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# Capacity Development in Environmental Management Administration through Raising Public Awareness: A Case Study in Algeria

Mitsuo Yoshida\*

## Abstract

During the civil war of the mid-1990s, large-scale destruction of social infrastructure and environmental management systems occurred in Algeria, leading to significant environmental deterioration. In the course of national reconciliation and the reconstruction process that began in 2000, environmental authorities were established and, with the support of international donor agencies, the national environmental policy, plan, and strategy were prepared. While these efforts shaped Algeria's environmental management administration system into its modern form, they have not been effective in actually controlling environmental problems in the country. Under these conditions, the unexpected discovery of a severe mercury contamination had a major effect on the situation in the country. The discovery itself was announced at a public seminar, and Japan's experience with industrial mercury pollution as a result of the "Minamata Disease incident" was widely shared with the public through mass media. The wide reporting of these experiences as well as others of pollution in local cities by the mass media, accelerated public concerns and eventually formed public opinions into a demand for immediate depollution efforts. The environmental management administration became functional at this time and backed by growing public awareness and strict law enforcement, it started to conduct specific countermeasures against mercury pollution. The Algerian case suggests that raising public awareness through the disclosure of information on environmental monitoring may trigger the realization of an effective environmental management administration system.

**Keywords:** capacity development, environmental management administration, pollution, information disclosure, public awareness

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## **Introduction**

In 1972, the Stockholm United Nations Conference (UN) on the Human Environment, placed environmental issues on global and national policy agendas and in 1974, resulted in the establishment of the United Nations Environment Programme (UNEP). This change in policy agenda led to the emergence of centralized environmental ministries or environmental protection authorities at the national level that were responsible for the administration of environmental management at the national level. In the years that followed, many countries attempted to establish government agencies with a sole or primary focus on the environment and to establish environmental laws, regulations, and standards that were in-line with those set during the 1992 UN Conference on Environment and Development (UNCED) held in Rio de Janeiro (Sagar 2000; Kameyama 2003; Bayerlin and Marauhn 2011). In addition to these government efforts, civil society became increasingly aware of the negative impacts of unrestrained industrialization.

In the course of establishing environmental ministries and authorities, each government imposed legally and administratively enforceable environmental regulations and standards to protect the environment and public health and safety. Other methods of environmental administration included the application of economic incentives and disincentives, which was essentially an attempt to promote allocative efficiency through monetary inducements. These measures recognized the market effects of health and safety risks and environmental damage that producers of goods and services absorb, or pass on to consumers, the social costs and the private costs of production, for example, a pollution charge (Rothwell 1992). Through both regulative and economic methods, government authorities acquired sufficient capabilities to enforce the system on the basis of appropriate environmental policies.

Most countries, including developing countries, have some form of environmental ministry or authority with overall responsibility for “protecting the environment” at the national

level; however, these authorities are often characterized by the following problems: (i) being relatively young, poorly staffed and, hence, weak organizations with limited political influence or fiscal support; (ii) being centralized, i.e. institutional monopolies with limited representation at the local level; (iii) having mandates that frequently overlap with other sectoral and non-sectoral line ministries and lead to institutional “turf battles” that often limit authorities to their own institutional setting; (iv) having limited capacity to commission, review, and use environmental assessments (EAs) in national planning; and (v) having limited capacity to enforce mitigation measures prescribed in the EAs and/or the enforcement measures under the Polluter-Pays-Principle (Jänicke 1997; OECD 2001). Thus, in many developing countries, environmental ministries/authorities are often weak and inactive and the legal systems governing environmental management do not function as they should (Sachs 1995; Mori 1999; World Bank 2008).

One of the reasons for this weakness is likely to be inadequate institutional setup. Statutes establishing most environmental regulatory authorities have often been rather vague, giving the authority freedom to choose how the various statutory mandates should be implemented (Brevis and Dobbs 1986). Consequently, environmental regulatory authorities often implement very limited or ineffective pollution controls. The weakness of environmental regulatory authorities is also attributed to policy volatility under pressure from the private sector and the market economy.

In order to strengthen and overcome the above-mentioned weaknesses in environmental management administrations in developing countries, international donor agencies have attempted to support policy formulation, planning, institution building, and human resource development. Undeniably, this support has aided the improvement of environmental management administrations but has not always led to an improvement in overall performance with administrations still failing to fully function.

The probable causes of the failure of formally established environmental management administrations in developing countries, has been discussed in the various capacity development and aid approaches. These arguments suggest that insufficient capacities at the organizational and/or institutional level (e.g. UNDP 2002; JICA 2006), a lack of ownership by aid-recipient countries (e.g. The Paris Declaration; OECD 2005), and insufficient functional capacities (e.g. UNDP 2011), underpin the problem. While these points should be considered, it is still not clear how environmental management administrations become functional or what kind of donor approach is needed to support this functionalization.

This article is a single-nation case study on Algeria, where in the early 2000s, in a similar way to many other developing countries, the environmental management administration system did not function despite support from donors. It was not until the mid-2000s that the system became functional. By examining the development history of environmental management administration in Algeria, this paper will explore the strengthened capacities and factors that promoted the functionalization of the environmental management administration system. In so doing, lessons learned are drawn from the Algerian case which promote effective and efficient technical cooperation by donor agencies to support capacity development in environmental management administrations.

Thus, the research questions are as follows: How did the capacity of the Algerian environmental management administration develop and become functional? What are the lessons from the Algeria's case that can help donor agencies to support capacity development in environmental management administrations?

The key terminology in the present paper are clarified as follows: *Environmental management* means "to conductor control the course of affairs by one's action which affects negative impacts to the environment"; *environmental management administration* is defined as, "a public authority (ministry etc.) tasked with directing or superintending the execution or

conduct of environmental management”,<sup>1</sup> and *environmental management administration system* is defined as “a regularly interacting or interdependent group of actors related to the environmental management administration.”

## **1. History of the Algerian Environmental Management Administration**

When considering the development of environmental management administration in Algeria, it is necessary to consider the social and economic background of the state. In this section, the history of Algeria after its independence and its environmental problems are briefly outlined according to the following nine periods: (1) independence and industrialization, (2) civil war and environmental deterioration, (3) reconstruction of environmental administration systems after the civil war, (4) discovery of mercury pollution, (5) information disclosure, a focusing event, and agenda setting, (6) countermeasures against mercury pollution, (7) development of technical capacities for wide-ranging environmental monitoring, (8) development of the legal system for environmental management administration, and (9) improvement in the performance of the environmental management administration.

### **(1) Independence and industrialization**

Algeria is the largest country on the African continent. Its land accounts for 2.38 million km<sup>2</sup> and its population exceeds 37.8 million people (as of 2013, according to the Algeria Bureau of Statistics). Algeria's population is concentrated mainly in the northern part of the country – the Mediterranean coastal zone.

After Algeria gained political independence in 1962, the country underwent significant economic development mainly centered in the Mediterranean coastal zone, backed by abundant

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<sup>1</sup> The essential difference between “administration” and “management” is that the former means “to serve” and the latter “to control or gain results” (Hughes 2003).

natural resources including oil and natural gas. Uncontrolled urbanization took place in this area. Benefitting from vigorous investment of domestic and foreign capital in the country, Algeria was considered Africa's largest emerging industrialized country in the 1980s. At that time, approximately 240 mega-scale industrial plants were in operation in various sectors (LDK-ECO 2006). The industries included carpet mills, cement factories, chemical plants, automobile assembly plants, food-processing installations, oil refineries, and textile plants. These industries are potential generators of industrial pollutants in the form of organic compounds, heavy metals, petrochemicals, and other toxic substances that require appropriate pollution control or treatment facilities.

## **(2) Civil war and environmental deterioration**

In the early 1990s, political confrontation between the government, the military, and extremists worsened, and Algeria became a civil war state. Although the exact number is still not clear, approximately ten thousand casualties occurred during the civil war, and hundreds of thousands of people, including engineers and highly-educated core human resources, were forced to escape abroad (Ageron 1999). During this period, there was a state of ruling but not governing in Algeria (Cook 2007). Much of the social infrastructure, such as a number of industrial plants and the sewage system, was destroyed or inadequately maintained. In addition, remaining industrial plants operated without any environmental controls, which caused the majority of the environmental pollution problems that were experienced both during and after the civil war.

According to statistical data reported in 2002 by the National Plan for the Environment and Sustainable Development (PNAE-DD), the investment rate for environmental infrastructure during the 1990s dropped to 0.84% (ratio to GDP) compared to the 1.16% average during the 1980s (MATE 2002). Waterborne infection disease rates, cholera, typhoid, and dysentery were extremely high in the early 1990s, and the rates of typhoid and dysentery suddenly increased starting in 1994 when the civil war intensified (see Table 1). At that time, the environmental

degradation of Algeria became serious, and it was assessed that “the situation would become very tragic in the not-too-distant future” (Zaimeche and Sutton 1997, p. 41).

**Table 1:** Incidence of waterborne infectious diseases (unit: per million) during the civil war in Algeria. The civil war became fierce around 1994, when the incidences of typhoid and dysentery increased. (Data Source: Plan National d’Actions pour l’Environnement et le Développement Durable (PNAE-DD) 2002)

Year	1992	1993	1994	1995
Cholera	0.39	0.06	0.47	0.02
Typhoid	9.68	9.03	16.36	16.21
Dysentery	7.72	7.78	9.24	11.09

During this period, an industrial pollution control project was planned by international donors in order to assist the Algerian government to reduce the hazardous pollution that causes health problems or serious ecological degradation (Algeria Industrial Pollution Control Project; World Bank 1996). However, due to the difficulties created by the civil war, the project components were revised on three different occasions during the first half of the implementation period. The implementation was significantly delayed, and the project design was modified into an institutional development project that was eventually completed in 2005 (World Bank 2005). Thus, the project could not successfully prevent the environmental deterioration of the late 1990s.

From the late 1990s, the civil war gradually calmed down and national reconciliation progressively took shape;<sup>2</sup> this led to a resumption of operations at nearly 4,000 old industrial plants and partially destroyed elements of infrastructure in the Mediterranean coastal zone

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<sup>2</sup> The reconciliation could not fully solve the social conflicts and, inspired by similar protests across the Middle East and North Africa known as the “Arab Spring,” popular uprisings took place all over the country (the so-called “2010-12 Algerian Protests” - *Al Jazeera* 13 February 2011).

(Rebah 2005). Facilities and infrastructure related to environmental pollution control were very limited, and regulatory environment management by public authorities was totally deficient; as a result, significant water and air pollution problems occurred during this period of insufficient regulation and control.

### **(3) Reconstruction of environmental administration systems after the civil war**

Within the post-civil war reconstruction process of the early 2000s, the Algerian government recognized a strong need to establish and strengthen the environmental management administration systems so as to regulate industrial emissions and protect the environment. However, due to insufficient human resources in the environmental management administration authorities, it was difficult to design and install new systems. The Algerian government then sought technical assistance from international donors in the following two fields:

(i) Institution building and planning support: institution building within the environmental ministry (MATE) and relevant authorities (support for drafting of laws, regulations, and plan of the environmental management issues).

(ii) Practical support for strengthening the capacities of the environmental management administration: enhancement of monitoring and enforcement activities by the local environmental department of “Wilaya” (the provincial-level local government unit in Algeria; DEW) and the public monitoring agency (Observatoire national de l’environnement et du développement durable; ONEDD), and the human resource development.

To address (i), the Algeria Industrial Pollution Control Project conducted by the World Bank was revised in cooperation with other international donor agencies (UNDP and the German donor *Deutsches Gesellschaft für Technisches Zusammenarbeit* (then the “GTZ”, now the “GIZ”)) to support institution building. The project supported the establishment of the Ministry of Territorial Planning and the Environment (MATE), the compilation of environmental data and reports on the state of the environment in Algeria (RNE2000 and

RNE2003), as well as the preparation of the “National Environmental Strategy” (Stratégie nationale de l’environnement; SNE2000) and the "National Plan for the Environment and Sustainable Development" (Plan national d’actions pour l’environnement et le développement durable; PNAE-DD2002). However, according to donor observations, weak ownership on the Algerian side affected project implementation, in particular from 1997 to 2001 in terms of a commitment to disbursements, compliance with the procurement schedule, and adherence to the loan covenants (World Bank 2005). The established environmental management administration system (MATE and other relevant organizations and institutions) did not function well (Staff Assessment Report; World Bank 2002), which indicated an urgent necessity to strengthen support for the functionalization of the system.

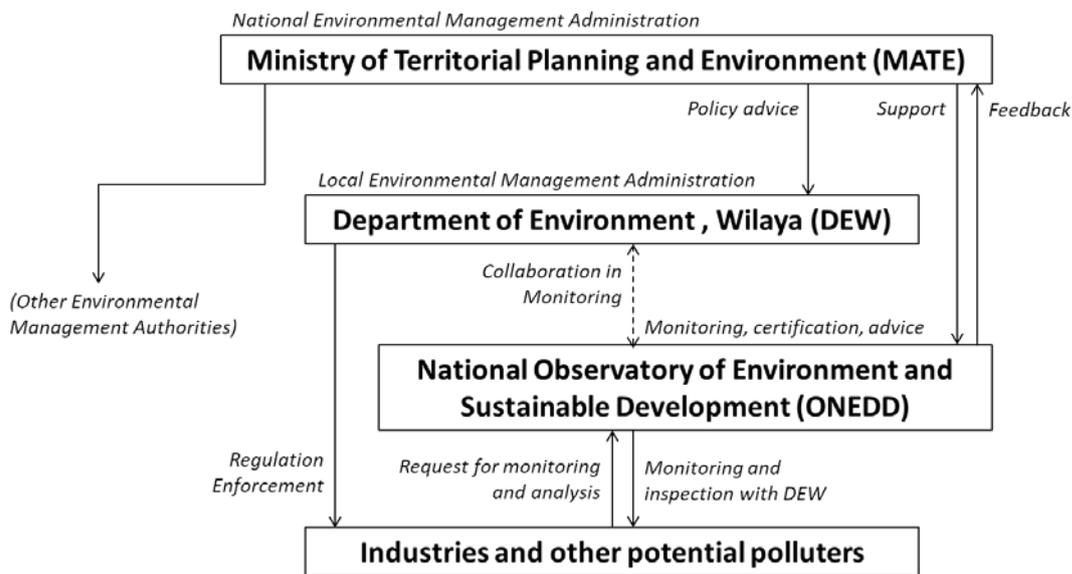
To address (ii), a capacity strengthening program was required to functionalize environmental institutions and administration authorities. In order to achieve this, between 2003 and 2012, Japan (through JICA) provided a staff training program for environmental authorities, organizational development support for the environmental monitoring institute (ONEDD), the provision of environmental analysis equipment, and support for law enforcement. European donors (EU) also implemented a number of technical assistance measures, provided analytical equipment, and facilitated environmental information exchange between Mediterranean countries (Mediterranean Environmental Technical Assistance Programme (METAP); UNEP/MAP-Plan Bleu 2009).

These efforts in the areas of (i) institutional development and (ii) capacity strengthening, can be regarded as support for the comprehensive Capacity Development for Environmental Sustainability (CDES) at the individual, organizational, institutional, and societal levels, starting from zero in the late 1990s (UNDP 2011).

The formally established system of Algerian environmental management administration functions in the following way (see Figure 1): it is wholly governed by the Ministry of Territorial Planning and Environment (MATE), which creates laws, decrees, standards, policies, and plans

at the national level. The MATE directly controls the Department of Environment (DEW) in the 48 Wilayas (Provinces) throughout the country, each of which is responsible for coping with local environmental problems and enforcing pollution laws. The ONEDD is the public environmental monitoring agency that collaborates with the MATE and the DEWs for inspection, monitoring, and enforcement activities in industries and other potential polluters from technical aspects. The ONEDD also conducts consignment analysis works from industries as their self-monitoring activities. The framework of the Algerian environmental management administration system and the functional relationships between the relevant organizations as defined by law, are shown in Figure 1 (below).

The functionalization of the system was still a major challenge for the Algerian government in the early to mid-2000s, largely due to the issues expressed in (ii) above. In the following section, the history of development and capacity development (CD) supports since 2003 are discussed.



**Figure 1:** Outline of the formal system of environmental monitoring, inspection, enforcement, and feedback to policy conducted by environmental management administration organizations in Algeria.

#### **(4) Discovery of mercury pollution**

In 2003, a preliminary environmental monitoring study was held in the Oued El Harrach river basin in Algiers city in cooperation with JICA experts. According to the Algerian government, the area was considered typical of environmental pollution zones in urban areas, (RNE2003). In fact, the Oued El Harrach was highly polluted by untreated sewage water leaking from a malfunctioning wastewater treatment plant, which emitted strong odors around the river stream and led to a deterioration of the state of public sanitation. In addition to sewage pollution, industrial pollution was also present; the Oued El Harrach river basin was one of the major industrial zones in Algeria where many industrial units were located (Louati 2015).

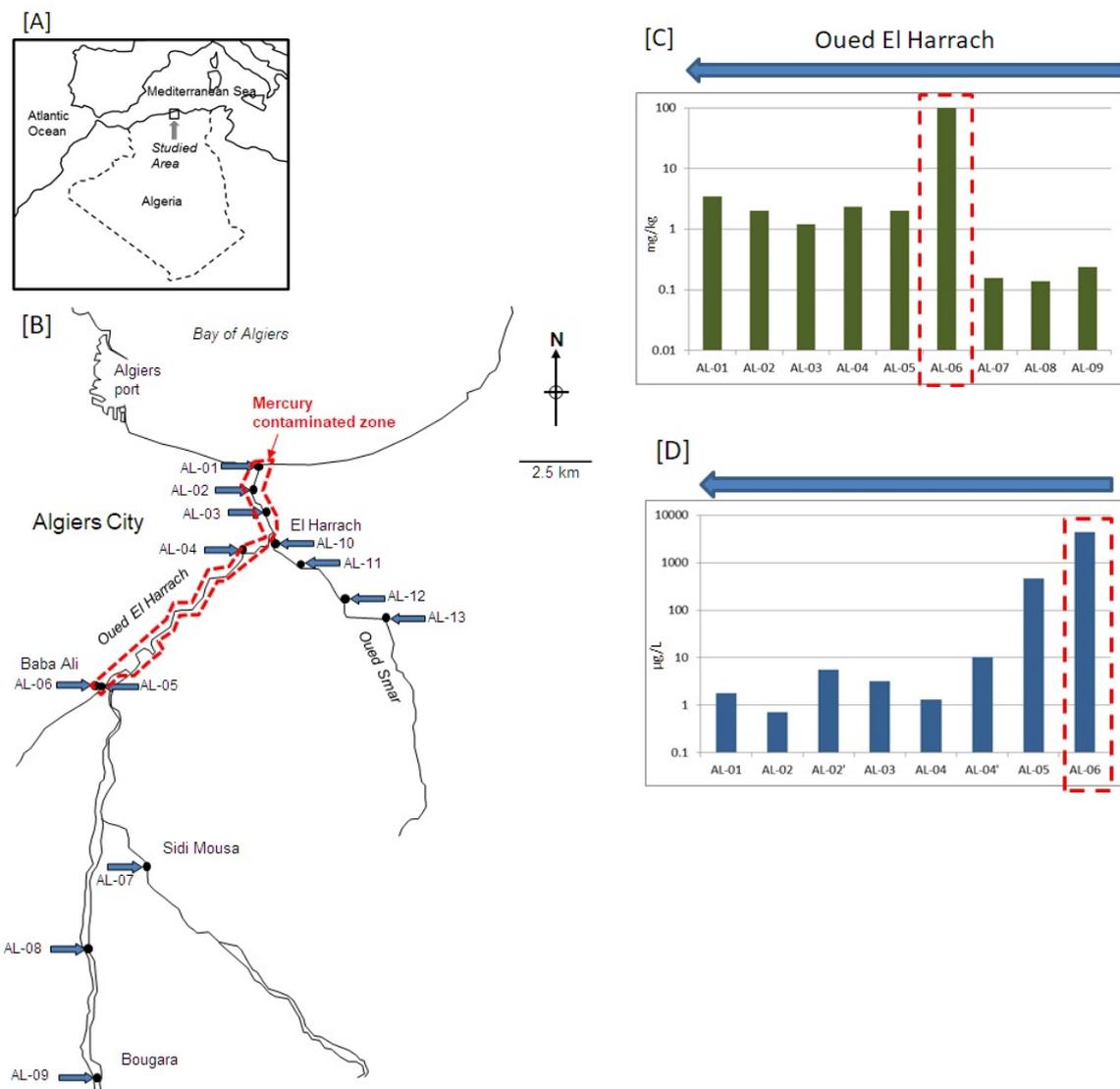
According to the analytical results of a preliminary study in 2003, an extremely high concentration of mercury (total Hg > 100 mg/kg) and a relatively high concentration of other heavy metals (Cu, Pb, Zn, Ni, As, Cr, and Cd) were found in sediment from the bottom of the Oued El Harrach (Yoshida et al. 2005). Following the preliminary study, MATE, DEW, and the ONEDD understood the significant health risks of mercury and heavy metal contamination, and decided to carry out a joint survey of the sediment and water of the Oued El Harrach with technical cooperation from JICA in 2004 and 2005.<sup>3</sup> The results indicated that the polluter responsible for the mercury concentration was a chlorine factory with a chlor-alkali mercury electrode plant in Baba Ali (maximum chlorine production capacity: 4,000 ton/year), which directly discharged untreated mercury-contaminated wastewater into Oued El Harrach (Figure 2). The sediment and river water samples at the location AL-06 (dashed box in two diagrams), which show extremely high concentration, were collected from the drain of the untreated wastewater discharged from the mercury electrode plant, Baba Ali. The total mercury concentration of sediments collected from downstream of the plant (AL-01 to 05) shows an elevated level from 1 to 10 mg/kg

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<sup>3</sup> The technical cooperation provided by JICA in 2004 and 2005 was implemented as an individual expert dispatch program entitled "Expert on Environmental Pollution and Protection." The author of the present paper was assigned as an expert in this program.

range, but the upstream site sediment (AL-07 to 09) shows an apparently lower level between 0.1 and 1 mg/kg (Figure 2 [C]).

During the collaborative survey and analysis, JICA experts trained members of the ONEDD in environmental monitoring survey and chemical analysis methods, in particular, how to monitor mercury levels using atomic adsorption spectrometry (AAS).



**Figure 2:** Index map [A] and location map for sediment and water sampling [B]. Spatial variation of total mercury contamination in the stream sediments (unit: mg/kg) collected from nine sites of the Oued El Harrach river [C] and that of total mercury contamination in the river water (unit: µg/liter) [D]. The large arrows in two bar diagrams shows the direction of river flow from the upper stream to the estuarine (AL-01). Data was compiled from Yoshida et al. (2005) and the Joint Terminal Evaluation Team (2008).

With the discovery of mercury contamination, MATE and the ONEDD became aware of the need for systematic environmental monitoring and the analysis of industrial practice of discharging wastewater into public waterways. In early 2005, DEW Algiers and ONEDD decided to inspect other industrial units and monitor the quality of industrial wastewater that was discharged directly to the Oued El Harrach. The analytical results showed that 11 of the 18 major industrial units located in the Oued El Harrach river basin were discharging untreated wastewater that had a contamination level above Algerian effluent standards (heavy metals).

These inspection and monitoring results showed that the environmental management administration had not been functioning up to this point. This failure led to the generation of environmental pollution, including from mercury.

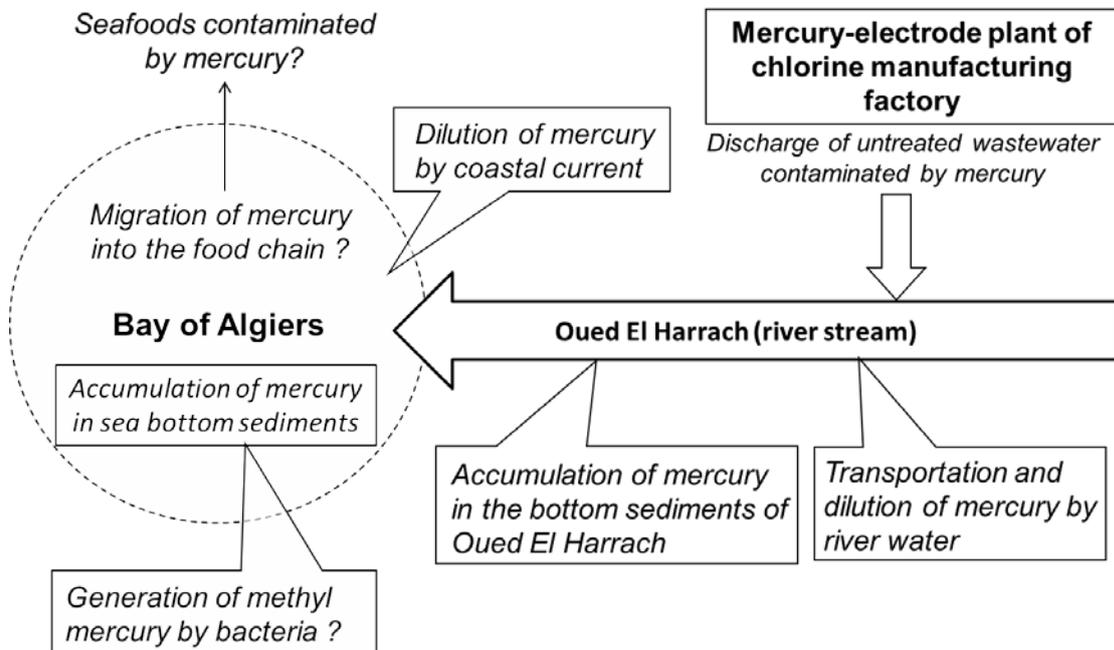
#### **(5) Information disclosure, the focusing event, and agenda setting**

The results of the survey on mercury pollution in the Oued El Harrach and industrial wastewater quality were presented at a public seminar organized by MATE, the ONEDD, and JICA in April 2005; members of the relevant industries, academics, public administration, NGOs, and the mass media were invited to attend the seminar. In addition to the survey team's report on the pollution problem in the Oued El Harrach, the JICA expert also presented the bitter experience Japan had faced during the "Minamata Disease incident", an incidence of industrial mercury pollution (*e.g.*, Harada 1972, 1978, 1995; Fujiki and Tajima 1992; Nishimura and Kumagai 1983). The seminar was reported nationwide through television, radio, newspapers, and internet websites, provoking strong reaction from the public.<sup>4</sup> Immediately after the public seminar and its reporting by the mass media, a number of citizens directly communicated with MATE about mercury pollution and asked about countermeasures, which indicates a sudden rise in public awareness of mercury pollution. The problem was explained through the following process: river water is highly

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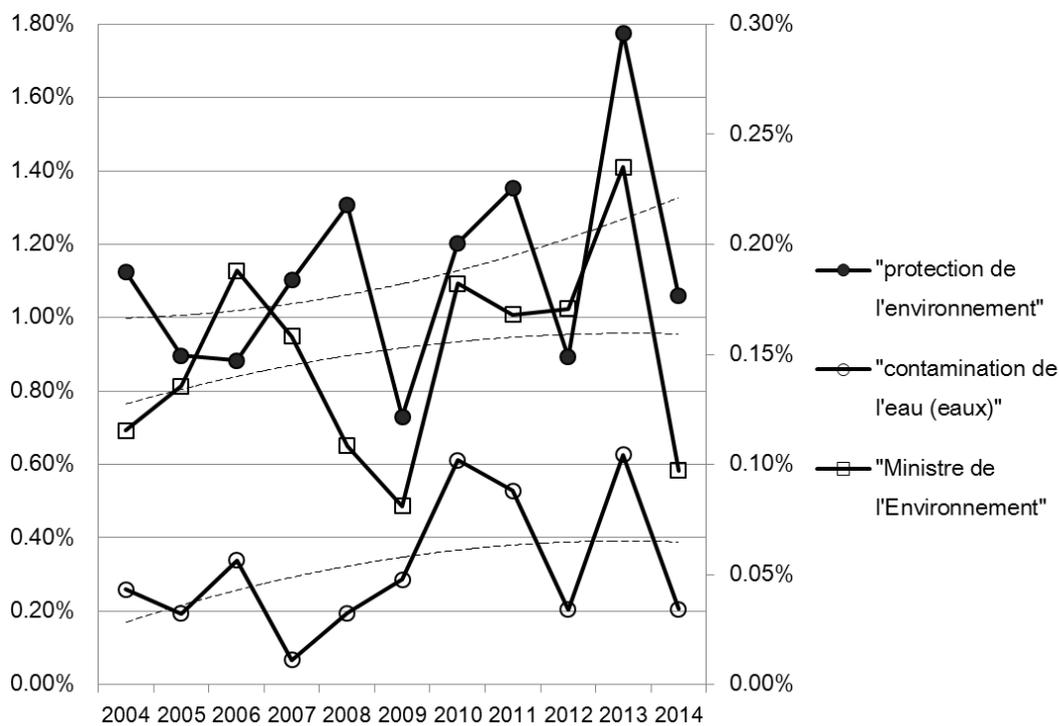
<sup>4</sup> For example, *El Watan* (6 April 2005) « La Sonnete d'Alarme des Japonais »

polluted by mercury derived from untreated industrial wastewater, which is flowing into the Gulf of Algiers; the contaminated mercury can be converted into highly toxic methylmercury by microorganisms under an anoxic condition; the methylmercury will be biologically accumulated in fish bodies through the food chain; and eventually this will cause public health problems like Minamata Disease (see Figure 3, below). The term environmental management administration had become familiar to the public and the survey results undoubtedly indicated the necessity for immediate countermeasures in response to the pollution.



**Figure 3:** Model of mercury contamination from the polluter to the Oued El Harrach and the Bay of Algiers. The mercury can be easily converted into methyl mercury in the bottom sediments of the Bay of Algiers. There is an observable risk of migration of the methylmercury into the food chain, which has the potential to provoke public health problems like the Minamata Disease incident.

Public concern about environmental pollution grew after information was disclosed at the public seminar and by the mass media. In addition to the mercury pollution issue, the mass media also reported other environmental pollution incidents that had occurred in local industrial cities such as Belcourt, Skikuda, and Arzew (Rabah 2005), which augmented the public awareness of the environment. Mass media increasingly reported on environmental pollution issues, in response to the strengthened public concern for the environment.



**Figure 4:** Annual variation in percentage of environmental articles published in the newspaper *El Watan*, Algeria. Data were sourced from the Archives Database of *El Watan* newspaper. Due to a shortage of available data, the percentage for 2004 was calculated based on the data from July 01 to December 31. The dashed lines show fitted curves. The left vertical axis shows the percentages of “environmental protection (protection de l’environnement)” and “water contamination (contamination de l’eau),” and the right vertical axis shows that of “Ministry of Environment (Ministre de l’Environnement).”

For example, Figure 4 shows the change in the annual proportion of the number of environment-related articles to the total number of articles in *El Watan*, a leading quality paper in

Algeria. Environment-related articles were considered articles that contained the keywords “environmental protection,” “water contamination,” or “Ministry of Environment.”

The percentage of articles containing the keywords “environmental protection (protection de l’environnement),” “water contamination (contamination de l’eau),” and “Ministry of Environment (Ministre de l’Environnement)” increased between 2005 and 2014. The increase of these keywords indicates the continuous growth of public concern regarding environmental pollution and protection issues. Frequently appearing topics on environmental protection in newspapers correspond to the increasing public consciousness regarding the environment or the rise in public awareness on the necessity for environmental protection, which involves a formation of “public opinion” (Lippmann 1922) and “agenda setting” (McComb 1972) for environmental protection. The disclosure of information on mercury pollution and other pollution incidents in local cities, played the roles of “focusing events” for the agenda setting (Birkland 1997).

MATE understood the necessity of law enforcement. It first organized a discussion forum with representatives of the industrial firms located in Algiers in order to urge compliance with the effluent regulations. During this forum, intense discussions were had on planning for self-monitoring and reducing industrial pollution. Based on the experience of the mercury contamination survey in the Oued El Harrach, MATE began to plan a nationwide river depollution program and in 2005, the National Action Plan was adopted within the framework of the Strategic Action Programme, to prevent pollution of the sea as a result of land-based activities.

The then-representative of the German GTZ, one of the leading donors in Algeria, acknowledged the impact of information disclosure and remarked that the sharing of the experience of the Minamata Disease incident was enormous for the Algerian public. He stated that: “the public seminar on mercury pollution was a big bomb for MATE.”

## **(6) Countermeasures to the mercury pollution**

In 2006, under intense pressure from the public, the Ministry of Water Resources quickly dredged the contaminated bottom sediments around the estuary of the Oued El Harrach. Additionally, based on the results of inspection by DEW Algiers and the ONEDD, an order was made by MATE to halt the direct discharge of untreated wastewater from the chlorine manufacturing factory into the river stream.

The importance of environmental monitoring, inspection, and law enforcement were also recognized by the responsible environmental authorities, MATE, the Department of Environment of Wilaya (DEW), and the monitoring agency (ONEDD), and initiated the monitoring and regulation of industrial wastewater discharged from the chlorine manufacturing factory. The factory began to treat wastewater and made plans to overhaul the chlorine manufacturing process. In addition, an industrial wastewater treatment facility was established in the Baba Ali area in 2014 (Bellala and Manel 2016). After the emergency dredging of mercury-contaminated sediments and river environment restoration work, the Algerian government launched a rigorous decontamination project as part of the new redevelopment plan for Algiers, with the target year of 2029 (Bellala and Manel 2016).

As a result of the above measures, the environment of the Oued El Harrach significantly improved; according to monitoring data, mercury contamination of the river sediment at the estuarine (Loc. AL-01) exceeded 100mg/kg in 2004 (before the countermeasures; Figure 2), but in December 2006 (after the countermeasures), the concentration level had dropped to 0.2mg/kg (JICA 2012). More importantly, the occurrence of human damage, such as mercury poisoning or the occurrence of the Minamata-type disease, was prevented.

Of course, in order to implement the above-mentioned timely decontamination measures, a corresponding financial backing was essential. As is well known, the international market prices of crude oil and natural gas have soared rapidly since 2004 and as an oil/gas producing country, Algeria's state finance entered into a surplus. The improved financial

situation ensured the implementation of quick decontamination measures at polluted sites. The government decided that pollution control measures were high-priority policies, and top-down funding for their implementation was financially feasible at the time.

#### **(7) Development of technical capacities for wide-ranging environmental monitoring**

The mercury concentration of offshore sediment samples collected from the Bay of Algiers was analyzed in 2006. The results showed that, although several hot spots were observed in offshore areas indicating relatively high concentrations of mercury in bottom sediments, the mercury contamination level was less than 1.0 mg/kg (Yoshida et al. 2007), which is much lower than that of the Oued El Harrach. Since the natural background of total mercury concentration of unconsolidated estuarine and marine sediments is generally 0.2 mg/kg or lower (Neff 2002), the concentration of the bottom sediments from the Bay of Algiers exceeded the background level but was not at such a hazardous level as the Oued El Harrach sediments. This may be due to the dilution and diffusion of mercury-contaminated water by the influence of coastal currents in and around the Bay of Algiers (Millot 1999; Benzohra and Millot 1995). It also became clear that the analytical results on methylmercury concentration in fish and shellfish caught in the coastal waters of Algiers, which were distributed to the Algiers seafood market, also showed an acceptable range of concentration (Ohi et al. 2007) according to the CODEX General Standard for Contaminants and Toxins in Food and Feed (methylmercury <0.5 mg/kg). Thus, the results showed that the mercury contamination of the sediments in the Bay of Algiers was not at a serious level but was at a point where potential damage could be prevented.

The discovery of mercury pollution in the Oued El Harrach led to a deep recognition of the functionality of the environmental management administration system, in particular environmental monitoring with all parameters defined by the effluent regulation in Algeria (Decree 06-141). Systematic and comprehensive environmental monitoring is likely to uncover unknown contamination and can prevent or reduce risks caused by the contamination in

advance; these are the expected functions of the environmental management administration system.

In order to enhance the capacities of environmental monitoring (field surveys, site inspections, laboratory analysis, and interpretation) not only for mercury but also for various other parameters defined by the effluent regulations, two-phase technical cooperation projects (Phases I and II), the so-called “Projects for Capacity Development in Environmental Monitoring,” were planned between MATE, DEWs, the ONEDD, and JICA.

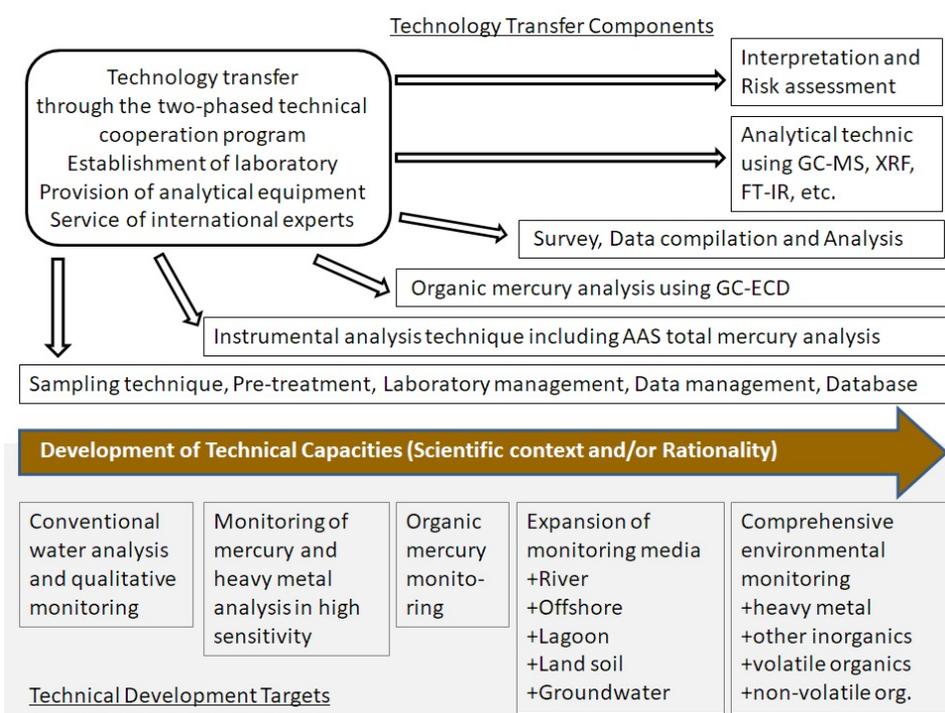
An intensive staff training program consisting of three country-focused training courses on urban and industrial environmental management was held in Kitakyushu City, Japan between 2004 to 2006. The trainings aimed to foster human resources in environmental management administration in Algeria and involved around 50 officers from MATE, DEWs, and the ONEDD.

As part of the two-phase technical cooperation projects, a new analytical laboratory was constructed, albeit in a temporary form, by Algeria (MATE and the ONEDD) and JICA; and the EU also provided the grant aid project with analytical equipment. Technology transfers on environmental chemical, physical, and microbiological analyses were made by the expert team in five categories (Figure 5), and the standard operation procedures (SOPs) for analysis methods were confirmed; this further cultivated the human resource capacities of the ONEDD. In the course of the projects, joint field work on environmental monitoring and inspection was undertaken by ONEDD workers and DEW inspectors, fostering a collaborative relationship between the monitoring agency (ONEDD) and the local government authorities (DEW). A database of environmental monitoring data and an inventory of potential polluters was also constructed as part of the collaboration between the ONEDD and DEW.

The development of technical capacities for environmental monitoring<sup>5</sup> through the two-phase technical cooperation program is illustrated in Figure 5.

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<sup>5</sup> As described later, these capacities correspond to Component 2 “Techniques for environmental analyses” (see Table 2).



**Figure 5:** Development of technical capacities for environmental monitoring at the public monitoring agency (ONEDD) through the two-phased technical cooperation program.

### (8) Development of the legal system for environmental management administration

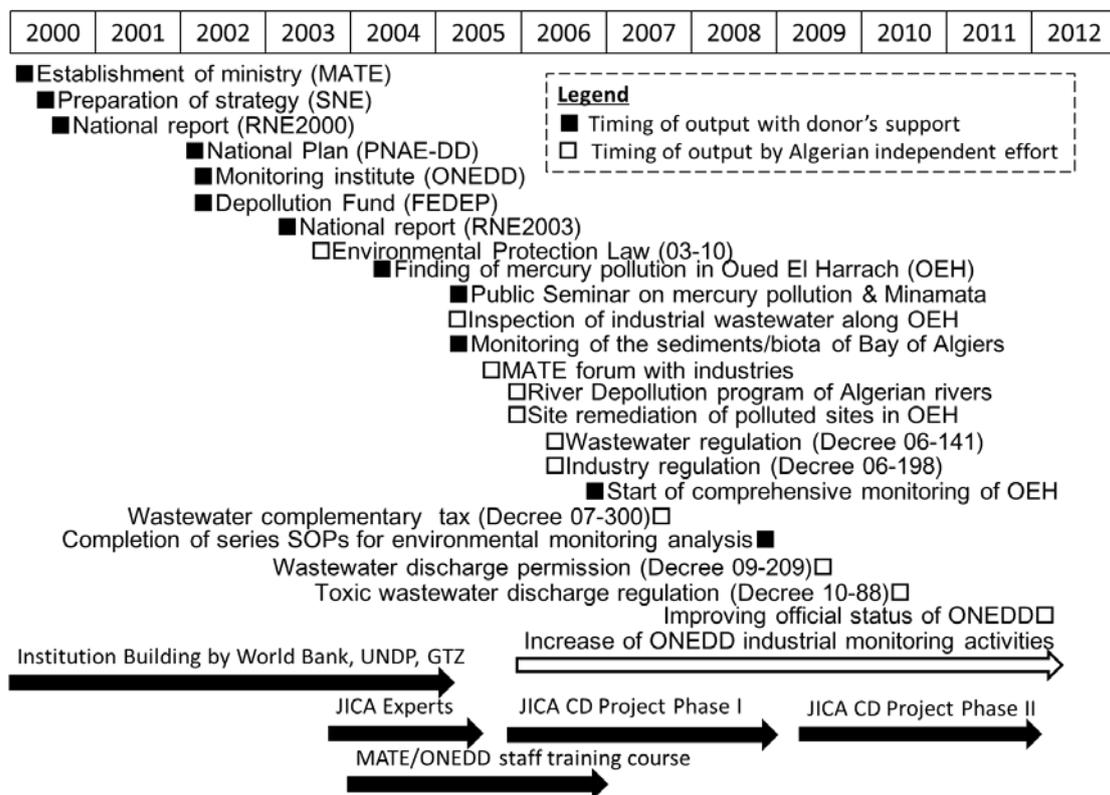
One of the most important tools for environmental administration is law and regulation (Buck 2006). Major developments in the Algerian law and legal system for environmental management between 2000 and 2012 are summarized below (also see Figure 6).

Algeria's new law for general environmental protection was set out in 2003 (Law 03-10 replacing the older Law 83-03 of 5 February 1983). This law aimed at implementing a national policy for environmental protection within the framework of sustainable development. It set out the fundamental principles and regulations for environmental management, i.e. protecting the environment, restoring damaged environments, preventing and fighting against any form of environmental pollution and nuisance, improving conditions and quality of life, and promoting the appropriate use of available natural resources. The law set prescriptions for the protection of biological diversity, the air and the atmosphere, water and aquatic environments, the land and

soil, desert environments, the sea, and the frame of life. It also provided for protection from nuisances caused by chemical substances and sounds.

In addition to Law 03-10, Law 01-19 of 12 December 2001 on the management, control, and elimination of solid waste was also important for environmental management administration. The law introduced the strategic principles of integrated hazardous and non-hazardous solid waste management. Law 02-02 of 5 February 2002 on the protection and valorization of the marine coastal zone, defined the framework for interventions on the coast. Law 04-05 of 14 July 2004 modified and completed Law 90-29 on land use planning.

The basic legislation on water was found in Law 05-12 of 4 September 2005, which set up the rules for the use, management, and sustainable development of water resources, including the treatment of municipal and industrial effluents.



**Figure 6:** Historical development of Algerian environmental management administration and donor support from 2000 to 2012. Closed symbols show outputs with donor support and open symbols show the output of independent Algerian efforts. The number of outputs by Algerian independent efforts remarkably increased from 2005.

A number of executive decrees have also been issued lately to implement Law 03-10 for industrial emissions (gas and liquid), as well as industrial hazardous wastes.

Enforcement of environmental legislation on polluters was strengthened by the following executive decrees: Executive Decree 02-372 of 11 November 2002 on the creation of a public system of reclamation, recycling, and valorization; Executive Decree 05-240 of 28 June 2005 on the designation of environmental audit and inspection at industrial installations; Executive Decree 06-198 of 31 May 2006 on the setting of rules for planning, inspection, and authorization for permitting applicable to listed industrial establishments (repealing the Decree 93-165); Executive Decree 05-314 of 11 September 2005 on the grouping of the industrial establishments generating and/or storing hazardous waste; Executive Decree 05-315 of 11 September 2005 on the process for declaring hazardous waste; Executive Decree 06-138 of 15 April 2006 on the setting of limits for atmospheric emission of gas, fumes, and particles and their control (repealing Decree 93-165); Executive Decree 06-141 of 19 April 2006 on setting limit values for discharged industrial effluents (repealing Decree 93-160); and Executive Decrees 07-299 and 07-300 of 27 September 2007 on the procedures for applying the supplementary tax on industrial wastewater.

Among these decrees for industrial wastewater control, those decrees that defined the regulation of industrial wastewater (Executive Decree 06-141) and established a supplementary tax system (Executive Decree 07-300, enacted November 2010) played very important roles in functionalizing the environmental management administration against industrial wastewater pollution. In the supplementary tax system, a polluter who discharged wastewater containing pollutants above the regulated concentration defined by the Executive Decree 06-141 into public waters was penalized in the form of a supplementary tax that depended on the excess concentration value. Setting the applicable level of supplementary taxes was made on the basis of the analytical data given by the authorized laboratory (the ONEDD laboratory). The supplementary tax system was an economic instrument for providing a disincentive to polluters

in order to reduce the environmental load caused by contaminated industrial wastewater, which was an application of the Polluter-Pay-Principle. Decree 06-141 also ruled on the upgrading of old industrial facilities within a period of five years.

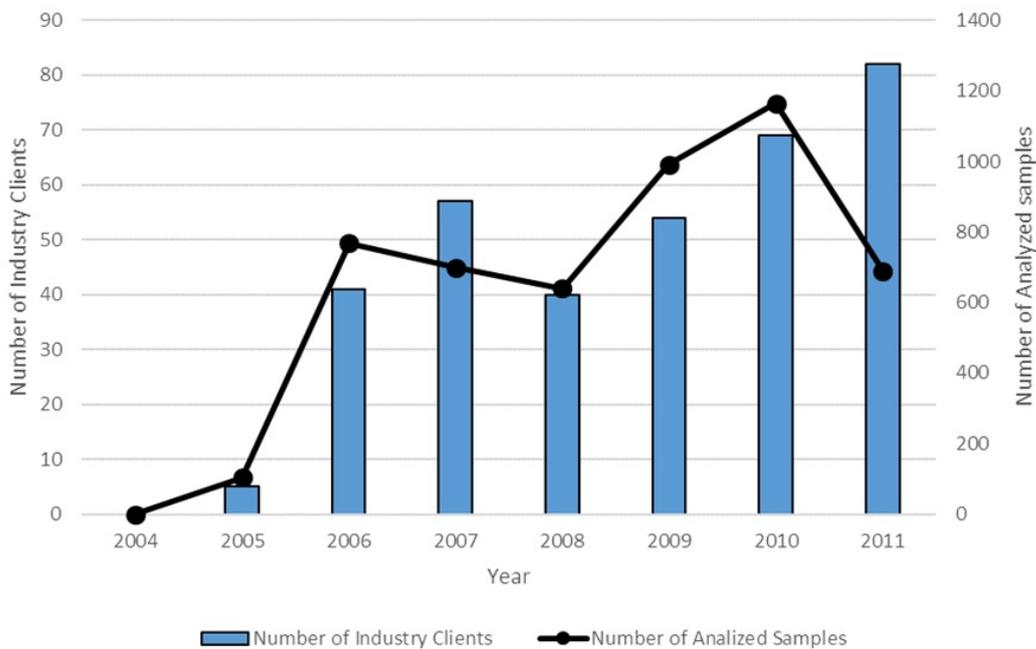
It is worth noting that the number of decrees that have been prepared by Algeria itself has remarkably increased since 2005, when public awareness of the environment was triggered by the disclosure of information on mercury pollution in the Oued El Harrach. There may be many reasons for this increase, such as the political environment and policy development, but a change of attitude with regard to environmental management administration is one of the most important reasons.

Although Algeria's laws for environmental protection were reinforced and amended, and many executive regulations were developed, the Algerian environmental management administration did not have a long history of effective environmental legislation that adopt the polluter-pays-principle (LDK-ECO 2006; European Environment Agency 2012). There are still many challenges to legislating and legally enforcing environmental management issues in Algeria, where the legal texts are vague and often lead to circumvention of the law rather than enforcement. Responsibilities and concepts are not clearly defined in the legislation and it is not rigorously enforced (Kacemi 2009). It takes time for these laws and decrees to be more concretely executed.

#### **(9) Improvement of performance in environmental management administration**

Under the improved legal system and acquired technical capacities, DEWs and the ONEDD vigorously implemented environmental monitoring and inspection of industrial units. For example, in the Central Region including Algiers city, environmental self-monitoring and inspection activities rapidly increased between 2005 and 2011 - 103 objects from 5 industrial units were monitored in 2005, while 690 objects from 82 industrial units were monitored in 2011. The number of clients (industrial units) using self-monitoring has been greatly enlarged since

2005, and the number of samples analyzed has also increased since 2005, as shown in Figure 7. The ONEDD also began offering consultancy services and providing analytical data. Judging by the figures, the ONEDD's capacity to generate environmental information for effective environmental management, including inspection, enforcement, and prevention, was undoubtedly strengthened. The number of monitoring services for industrial units has steadily increased since 2005, which indicates that the ONEDD was increasingly recognized as a public monitoring agency.



**Figure 7:** Increase in the number of industry clients for ONEDD Central Region Laboratory for monitoring and analysis in the Central Region (Sources: Joint Terminal Evaluation Team 2008 and 2012, and JICA 2013).

## 2. Capacity Development in Environmental Management Administration

Based on the facts observed in the history of Algerian environmental management administration, the following four features were recognized from a capacity development

perspective: (1) three-stage development, (2) comprehensive capacity development, (3) technical capacity development, and (4) functionalization and stakeholder ownership.

### **(1) Three-stage development of environmental management administration**

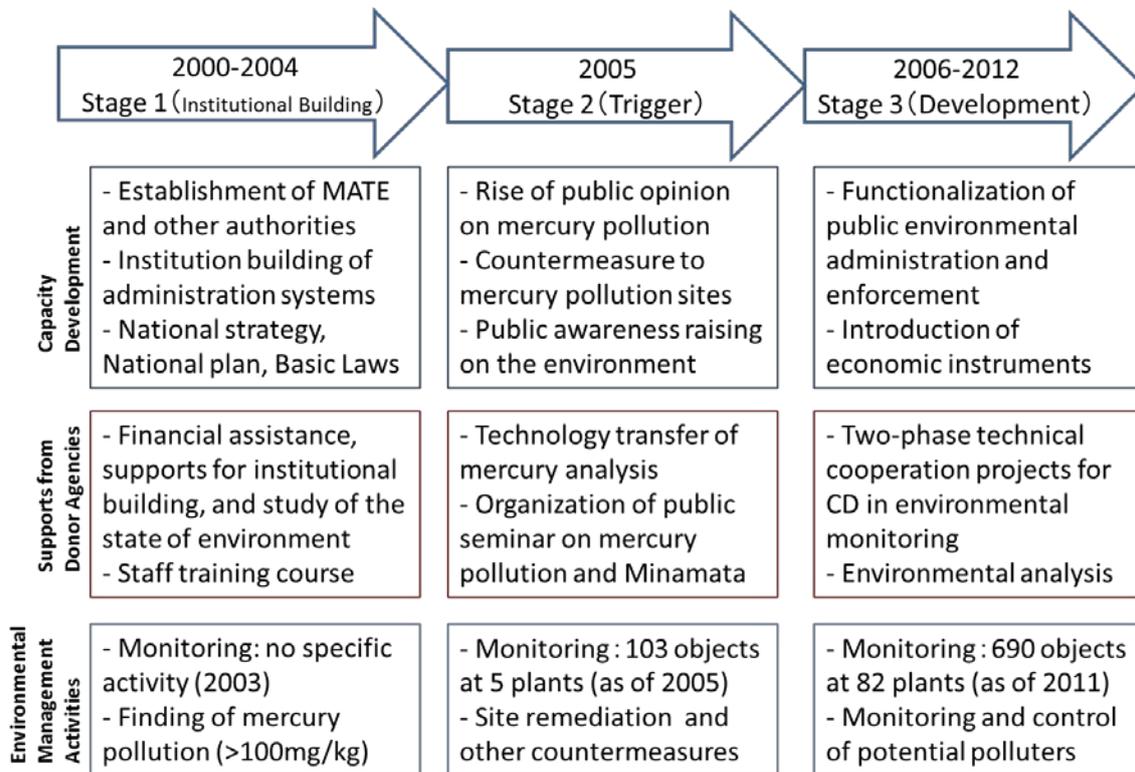
The history of environmental management administration in Algeria since the early 2000s can be divided into three stages (Stages 1, 2 and 3), which can be considered as parts of a development process of environmental management administration, or more broadly, a process of Capacity Development in Environmental Sustainability (CDES), as shown in Figure 8.

Stage 1 (2000-2004; boxes in the left column of Figure 8) was a formal institution-building stage during which major environmental organizations were established, basic laws and regulations were enacted, and a national strategy and plan were prepared with the support of international donors. However, the newly created environmental management administration system did not function well at this stage, and the environmental management administration was virtually ineffective.

Stage 2 (2005; boxes in the central column of Figure 8) triggered the functionalization of the environmental management administration system that had been formally prepared in Stage 1. Public awareness and consciousness about environmental protection arose following the disclosure of information on mercury pollution and other environmental pollution incidents in local cities by the mass media. The government took emergency countermeasures against mercury pollution and initiated systematic environmental monitoring. These steps indicate the development of functional capacities at the organizational, institutional, and societal levels.

Stage 3 (2006-2012; boxes in the right column of Figure 8) was a development stage, where the functionalization of the environmental management administration system continued and technical capacities in environmental monitoring and pollution control were strengthened. A series of environmental and executive decrees were prepared and enacted to support functionalization of legal system which significantly improved the institutional capacity of

authorities to implement and enforce laws. Stage 3 represents a maturing of the Algerian environmental management system.



**Figure 8:** Three-stage development of the environmental management administration in Algeria since 2000. Stage 1 was from 2000 to 2004; Stage 2 occurred in 2005; and Stage 3 lasted from 2006 to 2010. The upper-row, middle-row, and lower-row boxes show the major features of capacity development, the major inputs from international donors, and the major contributions by Algerian environmental management activities, respectively.

Of these three stages, a critical transformation toward an effective environmental management administration system can be recognized at Stage 2, the trigger stage. During this stage, the environmental management administration became functional and was backed by a deepening of public awareness and consciousness about the environment. In Stage 2, Algerian officers and decision-makers were motivated and acquired “ownership” of the environmental management administration systems, which the World Bank had previously evaluated as not fully functioning (2002).

The discovery of the extremely high concentration of mercury pollution in the river of the capital city, Algiers, was widely published during a public seminar and by the mass media; at the same time, they shared information about the bitter Japanese experience of mercury pollution during the Minamata Disease incident. The disclosure and sharing of information aroused public awareness and consciousness of environmental protection; such social pressure boosted the strengthening of the environmental management administration and a handsome budget and additional staffing were allocated to this endeavor. This intrinsic development process can be considered as a kind of self-reinforcement sequence (Mahoney 2000) accelerated by the rise of public awareness of environmental protection during the trigger stage.

According to Rainey and Steinbauer (1999), effective government agencies generally include the following five factors: (i) supportive behavior from external stakeholders such as political authorities; (ii) agency autonomy in refining and implementing its mission; (iii) high “mission valence” (an attractive mission); (iv) a strong mission-oriented culture, and (v) certain leadership behaviors, which enhance motivation (for example, the task motivation, mission motivation, and public service motivation (PSM)) of staff members in government agencies). In the case of the development of the Algerian environmental management administration, (i) supportive behaviors from external stakeholders such as political authorities were strengthened during the trigger stage and later under pressure from heightened public opinion on the environment, where the government allocated a handsome budget for establishing an analytical laboratory in the ONEDD and increasing the number of staff. The mercury pollution together with other environmental pollution incidents made government officers and policymakers reaffirm the (iii) high mission valence of the environmental management administration.

## **(2) Comprehensive capacity development**

The three-stage development can be interpreted as comprehensive capacity development of the environmental management system in Algeria; indeed, capacity strengthening at the individual,

organizational, and institutional levels was observed in each actor, and capacity strengthening at the institutional and societal levels could be perceived through changes in the relationship between the actors.<sup>6</sup>

The actors identified are the following five groups: (i) the Environmental Ministry of Central Government (MATE), (ii) the Environment Department of Local Government (DEW), (iii) the Environmental Monitoring Agency (ONEDD), (iv) industries (polluters or potential polluters), and (v) the general population and civil society. An outline of the capacity development recognized in each actor and the mutual relationship is described as follows:

**(i) The environmental ministry of the central government (MATE)** was established in 2000, and basic institutional mechanisms, such as the Environmental Protection Law (03-10), the Environmental Strategy (SNE) and the Sustainable Development National Plan (PNAE-DD), were formulated. This was the beginning of organizational and institutional capacity development. The important role of law enforcement was recognized by MATE in Stage 2, and it formulated and enacted a series of decrees and executive decrees for strengthening law enforcement in Stage 3; this indicates a strengthening of capacity at both the organizational and institutional levels. Since law enforcement itself is basically the role of local governments (DEW) under the supervision of MATE (see Figure 1), the linkages between the central government (MATE) and local government (DEW) were reinforced. Officers of the ministry were trained by donor agencies from Stage 1, which strengthened capacity at the individual level and ensured the performance of the ministry. Components of the capacity development identified at the various levels within MATE are illustrated in Figure 9 (upper left part of the figure).

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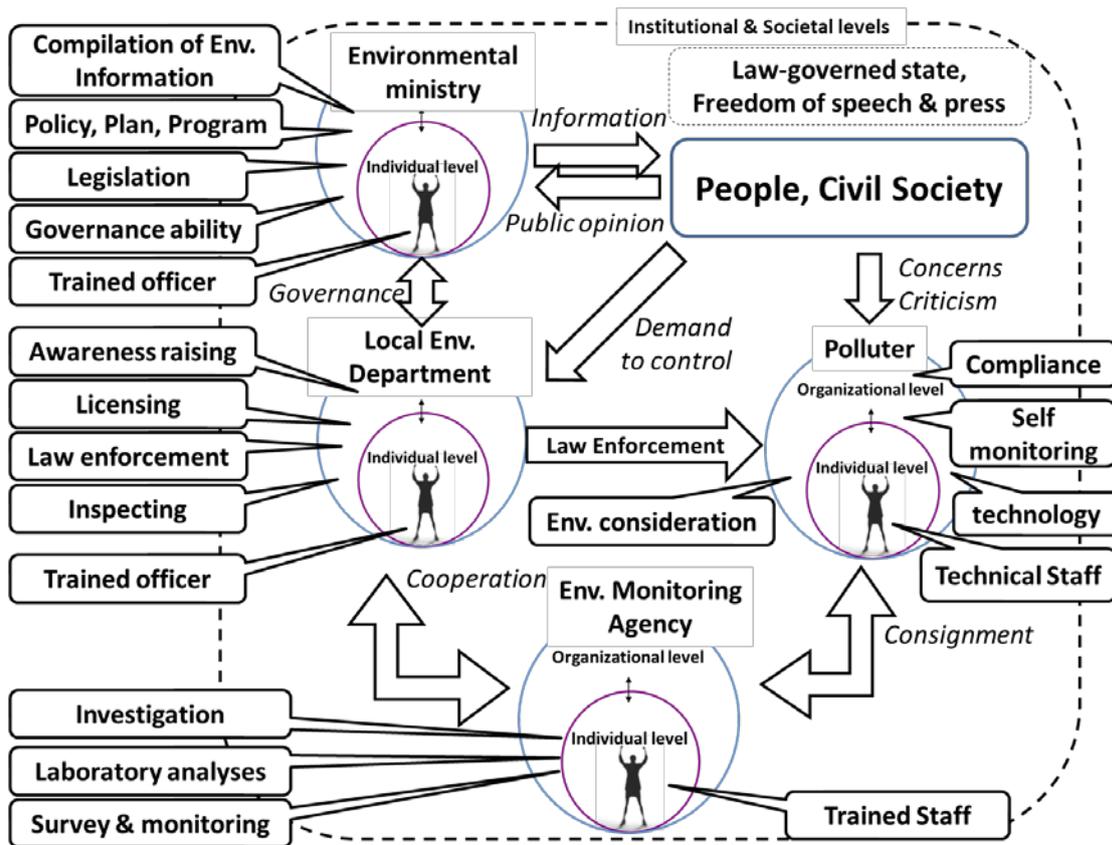
<sup>6</sup> The term 'actors' refers to the five groups of stakeholders, not to individuals.

**(ii) The environmental department of local governments (DEW)** began to undertake law enforcement measures such as on-site inspections, guidance to polluters, and the application of environmental regulations under the legal system formulated by the central government in Stage 2; again, this shows capacity development at the organizational level. The local government started to collaborate with the environmental monitoring agency (ONEDD) to obtain concrete results from environmental monitoring, without which laws could not be effectively enforced. The local environmental department (DEW) began to conduct environmental awareness-raising activities for a wide range of people including polluters and potential polluters, which is a prerequisite for effective law enforcement. These activities indicate a strengthening of capacity at both the institutional and societal levels. Staff members and inspectors of DEW were trained by donor agencies from early in Stage 1, amounting to capacity development at the individual level in DEW and ensured a qualified performance of environmental management administration by DEW in Stages 2 and 3. The various components of the capacity development identified in DEW, are illustrated in Figure 9 (the central left part of the figure).

**(iii) The environmental monitoring agency (ONEDD)** acquired a number of technical capabilities needed for environmental monitoring including various survey and analytical techniques (see Figure 5); the gaining of such capabilities made it possible to respond to DEW requests for official analyses of environmental monitoring and inspection and the self-monitoring analyses requested by the industries, where networking and collaboration between DEW, the industries (potential polluters), and the monitoring agency (ONEDD) had been established. In this case also, ONEDD staff members enhanced their technical ability to carry out various environmental analyses, which ensured the performance of reliable environmental monitoring work after Stage 2. The components that made up the capacity development identified within the ONEDD are illustrated in Figure 9 (the bottom part of the figure).

**(iv) Industries (polluters or potential polluters)** recognized the necessity of environmental monitoring through the enforcement by local and central governments. As a result, they began self-monitoring to assess the contamination levels of their emissions, the number of self-monitoring has drastically increased since Stage 2. In self-monitoring their emissions, industries often asked the ONEDD for consignment analysis work, which strengthened the network and collaboration between the ONEDD and industries (see Figure 7). These improvements in self-monitoring show a strengthening of capacity at the organizational level, which is a result of law enforcement by MATE and DEW. The various components of the capacity development identified in the industries are illustrated in Figure 9 (the central right part of the figure).

**(v) Civil society** in Algeria, particularly in Algiers city, saw a dramatic rise in public awareness and consciousness towards the environment following the trigger event in Stage 2. The civil society began to pay strong attention to whether the government conducted environmental management administration in a proper manner, whether polluters and potential polluters were complying with laws and regulations, and whether they took appropriate environmental pollution control measures; these factors all indicate capacity development at the societal level. Civil society actively began discussions with the environmental ministry, local governments, and the industries, and gradually established a wide network for environmental protection.



**Figure 9:** Components of capacity developed at the individual and organizational levels for five major actors, where small circles show individual-level capacity and large circles show organizational-level capacity. Arrows show relationships between actors that appear as capacities at the institutional and societal levels in an effective environmental management administration system.

The components of the enhanced capacity observed in the five major actors and the relationship between them (or their network) are illustrated in Figure 9, where each actor was able to both enhance its capacity at the organizational and individual levels and enhance the relationships between stakeholders; this indicates capacity development at the institutional and societal levels. This relationship is an establishment of an overall system of environmental governance<sup>7</sup> consisting of a set of regulatory processes, mechanisms, and organizations through which actors are able to influence environmental action and outcomes.

<sup>7</sup> Governance here includes the actions of the state and, in addition, encompasses actors such as civil society, private sector businesses, and NGOs (Lemos and Agrawal, 2006).

The development of capacity at both the institutional and societal levels is a transformation of the relationship between actors, for example, the strengthening of governance on environmental issues between the central government and local governments; strengthening collaboration between local governments and environmental monitoring agencies; strengthening the enforcement of laws against polluters by the local governments; a growth in concern amongst civil society about polluters; and the strengthening of the influence of civil society on central and local government agencies. Furthermore, broadly speaking, Algerian society had already ensured the implementation of a democratic system through popular elections, a law-governing state, and freedom of speech and the press based on historical lessons from independence and the civil war; this illustrates existing capacity at the institutional and societal levels or an “enabling environment.”<sup>8</sup>

### **(3) Technical Capacity**

Based on the capacity development seen in the environmental management administration system in Algeria, a total of eleven elements of technical capacity were identified in the Algerian case, as shown in Table 2. Among those eleven components, three components, 1 (Collecting and compiling information for understanding the state of the environment), 10 (Mainstreaming the concept of environmental sustainability across development sectors), and 11 (Implementing multilateral environmental agreements and international cooperation programs), can be observed in Stage 1 (2000-2004). However, the remaining four components were enabled through enacting newly defined decrees, executive decrees, and regulations enacted in Stages 2 and 3 (2005-2010). In particular, technical capacities for environmental monitoring and analysis were greatly enhanced in order to meet the needs of public authorities and private firms.

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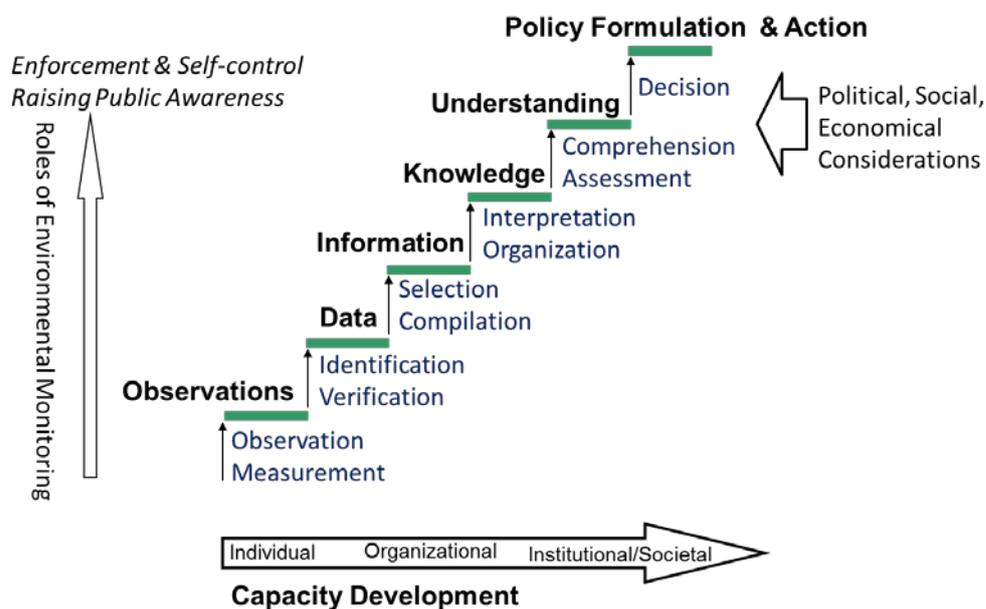
<sup>8</sup> “Enabling environment” defined by UNDP (2011) refers to the policy, legal, regulatory, economic and social systems within which organizations and individuals operate.

**Table 2:** The eleven components of technical capacity required for environmental management administration that have been identified from the case of environmental pollution control in Algeria. Components 2 to 11 are set according to the definition of technical capacity for CDES (UNDP 2011), while Component 1 was added by the present study.

s/n	Components of Technical Capacity*	Specific Development of Technical Capacity in Algerian Environmental Management Administration	
1	Collecting and compiling information for understanding the state of environment	Publishing two reports on the present state of the environment in Algeria - RNE2000 and RNE2003 - and setting up a database.	2000-
2	Techniques for environmental analyses	Field survey techniques, laboratory analyses techniques, and interpretation technique (see Figure 5).	2004-
3	Designing and managing pollution prevention, abatement, and control program	Environmental monitoring and inspection by ONEDD and DEWs depollution plan for Oued El Harrach. Depollution plan of major rivers in Algeria. Improvement of industrial plants.	2005-
4	Protecting, managing, and sustainably using natural resources	Periodical monitoring of the quality of river and coastal water.	2005-
5	Assessing, reducing, and managing environment-related risks, using the precautionary approach	ONEDD analytical laboratories. Environmental monitoring network. Interpretation of pollution and risks. Environmental impact assessment.	2007-
6	Using legal and regulatory tools for environmental sustainability	Inspection to industrial units (potential polluters) by DEW in cooperation with the ONEDD.	2005-
7	Raising public awareness and using educational tools for environmental sustainability	Organizing public seminars and fora with industries. Information disclosure via the website.	2005-
8	Using economic instruments as tools for environmental sustainability	Application of complementary tax to industry.	2010-
9	Using voluntary instruments as tools for environmental sustainability	Support to self-monitoring of industries by the ONEDD.	2006-
10	Mainstreaming the concept of environmental sustainability across development sectors	Reflection on environmental issues in national development plans, strategies, and policies.	2000-
11	Implementing Multilateral Environmental Agreements (MEAs) and an international cooperation program (ratified in 2000)	Barcelona Convention on Persistent Organic Pollutants (POPs). Basel Convention. Bonn Convention (terrestrial, marine and aerial migratory species). Cartagena Protocol on Biosafety to the Convention on Biological Diversity.	2006 2006 2005 2004

The Algerian case indicates that technical capacity is not only related to capacities at the individual and organizational levels, but also to those at the institutional and societal levels – in other words, collaborative relationships or networking among actors.

The discovery and disclosure of mercury pollution and drastically raised public awareness of the issues, which corresponds to the integration of Components 1, 2, and 7. After this, the environmental management administration was functioning. The mercury pollution itself can be said to be a specific incident in Algeria; however, it is necessary to pay attention to the fact that once environmental monitoring information (facts) was disclosed and shared with civil society, it encouraged more strict and severe functions within the environmental management administration and more responsible action from the industries. This means that by improving the social value of environmental monitoring, the functionalization of the environmental management administration is further promoted.



**Figure 10:** Upgrading of the social value of environmental monitoring. Environmental monitoring starts from observation, then the observed facts become data, information, knowledge, and understanding (Artiola et al. 2004). Eventually they will be utilized for policy formulation and environmental management. Scientific fact-based observations and measurements improve our understanding of the environment and lead to wise decision-making. In the process, the social value of environmental monitoring is upgraded, and public awareness is increased.

The Algerian case suggests that sharing the results of environmental monitoring among stakeholders (the public sector, industries, and civil society) is the key to enhancing environmental management administration. When environmental monitoring data are collected and interpreted, they become information, knowledge, and understanding, and are then utilized for environmental policy formulation. Similarly, individual monitoring data are not always carefully noted, but if they are accumulated, analyzed, integrated, and shared among the society, they will become crucial factors for activating environmental management by the entire society (see Figure 10).

#### **(4) Functionalization and Stakeholder Ownership**

In the history of Algerian environmental management administration, two types of institution building (or capacity development at organizational and institutional levels) can be identified as factors for realizing an effective environmental management administration system, establishing formal institutions (“formal institution building”), and making institutions effective (“functional institution building”).

“Formal institution building” involves building organizations, institutions, and laws, and is a prerequisite for establishing an environmental management administration system. In the Algerian case, a framework of environmental management administration under three authorities (MATE, the DEWs, and the ONEDD; see Figure 1) was established but its actual function was feeble, largely because the institutions were initially built with strong support from external donors who provided extrinsic knowledge about environmental management. Human resources for these authorities were also insufficient and technical knowledge and information were limited. This was most likely unavoidable given the difficult situations immediately after the civil war. The formal institution-building process at that time was more or less reactive in nature, characterized by the acquisition (or import) of external ideas on environmental issues and

performance of decision-making functions based on situational factors, which can be seen in Stage 1.

On the contrary, “functional institution building” is a process of functionalization of existing institutions. In Stages 2 and 3, environmental management administration had to be self-reliantly performed by government officers and decision-makers who, under the given conditions, enacted executive decrees, carried out monitoring activities and law enforcement, as well as other activities (see Figure 6). The attitude of officers and decision makers to environmental management administration was changed from reactive in Stage 1 to intentional in Stages 2 and 3.

The transformation process from formal to functional institution building can be considered to be a process of reinforcement of “functional capacity”<sup>9</sup> consisting of eight factors, shown in Table 3. It is evident that Factors 5 (Engage stakeholders and undertake multi-sector collaboration), 6 (Generate, manage, use, and communicate information and knowledge), 7 (Design and/or reform environmental institutional arrangements), and 8 (Accountability, transparency of decision-making, and information disclosure) grew in Stages 2 and 3. Factors 1, 2, 3, and 4 were mainly acquired in Stage 1, where the overall functional capacity was significantly developed.

Behind the development of functional capacity, self-reliant activities and goal-oriented approaches can be observed in the Algerian authorities and stakeholders. There was a significant increase in the motivation of environmental management administration officers under growing public awareness of environmental issues in Stages 2 and 3. The motivation for officers and decision-makers to implement environmental management administration was clearly a crucial factor in their recognition of their own environmental management mission. The mercury

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<sup>9</sup> “Functional capacity” defined by UNDP (2011).

pollution issue together with other environmental pollution incidents prompted an understanding of the importance of administration for environmental protection.<sup>10</sup>

**Table 3:** Factors of functional capacity identified in the capacity development process in Algeria. Factors 1 to 7 were originally defined by UNDP (2011) and Factor 8 was appended by the present article.

s/n	Factors of Functional Capacity	Development of Functional Capacity observed in the Algerian Environmental Management Administration	
1	Assess a situation, define goals, and analyze and choose options	Since 2000, various studies on the environmental situation have been undertaken. The results were summarized in RNE2000 and RNE2003. Based on the RNE2000, the national strategy, SNE, was prepared.	2000-
2	Formulate policies, legislation, plans, and strategies	Preparation of the national plan (PNAE-DD). Formulation of basic law (Environmental Protection Law 03-10).	2002-
3	Budget, manage, and implement, including the mobilization of resources	Establishment of MATE and relevant authorities. Establishment of depollution fund (FEDEP).	2000-2003
4	Monitor, evaluate, report, and learn	Establishment of a monitoring institute (ONEDD).	2003-
5	Engage stakeholders and undertake multi-sector collaboration	Organization of a forum with industries. Collaboration between MATE and local authorities (DEWs).	2005-
6	Generate, manage, use, and communicate information and knowledge	Self-monitoring by potential polluters using the services of the ONEDD. Enhancement of the technical capacity of the ONEDD.	2006-
7	Design and/or reform environmental institutional arrangements	Various executive decrees were enacted for improving environmental law enforcement. Introduction of Polluter Pays Principles through enacting Executive Decree 07-300.	2006-
8	Accountability, Transparency of decision-making and Information disclosure	Information disclosure through public seminars and the mass media. Information sharing on websites.	2005-

<sup>10</sup> There are three types of motivation: task motivation, mission motivation, and PSM (Rainey and Steinbauer 1999) for public officers. In the Algerian case, anecdotal evidence suggests that PSM was particularly strong and led to altruistic behavior and concern for the public interest.

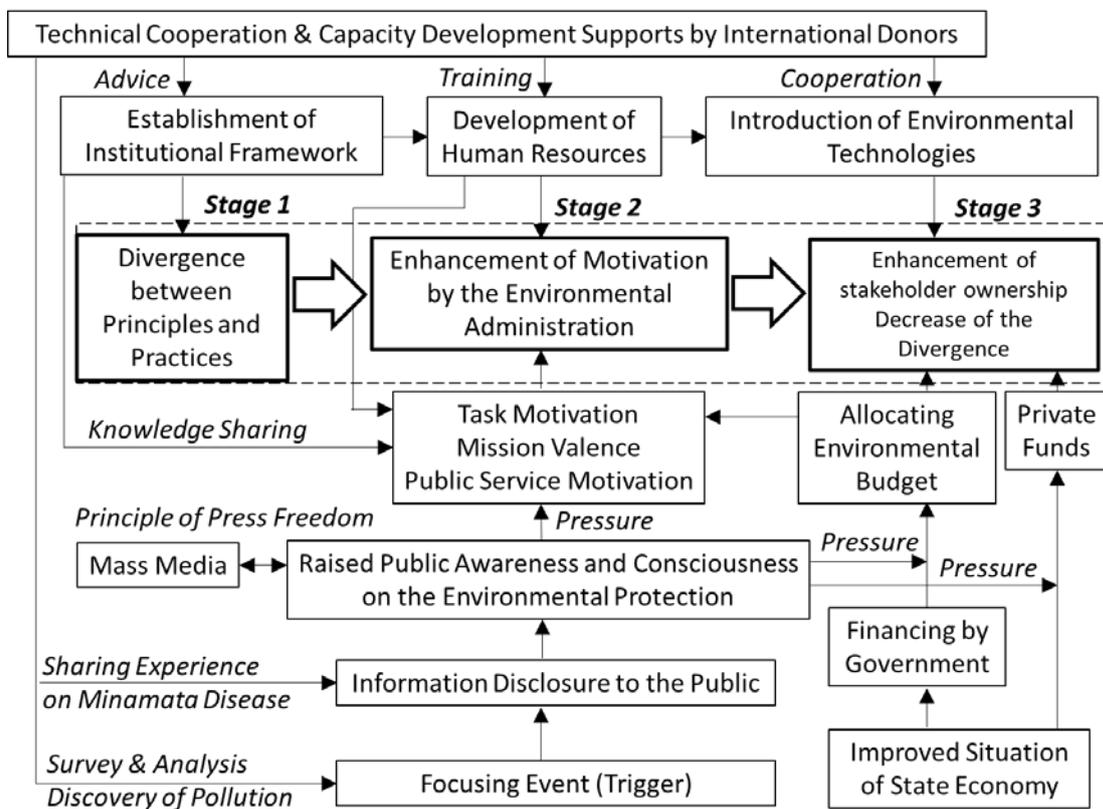
Continuing public awareness gave a push to environmental management administration organizations, such as the MATE, and led to the aggressive and rapid environmental measures deployed against environmental pollution in Stage 3. The private sector, including polluters and potential polluters, agreed to comply with the rules and regulations, which is indicated by the rapid increase in the number of self-monitoring organizations (see Figure 7). It was these factors that promoted the functionalization of the environmental management administration system.

Once the environmental management administration becomes functional, stakeholder ownership of environmental management activity is enhanced. As shown in Figure 7, Algerian self-reliant efforts for improving environmental management, drastically increased from Stage 2 (2005), which indicates that stakeholders' ownership at Stages 2 and 3 was much greater than that at Stage 1. The Algerian case suggests that the functionalization of environmental management administrations in light of public awareness-raising, guaranteed stakeholder ownership.

The Algerian process of functionalization of environmental management administration, reveals a “divergence between principles and practices” in environmental management administration and its transformation. In Stage 1, the environmental management administration did not adequately function, and the “divergence between principles and practices” was significant. As a result, there was marked insufficiency in executing administrative work that required principles (laws, decrees, strategy, and plans). This is often observed in environmental administration in developing countries. Although basic environmental law was enacted, and a national strategy and plan were formulated, (i.e., the principles of environmental management administration had been defined) little practice or specific interventions (such as monitoring, environmental protection measures, and law enforcement) were attempted in Stage 1. The “divergence” corresponds to weak ownership, which inhibited the functionalization of the institutions originally designed for environmental management administration.

However, from the trigger stage (Stage 2) onwards, stakeholder ownership was enhanced and the “divergence between principles and practices” tended to be resolved, resulting in the functionalization of institutions and realization of an effective environmental management administration. Human resource development, enhancement of technical and functional capacities, and improvement of the financial state were also observed. The key factor in the transformation was the enhancement of stakeholder ownership and motivation.

The model of functionalization of environmental management administration is illustrated in Figure 11.



**Figure 11:** A model of the functionalization process of the Algerian environmental management administration. The development (functionalization) proceeds from left to right in the dashed box, where the divergence between principles and practices tends to decrease and the stakeholder ownership is enhanced. The items above the dashed box are major inputs of technical cooperation from donor agencies, while the items below the dashed box are the conditions of and interventions by the stakeholders in Algeria.

### **3. Discussions and Implications for Capacity Development Support**

The research questions addressed in this paper include the following: How did the capacity of the environmental management administration in Algeria develop and become functional? What are the lessons from the Algerian case that can help donor agencies to support capacity development in environmental management administrations? Based on the investigation into environmental management administration development process in Algeria, the author discusses the following questions in detail below.

#### **(1) How did the capacity of the environmental management administration in Algeria develop and become functional?**

Algeria's history suggests that formal institution building is a prerequisite for realizing an effective environmental management administration, i.e. establishing organizations (environmental ministries, environmental departments within local government, and other relevant public authorities) responsible for the administration of environmental management, the enactment of basic laws on the environment, and the formulation of strategies and plans for environmental protection and sustainable development. At the same time, a compilation and analysis of various types of environmental information is crucial for formulating adequate and appropriate policies and strategies, such as the national reports on the state of the environment in Algeria (RNE2000; RNE2003). However, the Algerian case indicates that formal institution building alone is not enough.

In terms of formal measures, functional institution building is the key to establishing an effective environmental administration system, where more specific institutional tools, rules, mechanisms, and regulations (decrees) are aimed at the implementation of law enforcement and administration practices. Another factor for functionalizing the environmental management administration system is transformation of the relationship between stakeholders, which means networking, collaboration, and building a common understanding of environmental

management (see Figure 9). These factors make up the functional institution building observed in Algeria during Stages 2 and 3, where motivated actors played their individual roles.

In addition to institution building, the development of the human resources needed within environmental management administration organizations is, of course, a crucial factor. In the case of Algeria, a series of MATE/ONEDD staff training courses and on-the-job trainings in the two-phased technical cooperation projects greatly contributed to human resource development (see Figure 6).

Technical capacity, functional capacity, and the motivation of administration staff, together with established institutions, are central facets of a well-functioning environmental management administration. Eleven technical capacity components (see Table 2) were identified as crucial for the functionalization of an environmental management administration; eight functional capacity components were identified at the organizational, institutional, and societal level (Table 3) in the Algeria's case. Both technical and functional capacities are necessary for the planning, designing, implementing, monitoring, and evaluating of environmental management administrations. Although sufficient technical and functional capacities may be present, in reality it is the motivation of central and local government staff and decision makers that is indispensable to the creation of effective environmental management administration. In Algeria's case, sharing information on environmental pollution issues with the public invoked a remarkable raising of public awareness, which then motivated the public and accelerated the functionalization of the environmental management administration. This amounts to a mainstreaming of environmental issues (Benson 2014) which includes more transparent decision-making and better cross-government working modalities. Ultimately, the impact of mainstreaming was again expected to increase public awareness and improve inter-sectoral decision-making on policy, strategy, planning, and budgeting.

In order to realize an effective environmental management administration that is more responsive to the need to protect the environment and push for sustainable development, formal

and functional institution building, human resource development, and the development of relationships between government authorities and other stakeholders are crucial. Public awareness raising through information disclosure and sharing is one of the most essential factors in functionalizing the environmental management administration system.

**(2) What are the lessons from the Algeria's case that can help donor agencies to support capacity development in environmental management administrations?**

Capacity Development support can be seen in a wide range of formats. At the formal institution building stage, in Stage 1, the Algerian environmental administration largely depended on the support of external donors, including advice on establishing institutions, policies plans and programs, staff training, technology transfer, and financial support. While external support was undoubtedly necessary given the local conditions at that time, it led to weak ownership among Algerian stakeholders, which then resulted in less functioning institutions. The Algerian government conceptually understood the necessity of environmental management administration, but it did not function well because although they understood the functions of environmental management, they did not execute their plans and did not confront the strong demand from society.

The lesson for donor agencies is that it is insufficient to simply support formal institution building, technical capacity strengthening, and human resource development in a country. Moreover, public awareness raising through information disclosure and sharing is important, even if it is negative information for the government or industries who will make the system functional. Therefore, when donors provide technical assistance for strengthening environmental management administration systems, it is necessary to not only promote organization and institution building and human resource training, but to also synchronize information disclosure and raise public awareness.

Many developing countries may not have the “luxury” of a trigger event that is fixable before any long-term health or environmental consequences occur, as it was in Algeria. What can donor agencies do to raise the level of public awareness in the absence of such a trigger event? Support information sharing on the actual state of the environment based on the facts obtained through environmental monitoring. In some cases, it may take time to realize a greater public awareness and broad social understanding, but there is probably no other real way.

### **(3) Conclusions**

(1) Although environmental institutions have been formally established in many developing countries, in reality, they are not always effective. In the case of Algeria, the formal institutions of the environmental management administration system were built in the early 2000s, but no effective environmental administration was implemented at that time. However, after the disclosure of information on specific environmental pollution issues (mercury pollution together with environmental pollution incidents in local cities), public awareness of environmental protection was raised, and strong public pressure was applied to existing environmental management administration authorities; thus, the event acted as a trigger for functionalizing the environmental management administration system in Algeria. Through public pressure, the relationship between public authorities and other stakeholders was transformed, ensuring that all stakeholders were more responsive to the needs of the environment; eventually, the capacity for implementing an effective environmental management administration system was strengthened. Specific policy instruments for industrial pollution control, regulations, and a supplementary tax system for polluters, were also enacted in the course of development.

(2) The Algeria’s case indicates that public awareness raising is one of the key factors for realizing an effective environmental management administration system. While the mercury pollution itself acted as a trigger in the Algeria’s case, attention must also be paid to the significant impact that the sharing of information with the public about the actual environmental

situation and the risk it posed had on improving the environmental management administration system.

(3) When institution building, human resource development, technical capacity strengthening, and environmental monitoring are linked and synchronized with information disclosure and public awareness raising, the environmental management administration system becomes effective; this in turn promotes Capacity Development for Environmental Sustainability (CDES).

(4) Technical assistance from donors generally includes support for formal institution building, human resource training, technology transfer, information and knowledge sharing, and the provision of facilities and equipment. In addition to these forms of support, the Algeria's case suggests that information disclosure, which is one of the common principles of Official Development Assistance (ODA), can play a crucial role in raising public awareness and functionalizing environmental management administration systems.

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## Abstract (in Japanese)

### 要約

アルジェリアでは、1990年代の内戦で環境インフラや環境管理体制の大規模な破壊が発生し、旧式工業設備の無秩序な稼働のもと公害・環境汚染問題が多発していた。2000年以降の国民的和解と復興プロセスのもとで、アルジェリア国土整備環境省(MATE)の設立、「国家環境戦略」や「環境と持続可能な開発のための国家計画」の策定といった国家環境行政面での整備や法制度の確立が、UNDPや世界銀行といったドナーの支援によって進んだ。それは組織制度を近代的な形に整えたが、現実に発生している公害・環境汚染問題への調査対策を実行するまでには到らなかった。すなわち、環境管理体制の実効性の確保、機能化のための包括的な対処能力向上(キャパシティ・ディベロップメント; CD)が必要であった。このような背景のもと JICA は、2004年以降、中央のモニタリング機関(ONEDD)及び地方(Wilaya)政府環境局(DEW)をカウンターパートとして、環境管理能力向上を目的とした技術協力(CD支援)を行った。個別専門家派遣によるこの技術協力の過程で首都アルジェの河川において産業排水に由来する高濃度の水銀汚染が発見された。MATEとJICAは共同で、この水銀汚染の発見について水俣病の公害経験と共に公開セミナーで公表し、マスメディアが全国報道をした結果、公害対策への世論の急速な高まりと環境に関する公衆意識の深まりを引き起こした(2005年)。これにより、それまでのともすれば形だけにとどめられていた環境管理行政が、行政組織として具体的な対策実施に対する強いモチベーションを有するようになった。その結果、水銀汚染堆積物浚渫・封じ込めの対策工事がなされ、加えて、水銀汚染のみならず広く環境保全や産業公害の予防に関する関心を形成し、様々な環境管理法制度整備と施策が展開されるようになった(2006-2010)。

以上のアルジェリアにおける2000年以降の環境管理行政の発展史は、大局的には、(1)環境管理の組織制度形成期(2000-2004)、(2)世論形成と環境管理の発動期(2005)、(3)環境管理施策の展開期(2006-2010)の3段階に区分することができる。このうち環境管理行政にとっての決定的転換である主体(オーナーシップ)形成は、公衆意識の深化に裏付けられた(2)の段階に認められる。世論の高まりは環境管理行政を後押しし、また政府内での予算配分や人員配置、制度面での改善を促進する要因となった。

アルジェリア事例は、単なる組織制度の構築だけではなく、個別具体的な環境問題の情報公開を通じた環境に係る公衆意識の向上、世論の喚起と社会的圧力が環境管理行政の実効化のトリガーとなりうることを示し、情報公開を組織制度構築や技術協力と適切に同期させることがCD支援アプローチとして有効である、という示唆を与える。情報公開原則(これはODAの原則でもある)にもとづく環境情報の社会的共有は、環境管理行政の機能化、実効化のための要因となりうることを示している。

キーワード： キャパシティ・ディベロップメント，環境管理行政，環境汚染，情報公開，公衆意識



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Michael Barzelay, Masakatsu Okumoto, Hideki Watanabe