agriculture sector, anyone who uses water resources for production shall conserve water and prevent soil erosion and water pollution.[366] Notably, the most significant provision is that technical regulations and standards shall be applied to determine the quality of water used. All agricultural activities, such as irrigation, are only allowed to use the water that meets the bottom line of environmental standards. Based on the said article, MONRE has promulgated an important set called the national technical regulation (NER) on water quality for irrigated agriculture, which will be discussed later. Such regulation expressly displays its significance by controlling the water input that will eventually turn into water runoff – a leading cause of non-point pollution.

A framework that the LWR uses to achieve its objectives shall include dominant measures: water information and investigation, water quality standards, watercourse planning, and water permit. It can be seen that water permit is a remarkable managing instrument that shall be applied to the exploration of groundwater, the exploitation of surface water, groundwater and seawater, and wastewater discharge.[367] The provincial Department of Natural Resources and Environment (DONRE) is authorised to approve and issue the water permit.[368] The law also provides a flexible mechanism for the

[365] Law on Water Resources 2012 s 2.1 (Vietnam).

[366] *Ibid* s 46.

[367] Decree 201/2013/NĐ-CP Detailing The Implementation a Number of Articles of The Law on Water Resources § 15 (Vietnam).

[368] *Ibid* s 29.

duration of water permits depending on each application. For instance, a permit for exploiting surface water can be valid for five years to a maximum of 15 years, and DONRE will decide it after the approval process.[369] Water consumption at the individual and household-scale is exempt from permission, for example, below 10m^3/day for goods manufacturing, or 10m^3/second for agricultural farming or 50kW for power generation.[370] However, like many other Vietnamese statutes, the water permit mechanism faces the same obstacle in enforceability. So far, the authority has failed to supervise and control household activities, which mostly work in the agricultural sector, while it is almost impossible to look forward to people's law-abiding awareness. In Vietnam's largest province Thanh Hoa, during the ten years from 2010, DONRE has granted a mere number of over 100 groundwater permits, mostly to enterprises rather than households or individuals.[371] On the other hand, the effect of water permits on managing agricultural non-point pollution is likely uncertain. Mainly, regarding wastewater permits, applying to crop farming is very difficult since it is unable to identify the discharging sources.

5.2.3. Waste management

As a primary objective of the LEP, waste management is integrated into that law rather than a separate act and scatters over a number of provisions. The LEP has proceeded toward waste management with a relatively broad principle that combines both outcome-based and process-based approaches. Accordingly, wastes must be strictly managed since their discharges throughout the minimization, classification, collection, transport, recycling, and destruction.[372] Such provision should be compared to the management

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[369] *Ibid* s 21.1.a.

[370] *Ibid* s 16.

[371] Quốc Hương "Bất cập trong quản lý và khai thác nguồn nước ngầm" (10 February 2020) Báo Thanh Hóa <http://baothanhhoa.vn>. (Translation: *Shortcomings in managing and exploiting water resources*)

[372] Law on Environmental Protection 2014 s 85 (Vietnam).

hierarchy under the EU's Directive on Waste, though Vietnam's law has not expressly emphasized the priority of recovery measures. Waste is divided into two categories: conventional waste and hazardous waste that shall be treated in two different processes. Basically, it is obligatory to register with the authority for all hazardous waste sources before discharge, and only authorised entities may process such wastes.[373] A list of hazardous elements, including those used in crops and livestock farming, is prescribed by MONRE.[374] If any waste contains hazardous elements beyond the permissible limits, it shall be categorized as hazardous waste.

Wastewater is an integral part of waste management; therefore, it shall be treated following environmental standards.[375] For that purpose, a permit for wastewater discharge is required except for small discharges at the household scale described in the previous part of the writing. The provision is furthered described under the LWR that all manufacturing areas such as industrial zones/clusters and handicraft villages must connect to the adequate sewage treatment system.[376] However, that requirement is unlikely to be feasible for agricultural production, particularly crop farming, because of its unidentifiable diffuse sources. Beyond this, smallholder agriculture has long exacerbated the obstacle in waste management. The wastewater permit also raises confusion because it lies under both MONRE and MARD's authority.[377] While the LWR authorised MONRE to issue a wastewater permit, it only applies to the discharge to a natural watercourse.[378] Otherwise, the discharge

[373] *Ibid* s 90.

[374] Circular 36/2015/TT-BTNMT on Management of Hazardous Wastes pt Annex I (Vietnam).

[375] Law on Environmental Protection 2014 s 100.

[376] Law on Water Resources 2012 s 37.1 (Vietnam).

[377] Tạ Thị Thùy Trang "Một số bất cập của pháp luật bảo vệ môi trường về xử lý nước thải" (2019) 23(399) Tạp chí Nghiên cứu Lập pháp. (Translation: *Some shortcomings of environmental law on wastewater treatment*)

[378] Law on Water Resources 2012 s 73.

of wastewater to irrigation facilities must comply with the Law on Irrigation, thus falling under MARD's power.[379]

5.2.4. Managing pollutant substances

Vietnam's laws have long concerned about the management of chemical-related activities through the Law on Chemicals 2007. The law applies stringent supervision and control on chemicals, mainly hazardous, for the safety of all living beings, the environment, and ecosystems. To achieve the objective, the legislator prohibits using any chemical substance that is not prescribed in the authorisation list.[380] Based on the underlying principle of the chemical law, it is obligatory for such agricultural chemicals as fertilisers, pesticides, and veterinary medicines to be controlled through a registration system lying under the coordination of MONRE, MARD, and the Ministry of Trade.[381] The registration processes have been developed separately for fertiliser and pesticides by two statutes: the Law on Crop Production and Law on Plant Protection and Quarantine. Both laws provide the management and registration of these chemicals rather than control their quantities in use. In general, the production of pesticides and fertilisers is a restricted business that each product or commodity must apply for permission before introducing to the market.[382] While MARD must authorise all pesticide production, organic fertilisers for non-commercial uses are exempt from that requirement.

The Government further enacts the national technical regulations for these two agricultural supplementary products: NER on pesticide quality 2018[383] and NER on fertiliser quality 2019.[384] Indeed, because MARD issues them, their most important objective is to maximize agricultural productivity while

[379] Law on Irrigation 2017 s 44 (Vietnam).

[380] Law on Chemicals 2007 s 5 (Vietnam).

[381] Law on Environmental Protection 2014 s 78 (Vietnam).

[382] Law on Crop Production 2018 s 36 (Vietnam); Law on Plant Protection and Quarantine 2013 s 48 (Vietnam).

[383] National technical regulation QCVN 01-188:2018/BNNPTNT on pesticide quality (Vietnam).

[384] National technical regulation QCVN 01-189:2019/BNNPTNT on fertiliser quality (Vietnam).

protecting human health from chemical residues; thus, the environment, fortunately, benefits from the process of limiting chemical inputs. Generally, the codes set upper limits for chemical ingredients, particularly nitrogen and phosphorus, used to produce fertilisers and pesticides.

5.2.5. National technical regulations

Environmental technical regulations and standards are essential instruments to protect the environment against pollution. While technical regulations are legally-binding, environmental standards function as codes of practice that encourage people to apply voluntarily.[385] The technical regulation is simultaneously a measuring instrument for the stakeholders to self-control their activities and a legal and scientific basis for the authority to supervise environmental law compliance. There have been 48 sets of technical regulations on the natural environment issued by MONRE, with 12 of them are on the surrounding environment (air, noise, water, soil), and the others are on waste and waste treatment.[386] Each natural resource has its corresponding parameters system based on its unique characteristics and exploitation purpose/capacity; thus, the regulation prescribes different limit values even for the same resource.[387] For instance, the amount of nitrate and phosphate in surface water are set with different limits between Group A (for residential uses) and Group B (for irrigated use).[388] The management of non-point pollution from agricultural sources involves a range of national technical regulations that play a central role in controlling non-point pollution. Some significant sets of regulations by MONRE are listed as below:

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[385] Law on Environmental Protection 2014 s 3.5, 3.6.

[386] MONRE "Rà soát, xây dựng, hoàn thiện hệ thống quy chuẩn kỹ thuật quốc gia về môi trường trong điều kiện hội nhập quốc tế" <http://monre.gov.vn>. (Translation: *Review and improve the system of National Technical Regulations on the Environment in the context of international integration*)

[387] Lê Hồng Hạnh and Vũ Thu Hạnh, above n 361, at 197.

[388] National Technical Regulation QCVN 08-MT:2015/BTNMT on Surface Water Quality 4 (Vietnam).

(1) Water quality: NERs on surface water[389] and groundwater quality[390], NER on water quality for irrigated agriculture[391].

(2) Waste: NER on the effluent of livestock[392], NERs on the pesticide residues[393] and remediation of persistent organic pesticides[394].

The NERs on irrigated agriculture and livestock effluent should be considered the progress of environmental legislation in Vietnam, aiming to mitigate pollution from crops and livestock farming. In theory, by ensuring the irrigated water quality (input) and limiting the polluted level of effluent (output), the agricultural non-point pollution shall be tackled from the sources. The question here is how could such prospect be effectuated in the enforcement practice?

Moreover, two shortcomings can be easily recognized in the system of NERs. Firstly, there is no NER on the fertiliser residues issued so far, though fertiliser is the leading cause of non-point pollution. As discussed in Chapter 1, the threat and danger of fertiliser residues washed into water streams under surface runoff are even much more extensive than those of pesticides. Secondly, the conflict of functions between MONRE and MARD keeps occurring in the procedure of issuing NERs. While MARD guides the regulations on fertilisers and pesticides quality, MONRE controls their effects

[389] National Technical Regulation QCVN 08-MT:2015/BTNMT on Surface Water Quality.

[390] National Technical Regulation QCVN 09:2008/BTNMT on Underground Water Quality (Vietnam).

[391] National Technical Regulation QCVN 39:2011/BTNMT on Water Quality for Irrigated Agriculture (Vietnam).

[392] National Technical Regulation QCVN 62-MT:2016/BTNMT on the effluent of livestock (Vietnam).

[393] National Technical Regulation QCVN 15:2008/BTNMT on the Pesticide Residues in the Soil (Vietnam).

[394] National Technical Regulation QCVN 54:2013/BTNMT on Remediation Target Values of Persistent Organic Pesticides According to Land Uses (Vietnam).

(residues) on the environment. Consequently, it may lead to inconsistency in measuring parameters, confusing producers and consumers.

5.3. Deficiency of Vietnam's law

5.3.1. Institutional and socioeconomic problems

Vietnam's environmental institution is organized with a horizontal and vertical structure that largely grants responsibility to local authorities. Such decentralization results in confused reporting lines when a local agency is held responsible for both local authorities and its parent ministries. Besides, it leads to the high local autonomy that limits MONRE and MARD's power because the ministries only hold multi-provincial responsibilities. In a developing country like Vietnam, economic growth remains the largest goal to be achieved; and thus, local authorities will be highly assessed based on the benchmark of growth rather than the environmental standards. In the context that the central government budget largely relies on the local level, for example, 70% of the budget for agricultural irrigation is managed by the provincial committees,[395] provinces can bend the rules to reach economic targets.[396] Consequently, despite the strict environmental laws, its implementation at the local level is potentially weak for the lack of central control. However, it is not uncommon that the rule sometimes is bent through a top-down intent, creating the conflict of benefits between the central and local authorities. In February 2014, Da Nang's provincial People's Committee, after consulting with the local DONRE, threatened to take MONRE to court due to a draft regulation on hydropower reservoirs that potentially caused the water shortage to Da Nang's downstream region.[397] The above instance has elaborated the possible clash between a ministry and a local committee and department regarding conflicting benefits. Vietnamese

[395] World Bank *Vietnam Toward a safe, clean, and resilient water system* (World Bank, Washington, DC, 2019) at 75.

[396] Ortmann, above n 354, at 103.

[397] "Da Nang threatens to sue Ministry of Natural Resources—News VietNamNet" <http://english.vietnamnet.vn>.

legislators have promised that the recently adopted LEP 2020 would stop the trade-off between the environment and economic development.[398] Though, it is highly uncertain when all we have so far is a mere sub-article integrated into the LEP's principles that hardly have any actual impact on Vietnam's enforceability.

On the other hand, state agencies and public staff's capacity also pose another problem in governing environmental pollution. According to a report by MONRE, the ratio of environmental public servants to population was 29 per one million, with around 1,200 staff at the central level. The average numbers at the local levels are: 67 per DONRE (provincial), 7-8 per Division of NRE (district) and 1-2 per commune. It should be noticed that DONRE and its daughter agencies at local levels hold responsibility for nine sectors; therefore, those numbers of staff are severely insufficient to supervise the pollution activities, notably chemical uses in agriculture. For example, there are around 14,000 fertilisers and 1,500 pesticides permitted in the Vietnam market, but their use in the countryside with the highest agriculture density barely subjects to any control or monitoring.[399] DONRE also reports that most of the staff have been inadequately educated for environmental management.[400]

The institutional problem is even more challenging in the context of Vietnam's agriculture. Among approximately 39 million Vietnam inhabitants engaged in agriculture (2018), 89 percent are small family farmers.[401] Smallholders then result in two significant problems in the enforceability of law:

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[398] "Những điểm mới mang tính đột phá của Luật Bảo vệ môi trường 2020" <http://cem.gov.vn>. (Translation: *Major breakthroughs in Law on Environmental Protection 2020*)

[399] Nguyen, above n 58, at 17.

[400] MONRE *Đề án Tăng cường năng lực hệ thống tổ chức đội ngũ công chức, viên chức ngành tài nguyên và môi trường đến năm 2020, tầm nhìn đến năm 2030* (2019). (Translation: *National scheme for strengthening the capacity of public servants in natural and environmental sectors until 2020, and the vision for 2030*)

[401] FAO "Small Family Farming in Viet Nam—a country specific outlook" <www.fao.org>.

(1) Low-income and undereducated smallholders should be followed by non-compliance with laws on environmental protection for their lack of either knowledge or finance to adopt legal binding practices.

(2) Field scattering in smallholder farming makes the supervision of pollution far more complicated, particularly with the limited state resources.

Under such feature of the agricultural sector, the management of non-point pollution would cost Vietnam enormous resources that are likely to be unaffordable for the Government at least shortly.

5.3.2. Unfeasible approach of laws

Vietnam has introduced an integrated act of law on environmental law, but the approach is supposed to be inadequately feasible. Although the precautionary approach is among the fundamental principle of the LEP 2014, such act fails to recognize the significance of pollution anticipation.[402] The new LEP 2020 has added the principle of pollution anticipation as the priority in the environmental protection activities, yet we have to wait for its actual enforceability. Beyond this, Vietnam's legal system has not been adequately concerned about the impact of non-point pollution. The concept of non-point sources is not prescribed in any piece of legislation on environmental protection. Consequently, non-point pollution is still put under conventional approach that is insufficient to control nitrogen leaching and run-off from land-based activities. In other words, Vietnam legislation has not developed awareness toward non-point source pollution.

Environmental law compliance in Vietnam largely leans on penalties for violations rather than a preventive or precautionary approach encouraging good practices through economic incentives. Mixed instruments with regulatory and economic tools shall strengthen the enforceability in environmental protection. In the case of Vietnam, however, while the legislation has exposed various shortcomings, the economic incentives are

[402] "Hoàn thiện pháp luật về kiểm soát ô nhiễm môi trường không khí" <www.lapphap.vn:80>.

also not adequately attractive. Most economic incentives that can be applied effectively are regulatory tools such as tariffs and fees. In fact, the Government has made remarkable efforts to promote good practices from central to local levels. Since Decision 01/2012/QD-TTg of Prime Minister on policies for applying Good Agricultural Practices dated in 2012, most provincial committees have enacted their detailed guidelines for earning support. In 2018, Decree 109/2018/ND-CP on Organic Agriculture became the first integrated act for policing organic agricultural production. Overall, the support includes direct payment, periodically/lump-sum subsidies, training and education, expert and techniques, or loan interest.[403]

However, most of the current policies are relatively either unattractive or inaccessible for smallholders. Firstly, the incentive policies are normally open for farming at certain scales that are not applicable to most small farmers. The regulation varies from province to province. For example, rice farming from 50 hectares, livestock farming from 500 pigs/100 cattle in Tra Vinh province;[404] or respectively 20 hectares or 100 pigs/50 cattle in Tien Giang province.[405] Such farming scale cannot be considered smallholder in Vietnam's agriculture; therefore, only a small number of farmers are eligible for applying for government financial support. Secondly, some other subsidiary types have broader ranges of application, but it is supposed to be not attractive enough. To encourage farmers to establish waste treatment, the Government provides a lump-sum grant of 150 USD for every household biogas digester set up. Such amount, however, cannot compensate for the actual cost of a biogas treatment system.[406] Thirdly, complicated procedures

[403] Decree 109/2018/ND-CP on Organic Agriculture (Vietnam).

[404] Nghị quyết 09/2015/NQ-HĐND Phê duyệt chính sách hỗ trợ áp dụng Quy trình thực hành sản xuất nông nghiệp tốt trên địa bàn tỉnh Trà Vinh giai đoạn 2015—2020" (Translation: *Resolution 09/2015/ND-HDND on Approving Policies supporting the application of Good Agricultural Practices in Tra Vinh from 2015 to 2020*)

[405] "Quyết định 04/2015/QĐ-UBND hỗ trợ áp dụng quy trình thực hành sản xuất nông nghiệp tốt Tiền Giang" .(Translation: *Decision 04/2015/QD-UBND Supporting the application of Good Agricultural Practices in Tien Giang*)

[406] Dinh, above n 61, at 27.

and paperwork are the other obstacles that dissuade smallholders from accessing the government subsidiary. Indeed, the bureaucracy is an institutional disease of the whole Vietnamese political system that shall not be cured in one day.

5.3.3. Overlapping responsibilities

The conflict between State agencies occurs not only at the vertical system but also at the horizontal level and among acts of laws that are counterproductive to the general progress. The administrative problem is even exacerbated by the inefficiency of coordination between State agencies. At least ten ministries have currently established affiliated agencies to monitor the environmental issues within their authorised sectors. As relevant to non-point pollution, MONRE and MARD are holding the primary responsibility; besides, there is the participation of other ministerial agencies including the Ministry of Industry and Trade, Ministry of Construction, and most notably, Ministry of Public Security with the environmental police force. The environmental police force mostly holds liability for the inspection and imposition of administrative sanctions or criminal investigation on violators. Here is where the superficial coordination causes the problem because all MONRE, MARD, People's Committees and Police are empowered to impose administrative sanctions regarding environmental violations in the agricultural sector. Beyond this, a contradictory problem also exists in the relationship between MONRE and the others.

So far, MONRE leads the battle against environmental pollution while MARD takes part in when agriculture is the pollution source. At the central level, MARD has founded the Science, Technology and Environment Department that is liable for the state management of environmental protection, biodiversity, biosafety, and climate change. Though, there is no respective agency at the local level rather than DARD, while DARD does not have sufficient resources to fulfill such duty. As a result, this agency must ask for DONRE's support or join DONRE’s operation to monitor agri-environmental

issues.[407] Further, a number of contradictory responsibilities exist between the function of these two agencies. The largest factor of non-point pollution is the chemical used in agricultural production. However, the management of fertilisers and pesticides is inconsistent; for example, MARD monitors the production and quality of them, but MONRE shall manage their waste treatment because they are categorized as hazardous chemical waste. Another shortcoming had occurred to the management of fertiliser due to the overlapping liability. Before 2017, fertiliser quality control was brought under the authorisation of both MARD and the Ministry of Industry and Trade. The former only monitors the production of natural/organic fertilisers, while the latter monitors synthetic fertilisers. It was not until 2017 that MARD is empowered to monitor all types of fertilisers under Decree 108/2017/ND-CP. When it comes to solid waste, it would be more involved with the participation of the Ministry of Construction.[408] Similarly, MONRE is in charge of the permission for discharging into watercourse, yet MARD is authorised to grant the permit for discharging into irrigation facilities that eventually lead to the watercourse. Consequently, water pollution might be caused because MARD does not hold power to inspect wastewater quality. In Hung Yen province, Bac Hung Hai is an instance where most pollution sources identified were permitted by MARD.[409] To this end, non-point sources turn into point sources when all wastewater runs through drains connecting to an irrigation facility.

The conflicts might also arise between the authorities in the same river basin concerning their master plans on water resources. Vietnam's legal framework currently lacks a National Master Plan on Water Resources, which results in

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[407] "Quản lý môi trường nông thôn: Còn chồng chéo" (25 October 2016) Báo Tài nguyên & Môi trường <https://baotainguyenmoitruong.vn>. (Translation: *Managing the environment in rural areas: remain overlapping*)

[408] "Quản lý môi trường nông thôn: Còn chồng chéo", above n 411.

[409] MONRE "Thực trạng chức năng, nhiệm vụ, tổ chức bộ máy, nguồn nhân lực ở các bộ, ngành, địa phương liên quan đến QLNN về TN&MT" <www.monre.gov.vn>. (Translation: *The reality of function, duty, structure mechanism, human resources in ministries, local agencies with regard to the state management of natural resources and environment)*

a range of separate plans developed by the local committees. Consequently, the master plan of an upstream province could create conflicting benefits with the downstream province.[410] A national master plan for 2021-2030, vision to 2050 is supposed not to be completed before 2021 according to Decision 1748/QD-TTg of Prime Minister on approving the preparation of plan in 2019.

5.3.4. Insufficient Environmental Impact Assessment system

The EIA system in Vietnam's environmental law is considered the most remarkable institutional progress, making the country a pioneer among developing countries in introducing such framework.[411] The introduction of EIA dated back to 1993 under the first LEP that failed to adopt essential criteria of an effective EIA such as public participation and transparency. The LEP 2005 had been a turning point when establishing an integrated framework of EIA that was then reinforced by the LEP 2014. The period 1993-2014 witnessed considerable progress from two mere articles to 14 articles prescribing the EIA system's details.[412] Though, many shortcomings have been exposed during the implementation. A giant gap in the current law is that EIA shall only be applied to investment projects, which means that smallholder farming is excluded. Consequently, one of the primary sources of non-point pollution falls out of the pre-control measure. Furthermore, until the time being, Vietnam's EIA system has been failing to fulfill all three fundamental criteria as following: The EIA (1) shall be completed at the early stage of a project; (2) shall involve public participation; and (3) be informative and transparent.[413]

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[410] World Bank, above n 56, at 24.

[411] Ortmann, above n 355, at 89.

[412] Nguyễn Thị Bích Ngọc "Đánh giá môi trường chiến lược, Đánh giá tác động môi trường và việc giảm thiểu ảnh hưởng tiêu cực đối với môi trường của các doanh nghiệp đầu tư trực tiếp nước ngoài tại Việt Nam" (2016) 05/99(2016) Tạp chí Khoa học Pháp lý Việt Nam 03. (Translation: *Strategic Environmental Assessment, Environmental Impact Assessment and limiting the negative environmental impacts from FDI enterprises in Vietnam)*

[413] Tannetje Bryant and Keith Akers "Environmental Controls in Vietnam" (1999) 29 Environmental law (Portland, Ore) 133.

Firstly, there are unclear provisions on which stage to conduct the EIA. Article 19.2 of LEP 2014 requires the EIA to be conducted at "the preparation stage of a project";[414] however, the law does not provide any definition or guidance to determine such preparation stage. Consequently, EIA's application is often a perfunctory manipulation rather than an actual planning tool to prevent environmental damage. An EIA fails to perform its value when it follows behind such processes as allocating land, financing, or even obtaining approval in principle from authorities.[415] Further, LEP 2014 appears not to be consistent with other acts of law. For example, Law on Investment 2014 does not require an EIA in the application of investment registration certificate;[416] beyond this, there is no referral to the term "the preparation stage of a project" in such law. Therefore, it is not surprising that an EIA is only sent to MONRE after approval from the Ministry of Industry and Trade, placing MONRE in a passive position to monitor the investors' compliance.[417]

Secondly, the public participation in the EIA process is very low-powered. Public participation was not legally binding under the first LEP 1993, but then added into the act 2005 and 2014. Accordingly, investors are now obliged to consult with the local community, state agencies, and other organisations that are affected by the project.[418] There are severe flaws in such public consultation process. The current system grants the district and commune People's Committees a privilege to be the judge in their own cases. Accordingly, the local Committees and investors shall co-host the meetings/seminars of community consultation, while such committee is both a State authorised agency and one of the consultant subjects under Article

[414] Law on Environmental Protection 2014 s 19.2 (Vietnam).

[415] Alison Clausen, Hoang Hoa Vu and Miguel Pedrono "An evaluation of the environmental impact assessment system in Vietnam: The gap between theory and practice" (2011) 31 Environmental impact assessment review 136 at 138.

[416] Law on Investment 2014 s 37 (Vietnam).

[417] Ortmann, above n 355, at 92.

[418] Law on Environmental Protection 2014 s 21.2.

21.2. In other words, it is not fair and transparent to assign the local committees the hosting role.

More importantly, community voice is likely to be weak because it shall be spoken through a political organisation named the Fatherland Front – a representative agency of people aligned with the Communist Party of Vietnam. Nevertheless, the operation of Fatherland Front is called into question when the Government funds it, and therefore, is considered to be on the authority's side. Besides, investors are not obliged to involve public participation at the early stage of the EIA process or to obey the community's feedback. Without any legal requirements, investors often deliver a superficial commitment merely to reassure the community and authority.[419] On the other hand, the current public participation is lacking the voice of relevant experts. Environmental issues are a complicated in-depth major that needs expert opinions rather than only the affected community's. However, experts' participation during an EIA process has not been prescribed in law, so any expert word is optional according to the current system.

Thirdly, the transparency of the EIA process in Vietnam is another shortcoming. Both the EIA summary report and approval decision had not been obliged to be published until 2019 under Article 13 of Decree 40/2019/ND-CP. However, it has been two years, but MONRE has not published any documents onto their portal, severely restricting public access to environmental information. Despite some progress, the new LEP 2020 was a huge disappointment regarding the right to environmental information. Under the LEP 2020, MONRE and other authorised agencies are required to publish their approval decision, whilst the obligation to publish the full EIA report is granted to project owners. That should be considered a step backward because both obligations were once the State agencies' responsibility under Decree 40/2019. Obviously, it is nonsense to separate

[419] Trần Thị Sáu "Tham vấn cộng đồng dân cư trong quá trình đánh giá tác động môi trường và những vấn đề đặt ra" (2018) 6(358) Tạp chí Nghiên cứu Lập pháp. (Translation: *Community consultation during Environmental Impact Assessment process and the posed issues*)

such liability, making the process potentially delay due to the non-cooperation of project owners.

5.4. Summary

Vietnam's environmental issues are put under the responsibility of a multitude of agencies according to the horizontal and vertical structures. The laws dated back to the 1980s, but the first integrated statute was the LEP 1993 (latest revised in 2014 and 2020), which can be compared to New Zealand' RMA 1991. At the central level, MONRE primarily holds responsible, coordinated by MARD, regarding agricultural pollution. At the local level, the People's Committee shall be the main actor with the DONRE and DARD consultancy. LEP provides a range of technical regulations to control pollution. Besides, LWR plays a vital role in protecting water resources using the water permit as an essential instrument. Vietnam does not have a separate statute for waste management but integrating it into LEP. As for substance management, all compounds could be on sale provided that they are prescribed in the authorisation list under the Law on Chemicals and Law on Plant Protection. Many shortcomings have been exposed under the Vietnamese system, one of which is the overlapping of MONRE and MARD responsibilities and between central agencies and local agencies. Further, the public servants are supposed to be inadequately educated for monitoring non-point pollution. The laws provide an unfeasible approach when they mostly lean on punishments rather than a preventive and precautionary principle. The concept of non-point pollution control is very vague in the LEP. Moreover, such vital tools as EIA fail to achieve the expectation because it lacks public participation in the decision-making process.

CHAPTER 6. REVIEW AND RECOMMENDATION

6.1. A brief comparison

Over the past few decades, the global trend of water quality has shown significant improvements in the developed countries, compared to the increasingly worse status in those developing. This is also the pattern seen in the EU, New Zealand, and Vietnam pictures. In the EU's rivers, most water pollutants such as ammonium, nitrate, phosphate have decreased continuously. However, a large part of water bodies remains under the standard, attributed to agricultural non-point pollution. Similarly, most water bodies in New Zealand are of a high standard. But New Zealand has experienced an increase in nitrogen loads and nutrient loss in waters nationwide for the last 20 years. The rapid shift from forestry and sheep/beef farming to dairy farming is the leading cause. Consequently, New Zealand is now facing the challenge of non-point pollution from dairy production. As for Vietnam, agricultural pollution has long been the greatest challenge to economic growth. Although the data on water pollution in Vietnam remains very limited, an overall picture can be seen through the increasing trend of uncontrollable overfertilization. In short, Vietnam's water status is put under a warning position that many actions should be taken to tackle it.

In environmental protection, international principles set standards and guidelines for national laws. To that end, the EU and New Zealand have adopted underlying principles into their laws and regulations, in which sustainable development is the core objective. The prevention and precaution approach is expressly prescribed regarding non-point source control. It is how the key pieces of legislation, such as the EU's ND and WFD, New Zealand's RMA work. River basin management is introduced to implement the preventive principle and achieve water quality standards. The polluter-pays principle is applied to taxation, fees, and punishments with certain flexibility that allows such economic incentives as greening payment in Europe and nitrogen cap and trade in New Zealand. In theory, Vietnam also applies those principles to their system, yet the efficiency is called into question. The

prevention approach fails to control non-point pollution because many instruments like EIA, fertiliser monitoring have exposed many shortcomings. Vietnam's implementation of the polluter-pays principle is also weak when such offset is not adequate to compensate for the actual damage and discourage polluting activities. Moreover, another failure can be seen in the equitable utilization principle within the country. The case of Da Nang, which threatened to sue MONRE for their water shortage in the downstream area, is a remarkable example. Failing to adopt the most fundamental principles, it is not surprising that Vietnam's law so far has failed to control non-point source pollution.

The EU, New Zealand and Vietnam all apply three statutory systems to control non-point source pollution, which are substance and waste management, and quality targets. The EU and New Zealand adopt relatively similar systems of substance and waste management. The EU has REACH, and New Zealand uses the HSNO 1996 and ACVM 1997 combined to control the production and sale of hazardous chemicals, especially nitrogen and phosphorous fertilisers. In common, all agricultural chemicals must be registered before placing on the market (no data, no market). That is also the approach of Vietnam's laws, but the Vietnamese Government has failed to monitor unauthorised products and their use in rural areas. Waste management is the second filter in case the input control is surpassed. Directive on Waste in the EU and Waste Minimisation Act in New Zealand prioritize the recycling and recovery of waste, notably for agricultural purposes. A waste hierarchy is introduced in which disposal should be the last option. The European Parliament has recently developed a new concept of turning waste into resources in a circular economy – a initiative that even New Zealand should take into account. Like all the EU's Directives, specific measures for waste management depend on national laws. New Zealand has two instruments: product stewardship and waste disposal levy both of which shall be exempted for environmental-friendly products and waste treatment. Meanwhile, Vietnam has not adopted a separate act for waste management

rather than the LEP and an under-law decree that are mostly based on waste permits and sanctions.

The flagship pieces of legislation in the EU are the Nitrate Directive and Water Framework Directive. The Nitrate Directive provides a set of means-oriented regulations that may be compulsory or voluntary. The designation of nitrate vulnerable zones and action programme ensure that sufficient resources for pollution control are invested in the right places. The WFD has compensated for the lack of target-orientation under the Nitrate Directive, adopting water status (ecological, chemical, quantitative) to measure the pollution level of water bodies. The EU also approaches pollution control at river basin scale through establishing river basin planning. Vietnam has long attempted such basin-level approach but the results are very limited, though four river basin committees have been proposed to be established in 2019.[420] Regional plans in New Zealand are an important instrument under the RMA 1991 – the key act of law to protect water quality. Principally, all uses of natural resources and contaminant discharges are prohibited unless expressly allowed, contributing to the importance of resource consents. New Zealand further empowers under-law regulations including the NES for freshwater, Stock Exclusion Regulations, NPS for freshwater, and regional plans. The system is very flexible, such as, Canterbury region benefits from a special paradigm under the ECan Act 2010. Non-point pollution is an important part of most regional plans that focus on controlling land-based activities, streamside management and livestock access to water. Vietnam's system on environmental protection is, somehow, similar to New Zealand's when all issues are put under an integrated act – Law on Environmental Protection. The LEP obtains most basic instruments such as technical regulations and standards, EIA, resource and waste permits, sanctions and liability.

Experiences from the EU and New Zealand have proved that non-regulatory measures should be an indispensable part of the overall approach. They

[420] "Đề xuất thành lập 4 Ủy ban lưu vực sông theo vùng | Báo Dân trí" <https://dantri.com.vn>. (Translation: *Propose to establish 4 committees for river basin*)

include economic incentives, education, research and information system. Some notable economic incentives are the greening payment provided with cross-compliance under the EU's agri-environment schemes, and New Zealand's nitrogen cap-and-trade schemes or waste levy exemption. Education, research and information measures are also available to educate farmer's behaviour in the long term. The significance of voluntary approach in controlling agricultural pollution is not newly discovered, and Vietnam has attempted a number of initiatives. Though, most of them appear to be unattractive because they do not outweigh the benefit from conventional practices. For example, farmers conducting good agricultural practices in the EU may doubly benefit from the greening payment and the market that appreciates environmental-friendly products. However, in Vietnam, the market for such products remains too small due to the high prices but low information and guarantee of quality.[421] The Vietnamese Government has not had such regulatory incentives as tax reduction, direct/indirect subsidy for the application of VietGAP and GlobalGAP.

For the time being, the most feasible orientation for non-point pollution control is the preventive and precautionary approach. Both New Zealand and the EU has expressly prescribed such fundamental principle in their laws. Planning should be a significant instrument to prevent diffuse sources before the actual pollution takes place. However, this is what Vietnam is lacking. Without a consistent approach, the Vietnamese authority mostly leans on punishments and administrative governance, sometimes just case by case. Moreover, Vietnam faces other exceptional problems that might not be the case of the EU and New Zealand. Those are, firstly, the incompatibility and bureaucracy of the institutional structure, and secondly, the characteristics of smallholder farming agriculture.

[421] Hung Gia Hoang "Farmers' responses to VietGAP : a case study of a policy mechanism for transforming the traditional agri-food system in Vietnam: a dissertation presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Agricultural Systems and Environment at Massey University, Palmerston North, New Zealand" (Doctoral, Massey University, 2018) at 201.

6.2. Recommendations for Vietnam

All discussions have showed the failure of Vietnamese systems for preventing and controlling agricultural non-point pollution. The EU and New Zealand are the ideal role models for Vietnam to reform their law and enforceability. Some lessons have been acquired through this research but not all of them could be applied smoothly into Vietnam's system.

First, the preventive and precautionary approach should be applied far more drastically, based on the recognizing of non-point pollution impacts. Vietnam's limited resources for science might be an obstacle to set regulations and monitor pollution activities. This is where the precautionary principle takes effect because the burden of proof shall be shifted to the polluters. The precautionary principle may further solve the dilemma between environment and economic development. This problem is not uncommon, but more severe in developing countries like Vietnam. The precaution shall outweigh the environmental benefit over economic profit when the authority makes a decision. Provided that such principle is integrated into the Constitution, the LEP will hold a prevailing power over other acts, thereby the authority must be deeply concerned about environmental issues. If the significance of such principle can be strengthened under the LEP, many instruments shall gain more power. These are presented as follows.

- Master planning of river basin: as previously referred to, Vietnam needs the planning of water resources at basin level. Without an adequate plan, the authority cannot guarantee a consistent management of water bodies, such as water and land distribution for agriculture. Establishing vulnerable zones should be considered under the master plan. Some cases, such as, *Commission v United Kingdom* and *Commission v Spain* suggested that criteria for designating vulnerable zones should be specific and concise to avoid disputes.

- National bottom line: New Zealand has demonstrated the efficiency of national bottom lines. A similar system is the water quality targets under the EU's Nitrates Directive. Although Vietnam has a range of environmental

technical regulations, they are still far-reaching to the nationally unanimous approach. It would help Vietnam to set lower limits of water quality in a preventive system. Furthermore, categorizing water status is necessary but the 'one out – all out' approach in the EU's system might not be feasible for Vietnam. Assessing the whole status based on a single indicator is likely to cause many disputes, especially when Vietnam lacks water quality monitoring systems. Therefore, a national bottom line for water quality like in New Zealand will work well in the case of Vietnam.

- Waste hierarchy: the current law mostly deals with waste disposal rather than preventing such waste in the first place and re-using/recycling/recovering. Some wastes should be utilized in agriculture provided that there is a stringent regulation, such as the EU's Directive on using sewage sludge in agriculture. Waste recycling and recovery in Vietnam would face challenges because waste sorting is still uncommon among resident communities.

Second, the Vietnamese Government must ensure the coordination between horizontal and vertical agencies. This is an institutional problem of Vietnam's structure. Re-assessing all pieces of legislation is necessary to remove the overlapping responsibilities, particularly between MONRE and MARD. It is time for river basin authorities to be established and authorised adequate power. A basin authority shall consist of representatives from MONRE, MARD, all corresponding provincial committees and departments that allow such agency to make an effective decision. To that end, the case of Italy could provide the pros and cons as valuable experience for Vietnam. Despite achievements, some shortcomings have been exposed, notably the overlapping with local water planning, and the inadequate executive powers and budgets of basin authorities compared with regional administrations.[422] Those problems may easily occur in Vietnam's system. Therefore, the first

[422] Pellegrini, Bortolini and Defrancesco, above n 241, at 16.

and foremost is to fully equip basin authorities with sufficient resources to play the leading role in water control.

Third, the right to public participation and information needs to be guaranteed. The role of public in environmental protection is important but their access to information, planning, and decision-making process are very limited. Laws need to grant the public enough power to participate in crucial processes such as EIA. For the improvement of EIA system, Vietnam should imitate the EU's regulations rather than New Zealand's that does not set highly strict requirements of public participation. The public shall involve experts, resident communities and their opinion must affect the result of EIA approval. Moreover, an open information system of environmental issues should be available for the public to access. The new LEP 2020 should change their current provisions as soon as possible to make the full publication of EIA a state's mandatory responsibility.

Fourth, economic instruments under the Vietnam system needs a reform. There have been some incentives applied in Vietnam but barely contributing to any achievement. Experience from the EU and New Zealand shows that incentives must align with statutory measures to be effective. For instance, the greening payment in the EU is based on the cross-compliance with the Nitrate Directive and other regulations. Failing to follow the rules may result in the reduction of CAP support or penalty. Similarly, nitrogen cap and trade in Lake Taupo catchment in New Zealand is also a 'double' measure, where "cap" is a mandatory standard and "trade" is an optional stimulus. New Zealand also offers farmers the offset for reduction in stocking rates as the consequence of decrease in nitrates and sediment load. It is necessary for Vietnam to attempt such model to replace the current simple system of incentives. However, measuring outcomes of non-point sources shall be a barrier for determining the reasonable incentive 'price' that makes the payment attractive to farmers. New Zealand's experience suggests the approach of "correlated input" and "correlated practices" to measure the

outcome.[423] But under any circumstances, financial capacity remains Vietnam's biggest challenge because economic incentives shall be very costly to acquire a certain achievement.

Final, a non-regulatory approach should be enhanced. The code of practices under the EU's Nitrates Directive is a good example for Vietnam. Accordingly, smallholders in Vietnam should be encouraged to apply a code of practices that covers useful measures for managing non-point sources, such as the restriction of period, land, and terrain to apply fertilisers. For the long-term purpose, the government needs to educate most smallholders and all communities toward sustainable development. The effectiveness of law compliance and other tools like GAP is mostly based on farmers' awareness and knowledge. All regional council plans in New Zealand have an integrated education approach. For example, Waikato's plan refers to education about avoiding adverse effects of livestock and land use in water bodies.[424] Waikato Regional Council further employs sustainable agriculture advisors to support farmers and the agricultural industry in implementing long-term sustainable practices.[425] Besides education, research would support that process, and further provide farmers with technical equipment for good practices. However, it would not be an easy objective because an enormous financial resource should be spent. Notably, education is not only for the community, but also for improving state agency capacity. As referred to in previous parts, the government staff monitoring agri-environmental issues are inadequately educated. Despite several national plans and schemes, the government needs to invest more in the expertise education for their staff.

6.4. Conclusion

Nowadays, non-point pollution is an emerging problem that conventional systems may fail to control. The most challenging obstacle is to identify the

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[423] Harton McDonald Darla, Connor Jeff and Morrison Mark *Economic instruments for managing water quality in New Zealand* (TR 135 2004) at 61.

[424] Waikato Regional Plan s 3.9.4 (New Zealand).

[425] "Part 10: Approaches to non-regulatory initiatives" Office of the Auditor-General New Zealand <https://oag.parliament.nz>.

diffuse sources that probably cost an extensive resource. The thesis demonstrates that intensive agriculture, notably crop and livestock farming, is attributed to the leading cause. Therefore, monitoring agricultural production should be the primary objective to mitigate the non-point pollution impacts. Although the EU, New Zealand, and Vietnam have generally established comparable systems in managing non-point pollution, Vietnam faces their own challenges. The challenges may come from the institutional difference, laws' inadequacy approach and economy's unique characteristics. Those are why Vietnam's legislation should acquire various lessons and experiences from the EU and New Zealand to reform their mechanism. The research primarily aims to apply to Vietnam. An advantage of applying this research to the home country is that the thesis spends a large part studying the practice of Vietnam's laws, partly contributing to Vietnam without a transition process. In general, managing non-point pollution shall be a long trying process that requires the manipulation of international environmental principles into national laws. Non-point pollution sources, notably from fertilisers and manure, are unable to identify. Therefore, the system must be designed to monitor all input (substances) and output (waste) of pollutants, setting water quality targets for the overall management. The EU and New Zealand's legislations are not perfect, but they propose a feasible approach for Vietnam to learn. On the other hand, Vietnam should tackle their own problems that are the institutional structure, bureaucracy, and transparency. The research results would timely catch up with the development strategy of ASEAN. Specifically, ASEAN Economic Community Blueprint 2025 determines objectives of agriculture, including two strategic measures: to promote good agricultural practices to minimize the adverse effects on natural resources and reduce the greenhouse gas emissions, but at the same time, to enhance agricultural productivity.[426] That is also Vietnam's development orientation for the agricultural sector. In fact, the above objectives turn out to be the prominent term these days: 'sustainable intensive

[426] *ASEAN Economic Community Blueprint 2025* (2015).

agriculture'. It is undoubtedly necessary to create a solid legal framework for managing non-point source pollution that would protect water resources for future generations.

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