

LEGAL FRAMEWORK ON SUSTAINABLE USE OF RIVERS IN MYANMAR

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Abstract

Rivers as natural resources of immense importance symbolize life on Earth and constitute the core component of the environment. The world faces formidable challenges to meet the increasing demand for water, failing water quality, environmental pollution and associated impacts, and international conflicts over transboundary watercourses. There are various factors individually and collectively responsible for river pollution such as domestic and industrial wastes, pesticides, agricultural runoff and contaminated groundwater which are some of the major sources of river pollution, while upstream withdrawal and diversion of flow, insufficient rainfall during winter and irrigation also have impacts. The quality and quantity of rivers is deteriorating due to over consumption and mismanagement. Pollution growth and increasing standards of quality of life have an impact in this regard. These situations greatly influence the sustainable management perspective of inland rivers. The proper utilization of rivers is an emerging issue that demands national and international concerns as they are important in safeguarding the quality of life and in promoting sustainable development.

Keywords: Rivers, Sustainable Use, Standards, Monitoring, Enforcement

Introduction

Sustainable development is related to water resources are particularly crucial to a developing country like Myanmar. The country is gifted in abundance with rain and river water, but is in a grave situation regarding the availability of pure and sufficient water for drinking, household purposes, agriculture and fisheries. The quality of water deterioration due to unsustainable management is one of the main reasons of river pollution, but more so due to multiple other sources. In overcoming the situation, an effective regulatory regime is necessary, which contributes to improve water management as well as the quality of water to maximize social, economic and environmental benefits.

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The research will strive to evaluate the application and shortcoming of the present regimes of river conservation in Myanmar and suggests ways to improve outcomes. Specifically, the thesis aims to analyze national laws and policies that address river conservation; examine the strengths and weakness of the statutory framework in relation to river conservation; explore the reason for inadequacies of Myanmar's current laws and regulations on river conservation; suggest a comprehensive approach for the solution of the problem based on an effective arrangement.

Material and Method

The research methodology used documentary research which will be into two parts: method of data collection and method of analysis. Library research is the main method of data collection. Information and statistical data are obtained from books, periodicals, newspapers, reports and other publications including government official website. Data collected on existing water quality standards, legislation and management will be compared with the international criteria. Different levels of compliance monitoring systems in river pollution according to the existing situation will be described.

Rivers in Myanmar

Myanmar is well endowed with natural river resources; of which Ayeyarwady, Chindwinn, Kaladan, Leimyo, Mayu, Thanlwin, Attaran, Gyaing, Sittaung and numerous small rivers. In lower area of Myanmar, the delta region is crisscrossed with many rivers and creeks. There are only few transboundary rivers, virtually all water resources are within the national borders. The north-south direction of the mountain ranged of Myanmar is reflected in course of major river system.¹ In fact, with the exception of the Thanlwin, all the others are within in Myanmar territory and can be considered nationally owned water assets.

The Mekong river is an international river which involving six riparian countries: China, Myanmar, Laos, Thailand, Cambodia and Vietnam. It is called the Lancang River in China. Then it becomes the border river of Myanmar and China with the name of Mekong near the Nam Ngo River. The length of Myanmar-China border stretch is 31 kilometer up to the Myanmar-

¹ Sein Tun, Myanmar River Reference, Ministry of Transport, 1996, p-1.

Laos border near the Nam La River. The river flows southward to the confluence of the Mong Sai River as Myanmar- Laos's border with the stretch of 234 kilometer. Thus, the length of Mekong River which falls into Myanmar is 265 kilometers. Throughout the course of the river from the Myanmar-China boundary, there are five main tributaries within the Myanmar territory. They are The Nam Loi River, the Nam Yawng River, the Nam Lin River, The Nam Mae Sai River and the Nam Mae Kok River.¹

Environmental Problems on Rivers in Myanmar

In Myanmar it is almost a custom to discharge all kinds of waste into the rivers. Besides, the gradual growth of industries, increased use of fertilizers and pesticides, urbanization and discharge of municipal waste are continuously polluting the river system. In rural areas, unprotected water bodies permit contamination by animal and human wastes. Moreover, the numerous rivers and their tributaries that crisscross the country carry pollutants of the whole catchment area including upstream areas.²

Mining, as an essential economic sector, is a major and growing source of water pollution. Since the opening up of the country to foreign investors, the Ministry of Mines has granted hundreds of official and unofficial mining concessions to both local and foreign investors. Jade, copper and gold mining activities have expanded rapidly. Mines are associated with water pollution problems from tailings. Gold mining is particularly rampant in Kachin State, in northern Myanmar, especially along the Ayeyarwady and Chindwin Rivers.³

Sedimentation is one of the major adverse effects of storage dams in the lower courses of rivers. Mining and deforestation along the upper reaches of river basins cause serious erosion problems. The Yangon River, the Bago River and the Sittaung River have been identified as the rivers with water quality problems of greatest concern in Myanmar.⁴

Deforestation in the northern parts of Myanmar has large impacts on the landslides and other water related issues in the country. Also, the

¹ Ibid, pp-92-121.

² Dr Kyaw Naing, National Report of Myanmar on the Coastal Pollution Loading and Water Quality Criteria, BOBLME Project, 2011, p-4.

³ Burma Environment: People, Problems, Policies, The Burma Environmental Working Group (BEWG), 2011, p-61.

⁴ Inter-Ministry Task Force on Water Resources, Ministry of Agriculture and Irrigation, Strategic plan on integrated water resources management in Myanmar, 2004.

deforestation of the mangroves in the Ayeyarwady delta is problematic, since mangroves are the only natural protection against floods. The Ayeyawady mangrove forest is a prominent example as it has been affected by serious deforestation and environmental consequences due to increasing population pressure and over exploitation of mangrove products including woodfuel and charcoal exporting to meet the demand of Yangon City¹.

Climate change-induced changes to hydrological cycles will deteriorate water quality, quantity, and accessibility. Flooding in the downstream area of rivers causes serious navigation problems. Riverine floods are the most common type of flood in Myanmar. In the Ayeyarwady and Chindwin Rivers, flooding occurs when intense rain persists for at least three days over the headwaters of the rivers in northern Myanmar. In the Sittaung and Thanlwin Rivers, floods are duly caused by rainfall associated with low pressure waves (the remnants of typhoons and tropical storms of the South China Sea) moving from east to west across the country.²

River bank erosion damages and threatens the stability of roads and other infrastructure. Rivers in Myanmar are naturally dynamic due to a highly variable monsoon climate and the high sediment levels. The Ayeyarwady delta experiences a floodplain type of flooding, with relatively low flood levels but over a large area. The combination of heavy rainfall, strong winds, high soil saturation, and unstable soils in hilly areas causes landslides that destroy houses, roads, bridges and other infrastructure.³

Myanmar's largely rural population relies heavily on rivers and streams for their livelihoods and culture. These are now under serious threat from dam development. Building dams inside Myanmar offers an opportunity to acquire cheap electricity for neighboring countries, while investors are not accountable for the negative economic, social and environmental impacts of the dam building. The dams will have a serious impact on food security and health vulnerability. The dams will also decrease food security through their negative impact on fisheries and river bank farms. An estimated 48 hydropower projects such as Myitsone Dam, Shwelee River Dams and Thanlwin River Dams are currently being planned, constructed or already

¹ Water in Myanmar, Embassy of the Kingdom of the Netherlands, Ministry of Foreign Affairs, 2006, p-3.

² Ministry of Transport, The Union of Myanmar, Myanmar National Adaption Plan of Action (NAPA) to Climate Change, 2012, p-34.

³ Government of the Guideline Flood Manual Union of Myanmar, Myanmar Post Disaster Needs Assessment of Floods and Landslides, 2015, p-7.

exist in Myanmar on major rivers including the Thanlwin, Ayeyarwady, Chindwin, and Sittaung, as well as their tributaries.¹

Policies and Strategies for River Conservation

Since water resources play an important role in Myanmar's socioeconomic development, the Myanmar National Water Resources Committee (NWRC) has drawn up a national Integrated Water Resources Management (IWRM) Strategy Plan. This plan includes the strategies and policies of the involved stakeholders in the water resources system. The overall objective was to assess the water resources on basin and local scale for the present and future situations for which the water allocation, water utilization, water availability, water demand, inter-linkages between sectors; and validation data, are used as support for the recommendation of IWRM process. The water demand and allocation assessments were done for the major river basins in Myanmar such as the Ayeyarwaddy, Thalwin, Sitaung, Bago and Myit Ma Hka Rivers.²

The implementation of an integrated approach needs to be started through no-regret projects. For such kinds of projects, “Learning by doing” with utmost care during the planning and selection process is the best way to develop IWRM for Myanmar and the associated human resources. These projects need to be carefully designed, with the “broader view”, and closely monitored to allow adaptive management. The projects can be implemented in different regions e.g. the Mountains, the Dry Zone, the Rivers, the Cities and the Delta as a preparatory work for development of a Myanmar IWRM Master Plan with measures for country-wide implementation. These projects are *Integrated Meiktila Lake Area Development, Bagan Multi-Purpose Pilot River Beautification, Pan Hlaing Control Sluice cum Navigation Lock, Feasibility Study Mandalay-Bagan navigability improvement, Sittaung-Bago Canal Integrated Water System Analysis*.³

¹ Burma Environment: People, Problems, Policies, The Burma Environmental Working Group (BEWG), 2011, p-53.

² R. (Rens) Hasman, Water Allocation Assessment to Support IWRM in the Major River Basins of Myanmar: Now and In the Future, Delft University of Technology, 2014, p-164.

³ A statement of declaration from the 23rd Aug 2014 meeting between Expert Group of the National Water Resources Committee (NWRC) and Dutch High Level Experts held at DWIR office in Yangon.

The Myanmar National Water Policy (MNWP) which is to be the first integrated water policy for the watersheds, rivers, lakes and reservoirs, groundwater aquifers and coastal and marine waters, was approved by the NWRC in March 2014. The MNWP stated the goal is to apply IWRM and develop, share and manage in a sustainable manner. The vision is that Myanmar will become a water efficient nation based on IWRM by the year 2020. The mission is to introduce the Water Policy to all the agencies of water the sector to further develop respective rules and regulations.

The MNWP should result in a framework for creating a system of laws and institutions and a plan of action including the Myanmar National Water Framework Directive (NWFD), 2014. This Myanmar NWFD is to be an umbrella statement of general principles governing the exercise of legislative and executive powers.¹ The goal is to apply IWRM for sustainable development. The policy covers two broad areas such as water resources management and water resources use. The objectives include the providing of national policy on use of transboundary water courses. One of main strategies is that the polluter pays principle should be enforced.

The Myanmar NWFD includes the following seven key principles;

- (1) Good status, i.e. clean and sufficiently stored, for all ground water and surface water (rivers, lakes, transitional waters, and coastal waters) in Myanmar.
- (2) National Water Budget; a National Water Budget must be estimated under the current hydrological and meteorological conditions taking into consideration climate change impacts already visible. The groundwater must achieve “good quantitative status” and “good chemical status” (i.e. not polluted) by 2020. Classification of groundwater bodies, "good" or "poor" according to the current status, should be examined.
- (3) The ecological and chemical status; the ecological and chemical status of surface waters should be assessed according to the following criteria: Biological quality (fish, benthic invertebrates, aquatic flora); Hydro-morphological quality such as status of river banks, river bank structures, river training works, river continuity or substrate of the

¹ Water in Myanmar, Embassy of The Kingdom of The Netherlands, Ministry of Foreign Affairs, 2016, p-2.

river bed; Physical-chemical quality such as temperature, oxygenation and nutrient conditions.

- (4) Cooperation between the Union Government and the States and Divisional Governments; the proposed Directive requires local governments (States and Divisional Governments) "to encourage the active involvement of interested parties" in the implementation of the Directive.
- (5) Spatial management of river basins; all major basins in Myanmar need River Basin Development Plans, which provide a clear indication of the way the objectives set for those river basins are to be reached within the required timescale. Local Governments have to cooperate and work together for the management of the river basin. River Basin Development Plans should be updated every ten years.
- (6) Transgressions; the River Water Transfer projects are very popular due to water scarcity around the world and heavily criticized as being contrary to the principles of Sustainable Water Resources Management of River Basins. Therefore, this topic should be addressed in a proper manner.
- (7) Restructuring Process; citizens of Myanmar expressed their concerns over water scarcity, safety and water pollution issues through media and various workshops as well as direct communication to the President's office.¹

Myanmar is one of the most highly vulnerable countries in the world to the adverse impacts of climate change facing threats from extreme weather events, sea level rise, flooding and drought. Ahead of the next United Nation Framework Convention on Climate Change (UNFCCC) Conference of the Parties in Paris (COP21) in December 2015, governments are preparing their Intended Nationally Determined Contributions (INDCs). INDCs are a key input to the negotiations of a new international climate agreement that will be finalized at COP21 and come into effect in 2020. Myanmar is determined to play its role in the global effort and to crystallize this will into Myanmar INDC. Myanmar desires to undertake a series of actions to demonstrate its commitment to climate change mitigation and highlight options for

¹ Ingrid Nesheim, Bente M. Wathne, Bo Ni and Zaw Lwin Tun, Myanmar: Pilot introducing the National Water Framework Directive, 2016, p-23.

adaptation. Myanmar is therefore actively engaged in designing and implementing the required policies, governance, financial and programming instruments to address climate change.¹

According to planning and implementation of INDC, the policy area of forest management aims to realize the co-benefits of the policy such as reducing soil erosion, thereby decreasing the risk of floods and landslides that may occur near rivers. According to the specific elements of forest policy, in the catchment areas of rivers, streams, lakes and dams, forest plantations, agroforestry practice, community forestry have been done and also to reduce soil erosion, contour bunds, sediment trapping dams, conserving natural springs and bioengineering measures are being done. In the forestry sector, projects example includes the *Mangrove Rehabilitation Plan for the Enhancement of Disaster Prevention in Coastal and Delta Areas*.²

Laws Relating to River Conservation

Myanmar has not only a direct law but also a number of sectoral laws that are related to protection and conservation of rivers and control of pollution. The Republic of the Union of Myanmar Constitution, 2008 provides that the union shall protect and conserve the natural environment.³ It also provides that every citizen has the duty to assist the union in carrying out environmental conservation. However, there is no provision of constitutional rights to a clean and healthy environment and instead citizens have a duty to assist the Union Government in environmental conservation.⁴ Under the Constitution, the national Parliament can enact environmental and other protective laws.⁵

In Myanmar, the Environmental Conservation Law, 2012 is a National Framework Law which contains certain provisions with respect to the protection of environment matters. The objectives of the Environmental Conservation Law include the systematic integration of environmental conservation in the sustainable development process, a healthy and clean environment and the conservation of natural and cultural heritage for the benefit of present and future generations.⁶

¹ Ministry of Environmental Conservation and Forestry, Myanmar's Intended Nationally Determined Contribution INDC, The Republic of the Union of Myanmar, 2015, p-1.

² Ibid, p-7.

³ Section 45, The Republic of the Union of Myanmar Constitution, 2008.

⁴ Section-390 (b), The Republic of the Union of Myanmar Constitution, 2008.

⁵ Schedule 1, Section 6(b), Ibid.

⁶ Section-3, Environmental Conservation Law, 2012.

The Environmental Conservation law is based on the "polluter-pays principle" with compensation for environmental impacts to be paid to a fund to be set up by the Ministry of Natural Resources and Environmental Conservation.¹

The Environmental Conservation Law provides the responsibilities of a project proponent/ business owner for reducing environmental impacts as follows;

- A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.
- The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.²

The Environmental Conservation Law mentions the possibility that certain categories of companies, whose activities can impact on the environment, may be obligated to request authorization from the Ministry. In addition, the Law requires that any business that requires prior permission must have insurance cover for impacts on the environment. The Law provides for criminal penalties, if these apply to business entities, and payment of compensation for damages. According to this Law, any person without the prior permission, who operates a business, work-site or factory or workshop which is required to obtain the prior permission under this Law shall, on conviction, be punished with imprisonment for a term not exceeding three years, or with fine from a minimum of one hundred thousand kyats to a maximum of one million kyats, or with both.

According to the Environmental Conservation Rules, 2014, the Ministry shall determine the categories of projects, businesses; services or activities with regards to whether or not shall conduct an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) study to conduct such projects. Moreover, the Environmental

¹ Section-7 (o), Ibid.

² Section-13 (d,e,f), Ibid.

Conservation Rules stipulate the basic policy and concept of EIA application for the development of project: to prepare the environment impact assessment system and submit to the Ministry; and to implement and carry out environmental management plan within the time stipulated by the Ministry and submit the performance situation to the Ministry.

Under the Environmental Impact Assessment Procedure, 2015, a project proponent or qualified third party must conduct an IEE or EIA report and prepare an Environmental Management Plan (EMP).

For making investments in the energy sector such as dam projects and hydropower generation and mining activities in Myanmar Rivers, the project proponent must submit the project proposal to the Ministry of Natural Resources and Environmental Conservation under the Environmental Impact Assessment Procedure.¹ The Environmental Conservation Department (ECD) has the power for screening the desired project proposal. After that ECD will decide whether IEE or EIA is needed for the desired project or not.² If the project does not need to do an IEE or EIA, the desired project can proceed to receive the license from the Myanmar Investment Commission, (MIC). If the desired project is required to do an IEE or EIA, the desired project will arrange to submit an IEE³ or EIA report⁴ and prepare an EMP⁵ before receiving the Environmental Compliance Certificate (ECC).⁶ After screening the IEE or EIA report of the relevant project, the Ministry issues the ECC to the project proponent.⁷ After receiving the ECC, the project proponent shall apply to the MIC in order to acquire a license for carrying out the desired project.⁸

Water resources and river conservation works are being managed according to the laws and regulations of the State. The Conservation of Water Resources and Rivers Law, 2006 is the direct law relating to inland river conservation. This law aims to conserve and protect the water resources and rivers system for beneficial utilization by the public; to smooth and safe

¹ Article-23 (a), Environmental Impact Assessment Procedure, 2015.

² Article-23(c), Ibid.

³ Articles-37-38, Ibid.

⁴ Articles-64-66, Ibid.

⁵ Articles-76 and 77, Ibid.

⁶ Article-83, Ibid.

⁷ Articles-41 and 70, Ibid.

⁸ Articles-86 and 87, Environmental Impact Assessment Procedure, 2015.

waterways navigation along rivers and creeks; to contribute to the development of State economy through improving water resources and river systems; and to prevent serious environmental impacts.¹ However, this Law is under the jurisdiction of the Ministry of Transport and Communications. This Law focuses on transportation safety and its development. This law includes the general prohibition on polluting water courses on rivers. Moreover, this Law provides not only criminal penalty² but also compensation for the relevant offence.³ If the said compensation is not paid, it shall be recovered as as a fine under Section 386 of the Code of Criminal Procedure.⁴ Whoever attempts or conspires or abets in the commission of an offence under this law shall be punished with the punishment provided for such offence in this law.⁵

The followings sectoral laws are indirect laws related to river conservation. They have specific descriptions relating to the discharge of wastewater and water quality control in rivers.

- The Penal Code, 1861
- The Obstructions in Fairways Acts, 1881
- The Yangon Waterworks Act, 1885
- The Defile Traffic Act, 1907
- The Ports Act, 1908
- The Yangon Municipal Act, 1922
- The Water Power Act, 1927
- The Emergency Provisions Act, 1950
- The Factories Act, 1951 (amendment in 2016)
- The Union of Myanmar Public Health Law, 1972
- The Forest Law, 1992
- The Forest Rules, 1995
- The Protection of Wild Life, Wild Plants and Conservation of Natural Areas Law, 1994

¹ Section-3, The Conservation of Water Resources and Rivers Law, 2006.

² Sections-25, 26 and 27, Ibid.

³ Section-28, Ibid.

⁴ Section- 28, Ibid.

⁵ Section-29, Ibid.

- Myanmar Mines Law, 1994
- Myanmar Mines Rules, 1996
- The Water and Air Pollution Control Plan, 1995
- The City of Yangon Municipal Law, 2013
- The Nay Pyi Taw Development Law, 2009
- The Inland Water Vessel Law, 2015
- The Myanmar Port Authority Law, 2015
- The Environmental Impact Assessment Procedure, 2015
- The Canal Act, 2017
- The Embankment Law, 2017

Water Quality Standards and Guidelines

Control of the disposal of wastewater from residential buildings, office buildings and factories is the responsibility of the Ministry of Natural Resources and Environmental Conservation. The Environmental Conservation Law, 2012 provides that the Ministry may, with the approval of the Union Government and the Committee, stipulate environmental quality standards regarding river conservation as follows;

- (a) suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;
- (b) effluents standards; and
- (c) Other environmental quality standards stipulated by the Union Government.

According to the Environmental Conservation Law, the Ministry issued the National Environmental Quality (Emission) Guidelines, on December, 2015. The Guidelines aim to prevent pollution for purposes of protection and ecosystem health.¹

For inland water quality control, “water quality criteria” are set as the benchmarks for water quality conservation under the National Environmental Quality (Emission) Guidelines. If there is no other provision, these Guidelines

¹ Article-1, The National Environmental Quality Guidelines, 2015.

refer to emissions sources, and are intended to prevent or minimize adverse impacts to environmental quality or human health by ensuring that pollutant concentrations do not reach or exceed ambient guidelines and standards.¹

The emission guidelines shall apply to any project subject to EIA procedure, as adopted by the Ministry. Moreover, the emission guidelines specifically apply to all project types listed in the EIA procedure.² These guidelines shall be reflected in investment projects of EMP and ECC.³

The National Environmental Quality (Emission) Guidelines include general guidelines; industrial specific guidelines; guidelines for agriculture, livestock and forestry development; guidelines for manufacturing; guidelines for waste management; guideline for water supply; guidelines for infrastructure and service development and guidelines for mining. These guidelines include the standards (criteria) of water quality which are uniform among the country.

In the absence of any other provisions, the National Environmental (Emission) Guidelines will apply to all the types of projects listed in the EIA procedure that have either direct or indirect discharge of process water, wastewater from utility operations or storm water to the environment without any treatment.

Before the Myanmar National Environmental Quality Guidelines of 2015, the Ministry of Industry-1 (MOI-1) issued the Water and Air Pollution Control Plan in the year 1995. This Plan was drawn up for the uniform adoption of the preparatory prevention measures. The order aims to prevent pollution and damage to the natural environment by waste discharged from factories; and to develop the programme by laying emphasis on the control of the wastes, reduction of wastes and elimination of wastes. Moreover, the order intends that control should be carried out by exercising the “Cleaner Production Programme” adopted by United Nations Environmental Programmes (UNEP).

This order prohibits wastewater from factories being directly discharged into rivers. The order also designates the effluent quality standards, but these standards are temporary and apply only until the national effluent quality standards are officially designated.⁴ The water pollution control system, under the order of MOI-1, requires that the type of discharge of wastewater from factories shall be measured and data recorded using 16

¹ Article-4, Ibid.

² Article-5, Ibid.

³ Article-6, Ibid.

⁴ Article-3, The Water and Air Pollution Control Plan, 1995.

parameters¹ for analytical data of the liquid effluent. Wastewater from factories, having conditions of high acidity, alkalinity, high temperature and the presence of toxic chemical such as arsenic, mercury and cadmium is prohibited from being directly discharge into public water areas such as river, creek, lake and pond.²

According to this order, factories are required to complete the implementation of wastewater treatment facilities within their own specified time-frame, outside of which the direct discharge of wastewater into public water areas without pre-treatment is prohibited.³ By the requirement of this order, the factories shall check and record the condition of the treated effluent after treatment.⁴ The factories shall specify the quality standards of the wastewater discharged into public water areas according to the types and nature of the factories under their management,⁵ and these standards must be inconformity with 26 parameters⁶ specified by order of MOI-1 until the national quality standards are promulgated by the State.⁷

However, this plan of MOI-1 concerns only state-owned economic enterprises under the jurisdiction of MOI-1. Therefore, this plan is not absolutely effective to control discharge of wastewater from all factories in Myanmar.

Institutional Arrangements on River Conservation

In Myanmar, several government agencies and departments under different ministries are engaged independently both in surface and ground water use but the extent and type of water use are different from one another.

There are different government organizations which are responsible for water environmental management within respective sectors such as health, irrigation, mining, transport, and industry. Myanmar has 21 Ministries under the Office of the Presidents as of May 2016. The leading Ministries in charge of environment and social considerations are the Environmental Conservation Department of the Ministry of Natural Resources and Environmental

¹ Annexure(B), Ibid.

² Article-7, Ibid.

³ Article-9, Ibid.

⁴ Article-11, Ibid.

⁵ Article-12, Ibid.

⁶ Annexure (C), Ibid.

⁷ Article-9, Ibid

Conservation. This Ministry is responsible for the implementation of the Environmental Conservation Law. However, clarification of the responsibility of different ministries may remain an issue in the promotion of environmental protection in the country, including water pollution control.¹ The nine Governmental Ministries identified as having some responsibility for water issues in rivers number around 18 institutions.

Concerning river monitoring, there are no specific regular monitoring programmes for ambient water quality in the country. Similarly, water quality monitoring is also conducted by different governmental agencies in line with their own respective purposes. To ensure appropriate and efficient monitoring and reporting, it is advisable to use existing mechanisms in the following ways.

- (a) The Department of Methodology and Hydrology (DMH) under the Ministry of Transport and Communications will be responsible for (i) monitoring and reporting water quality, (ii) developing indicators for watershed quality, (iii) surveying and collecting meteorological and hydrological data of the main river systems, and (iv) disseminating and sharing of water resources data with other water sector agencies;
- (b) The Irrigation Department (ID) under the Ministry of Agriculture, Livestock and Irrigation will be responsible for managing the exploitation, development and use of water and water resources in agriculture, reclamation and drainage. It will also be responsible for preventing and controlling flooding in protected areas, the collection of hydro-meteorological and water quality data on a project-oriented basis, and disseminating and sharing data with other water sector agencies;
- (c) The Department of Hydroelectric Power (DHP) under the Ministry of Electricity and Energy It will also be responsible for collecting and disseminating hydrological data and hydrographical survey data

¹ National Performance Assessment and Sub-regional Strategic Environment Framework in the Greater Mekong Sub region, "Myanmar National Environmental Performance Assessment (EPA) Report" prepared by NCEA and UNEP Regional Resource Center for Asia and Pacific, 2006, p-96.

together with generated firm power for past, present and future projects;

- (d) The Department of Tourism under the Ministry of Hotels and Tourism will be responsible for the management, exploitation, development and use of water and water resources in the tourism sector;
- (e) The Ministry of Industry will be responsible for the management, exploitation, development and use of water and water resources in industry and mining as well as water quality from industrial waste;
- (f) The Department of Health (DoH) under the Ministry of Health will be responsible for the management, exploitation, development and use of water for health care purposes;
- (g) The Ministry of Border Affairs will be responsible for the rural water supply and domestic consumption. It will also be responsible for water supply in rural and urban areas, water quality and urban drainage;
- (h) The Water Resources Utilization Department (WRUD) under Ministry of Agriculture, Livestock and Irrigation will be responsible for implementation, development and use of water pumping from rivers and groundwater to be used to irrigate farmland;
- (i) The Directorate of Water Resources and Improvement of River Systems (DWIR) under the Ministry of Transport and Communications will be responsible for the implementation, management, development and use of water and water resources in transportation, the protection of river banks and river systems as well as the collection of hydrological data and hydrographical surveys for navigation;
- (j) The Forest Department (FD) under the Ministry of Natural Resources and Environmental Conservation will be responsible for conservation management, development and use of forests in a sustainable manner. It will also be responsible for the reforestation programme and for monitoring deforestation and forest cover reduction in critical areas;
- (k) The Environmental Conservation Committee (ECC) under the Ministry of Natural Resources and Environmental Conservation will be responsible for coordinating with the ministries and for supporting and presenting proposals, with recommendations, put forward by the

task forces to the Government; prohibiting the relevant Government departments and organizations if the environmental damages arise or situations for damage arise; and laying down and carrying out the Myanmar national environmental policies for conservation and enhancement of environment.

- (l) The National Water Resources Commission (NWRC) under the Ministry of Transport and Communications will be responsible for coordinating the various line agencies in carrying out studies and formulating policies, drafting laws, strategies and action plans for the planning, management, use and protection of water and water resources. It will also be responsible for reporting the results of implementing activities related to water and water resources, including watershed quality indicators, to the Government;
- (m) The National Planning Department under the Ministry of National Planning and Finance will be a mechanism for monitoring financial resources allocation and utilization for the water sector. It will also be responsible for compiling resources allocation to the water sector and for providing advice or strategies to increase resource mobilization and utilization; and
- (n) The Ministry of Foreign Affairs will be responsible for setting up and monitoring a programme for reducing the number of conflicts with neighbouring countries that are against international laws concerning utilization of water and water resources from trans-boundary rivers. It will also be responsible for keeping track of, and compiling information on, conflicts and violations and for preparing a report together with recommendations for improving/resolving such conflicts.¹

Findings

Although Myanmar has Conservation of Water Resources and River Law, this law is not covering all aspects of water resources. Supplement any legislation on degrees for water pollution control is necessary to fill the gaps

¹ Working Group of WACDEP Myanmar, Report of Assessment on Integration Water Security and Climate Resilience Aspects to Myanmar National Water Policy.

in the river conservation laws and to provide practical guidelines and criteria to the enforcement agencies. Myanmar rivers conservation embraces several functions such as water quality management, legislation and regulation for river utilization, standard setting and collection and treatment of domestic and industrial wastewater. Each function needs an appropriate institutional arrangement in order to make the whole system work effectively. However, Myanmar's river conservation system is scattered among the different ministries and the designations of responsibility lack an ad hoc character. No central institution has been designated for coordinating the activities of these various stakeholders. This is required in order to organize and collocate existing data on water quality to ensure its satisfactory analysis and interpretation.

Conclusion

River conservation must be based on principles of ecological sustainability and social justice. To ensure sustainable development in Myanmar, social impact assessments need to be developed in the primary stage of the decision-making process for national development planning, to develop environmentally; sector wide, region wide and nationwide. In order to take steps towards ecologically and socially responsible development in the context of inland river conservation since affected communities-upstream and downstream need to be protected. Myanmar must have a sound policy framework for environmental protection and sustainable development that enables citizens to take part in decision making about their own development, and ensures responsible private sector investment.

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