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Interaction Processes Between Key Actors – Understanding Implementation Processes of Legislation for Water Pollution Control, the Israeli Case

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1. Introduction

Israel is a semi-arid water-scarce country with currently ca. 250 cubic meters per capita per annum. With limited natural water sources due to the country's climate, geography and hydrology, it now faces its worst water crisis following several multi-year cycles of droughts (Israeli Ministry of Environmental Protection, n.d.). While these consecutive droughts aggravated the water-scarcity situation, it is by far not the main factor in the current crisis. In 2001 a parliamentary enquiry committee was established to investigate the water crisis. In its report the committee concludes that the crisis is mainly the result of inadequate management of the water sources throughout the years rather than the country's natural conditions. Focused on rapid development, the water sources were managed mainly for quantity and over-exploitation was the main answer to the growing water demand, depleting the country's water sources (Israeli Parliament, 2002). This created a major water deficit currently in an amount that is equal to the annual consumption of the country (Israeli Ministry of Environmental Protection, n.d.). The Committee's conclusions are not a new revelation. In fact this was reported in numerous experts' and State Comptroller reports in the past, though to no avail (Israeli Parliament, 2002; Adam, 2000).

In light of the natural water scarcity and the ever-growing demand for water, one would have expected that the quality of the water sources is well protected. However, in addition to the long-term over-exploitation, on-going uncontrolled pollution further deteriorated the water sources and their quality (Adam, 2000; Laster & Livney, 2009), with the main source of pollution being untreated or partially treated wastewater.

Whereas most of the population has received adequate sewerage facilities - removing wastewater from the population centers from early stages, wastewater treatment facilities lagged behind. In 1971 only 37% of the generated wastewater was treated, mostly by primary treatment, and in 1982 only 55%. By the end of the 1980s over 20% of the wastewater generated was discharged untreated into the environment, mainly to the adjacent dry river-beds, whereas the rest was mostly insufficiently treated resulting in low-quality effluent (The State Comptroller, 1991). The country's streams became in fact conduits

of wastewater (Gasith & Pargament, 1998), contributing to pollution of the surface and groundwater resources.

Prevention of water pollution by wastewater receives, however, much attention during the 1990s, and a new trend can be seen in which most municipalities begin engaging in building advanced wastewater treatment plants (Gabbay, 2002). By 2008, for example, ca. 92% of the generated wastewater was treated, of which 55% to secondary level and additional 32% to tertiary level. While further improvement is yet to be made with the remaining 8% being untreated (Israeli Ministry of Environmental Protection, n.d.), this is, no doubt, a substantial improvement in comparison to previous decades.

The on-going water pollution was not the result of lack of legal tools. On the contrary, Israel has extensive legislations sufficient to protect its water sources and prevent their pollution. These were put in place at early stages of the State. It was their lack of enforcement that resulted in continuous pollution (Adam, 2000). Accordingly, while several factors can explain the shift observed starting the 1990s, forceful enforcement of the existing laws for the first time, is a crucial one (Hophmayer-Tokich, 2010). The question arises, why in previous decades were the laws not enforced, whereas starting the 1990s, they were? Laster (1976), addressed this issue in his doctoral dissertation, but at that point in time could refer only to the phase of lack of implementation. He referred to the institutional structure and particularly to the Ministry of Agriculture's vast authority over water management. Adam (2000) concludes that in addition to the governmental institutional failure, public indifference to the on-going pollution, also explains well the lack of implementation.

This chapter builds up on these previous works to further answer the question from actor-centered approach. A study of the historical development of wastewater resource regime in Israel reveals that, among other things, the relevant actors in the policy network and the power-imbalance between them explain well the long-term neglect as well as the paradigm shift (Hophmayer-Tokich, 2010). In this chapter this is further explored with the aim to analyze the interaction processes between the relevant actors in the policy network as explaining mechanism for implementation processes. This is done using the Contextual Interaction Theory. The analysis addresses implementation processes of water sources pollution control legislation, with focus on domestic wastewater treatment – the main source of pollution. Section 2 presents the theoretical framework used for the purpose of this analysis; in Section 3 the relevant legislative framework for pollution control in Israel is presented and the interaction processes between key actors are analyzed; conclusions are drawn in section 4.

2. Theoretical framework and methodology

Laws and regulations are policy instruments, one of the traditional elements of public policy (Kissling- Näf & Kuks, 2004). As all other instruments, they are meant to reach policy goals (Linder & Peters, 1989). However, the actual outcome of a given policy does not always match the policy goals (Owens, 2008), as in practice implementation of policy instruments may be hindered or lacking. Thus, a distinction should be made between 'policy formation' and 'policy implementation' processes, and when looking at possible changes intended by a given policy, one needs to analyze the implementation of the policy instruments. This has, thus, been given a separate attention in policy studies. 'Implementation' in this context is seen as "processes that concern the application of relevant policy instruments" (Bressers, 2004: 284). Since implementation of policy instruments is usually the responsibility of

relevant actors in the policy network, its processes can be seen as a social interaction between these key-actors (Bressers & Lulofs, 2010). This led to the development of the Contextual Interaction Theory.

The Contextual Interaction Theory (in its latest conceptualization/adaptations based on Bressers, 2004 and Bressers & Lulofs, 2010) focuses on policy implementation and perceives policy processes (including policy implementation) as actor-interaction processes, meaning, processes that are influenced by activities and interactions of the relevant actors. Actors are individuals, representing themselves or their organizations, and within the context of implementation process include the responsible government officials (“implementers”) and the target group of the policy. The Theory’s basic assumption is that the characteristics of the actors involved, particularly their motivation, information, and power – are crucial in understanding courses and outcomes of policy processes (Bressers, 2004). This is based on the acknowledgement that for the accomplishment of any given task one needs a motivating objective, expertise, and capacity/resources (Owens, 2008). Motivation can incorporate both internal/own goals (values, self-interests) as well as external factors (such as those from higher authorities). It can also be influenced by self-effectiveness assessment. According to this concept an actor can become de-motivated if he perceives his preferred course of action to be beyond his capacity (de Boer & Bressers, 2011). Information incorporates issues such as interpretation, frames of reference as well as knowledge and accessibility to information required for execution of the task. Power incorporates available resources and control/authority (Bressers & Lulofs, 2010). Owens (2008) analyzed implementation literature reflecting important implementation variables, and found that in dozens of them the important implementation variables can be directly linked to the characteristics of motivation, information and power thus validating these characteristics as suitable.

According to the Contextual Interaction Theory these characteristics and the interaction between them influence the standpoint of a given actor regarding the policy in question and in turn his position and activities within the interaction process with other actors in the policy network. The characteristics of the actors are also influenced by external contexts such as the specific context of the policy (former decisions, specific circumstances), the structural context of the governance regime, and the wider context (such as political, economic, cultural and others). The interaction between the key characteristics and between the actors in the policy process can also change over time (Bressers & Lulofs, 2010).

The theory further assumes that policy implementation includes not only achieving implementation but also avoiding implementation. Interaction types may include: **cooperation**, either active (when actors have joint ambition), passive (e.g. when one actor is impartial about this implementation) or forced (when passive cooperation is imposed by a forceful and dominant actor); **opposition**, when one actor attempts to prevent implementation by other actors; and **joint learning** when only insufficient information prevents implementation (Bressers, 2004; Owens, 2008). The theory also distinguishes between two situations: lack of (or insufficient) implementation and failed/inadequate implementation (“adequate” with respect to the specific policy goals) (Bressers, 2004). As such, the theory is suitable for actor-centered analysis such as the one carried out in this chapter.

To summarize, the characteristics of motivation, information and power of each actor and the dynamics between them influence the interaction process between the relevant actors (implementers and target group), which in turn influence the output and outcome of the policy process. Based on this, the Israeli case is analyzed. In this case the Theory is also used

to analyze the dynamics between the key characteristics and actors as explaining changes in the process over time (e.g. the shift from lack of enforcement and continuous pollution to forceful enforcement and pollution control). The analysis includes the actors; the interactions between them; and the outcome as a result.

2.1 Methodology

The findings presented in this chapter are based on a doctoral research and thus form a part of a larger study. The data collection includes documents' review and analysis as well as in-depth semi-structured interviews. The former includes review and analysis of relevant documents such as correspondences between position holders within relevant Ministries and other actors, minutes of meetings, relevant legislation, etc., using the State Archive, relevant reports and literature. The latter includes interviews with relevant stakeholders such as Government officials from all Ministries and organizations involved, environmental Non-Governmental Organizations, experts from the academy, and private consultants, since the establishment of the State. This is found suitable for the qualitative approach used in the research. At points, the author relies on dated literature sources. This is due to the historical perspective and is used for the purpose of the analysis.

3. Water pollution control and its implementation, the Israeli case

In this section the relevant legislation is presented, following which the relevant actors and the interaction between them are analyzed as to explain the implementation processes of the pollution control legislation. It should be noted that the relevant legal system and policy-network are highly complex, and only the most relevant laws / regulations and actors related to domestic wastewater are presented and discussed.

3.1 Relevant legislative framework

As above-mentioned, Israel has extensive legislations that can ensure the protection of its water sources (Adam, 2000). In fact, according to Laster (2000: 437), "in its early years Israel promulgated some of the most forward looking legislation in the world concerning protection of water sources".

The two most relevant and direct laws regarding freshwater pollution prevention and (domestic) wastewater treatment are: the Water Law (1959) and the Local Authorities (Sewerage) Law (1962). Two additional laws that should be mentioned include the Public Health Ordinance (1940) and the Streams and Springs Authorities Law (1965).

The Water Law, promulgated in 1959, establishes the framework for the control and protection of Israel's water resources. It is *the* principle law regulating freshwater sources in Israel and is regarded by Laster (2000: 441) as "a brilliant legislative code to protect all aspects of Israel's water and the recipe for its proper management". The Law defines the water sources (natural or man-made, including wastewater), and their ownership (public property, subject to the control of the State) as well as creates Israel's water institutions. It creates the Water Commission (later on: Water Authority) and the position of the Water Commissioner (later on: the Director of the Water Authority) as the higher authority with respect to water management, giving him vast authority to manage the water affairs of the State (Laster, 2000; Laster & Livney, 2009). Significant sections of the Law deal with pollution prevention and control of all water sources. In 1971, the law was amended to include prohibitions against direct or indirect water pollution, regardless of the state of the

water beforehand. This amendment empowers the responsible Minister (initially the Minister of Agriculture) to set water quality standards for all sources and to promulgate regulations to prevent water pollution (Gasith & Pargament, 1998; Katin, 1976). The Water Commissioner further receives sanctioning power over polluters. For example, the power to require any person polluting water source to repair the situation within a reasonable amount of time and at the expense of the polluter (art. 11). Specific to wastewater pollution, the Law authorizes the Water Commissioner to order any polluter to provide him with a disposal plan. Failure to submit a plan or deviate from the plan can result in fine and loss of water supply, except for drinking purposes. The Water Commissioner can also bring criminal charges against a polluter – e.g. a mayor (Laster & Livney, 2009; Katin, 1976). The Local Authorities (Sewerage) Law was promulgated in 1962 to enable local municipalities to construct sewerage works. The Law prescribes the rights and duties of local authorities in the design, construction and maintenance of sewage systems (Israeli Ministry of Environmental Protection, n.d.). According to the Law a local authority may (and upon the demand of the Minister of Interior, must) install a sewerage system within its boundaries (Local Authorities (Sewerage) Law, 1962). The Law requires each local authority to maintain its sewage system in proper condition to the satisfaction of the health authority (Israeli Ministry of Environmental Protection, n.d.). Initially, the Law addressed the sewerage systems only; in 1972 it was amended to include also the construction of wastewater treatment plants.

The Public Health Ordinance (1940), based on its amendment of 1970, provides the Ministry of Health a framework for the protection of the quality of drinking water including at the water source. Later amendments further prohibit any activities that cause environmental nuisances, including pollution by sewage (the Public Health Ordinance, 1940). Several regulations under this Law were promulgated over the years including the 1981 regulations for 'effluent intended for use in irrigation', restricting irrigation with effluent in accordance with the treatment level and the type of crops. These regulations, however, did not specify the required effluent quality and were thus difficult to enforce. In 1992 regulations for effluent standards (base-line quality defining the permissible concentrations of organic matter and suspended solids) were promulgated by the Minister of Health. These are considered a milestone in wastewater treatment processes in Israel. In 2010 new regulations were promulgated by the Minister of Environmental Protection and the Minister of Health, to include stricter requirements for effluent quality. These regulations set much higher treatment levels in existing and future wastewater treatment plants than were previously in force, for unrestricted irrigation and discharge to rivers (Israeli Ministry of Environmental Protection, n.d.).

The Streams and Springs Authorities Law, established in 1965, empowers the responsible Minister (initially the Ministers of Agriculture and Interior – dual control) (Gasith & Pargament, 1998) to establish an authority for a particular stream or part of a stream, spring, or other water source (Israeli Ministry of Environmental Protection, n.d.). Once created, a stream authority has the power to abate sanitary hazards and prevent pollution of the stream.

3.2 Actors in the policy network

Several actors can be mentioned with respect to implementation of the relevant legislation: implementers of the policy, actors not directly participating in the process but facilitating and providing support to other actors, and the target group of the policy. Within the context

of this analysis actors are meant as organizations or individuals representing their organizations.

The Water Commissionaire is the highest authority regarding management of the water sources including prevention of their pollution (until the transfer of the responsibility for prevention of water pollution to the Ministry of Environmental Protection upon its establishment in 1989). The Water Commissionaire, however, was - until 1996 - subordinated to the Ministry of Agriculture, appointed by and answers to the Minister of Agriculture. Furthermore, all but two of the Water Commissionaires since the establishment of the State were clear representatives of the agricultural sector. The Water Commissionaire of 1977-1981 was appointed as the Director General of the Ministry of Agriculture in 1980 and served as both positions for several months (Israeli Parliament, 2002). As such, and with regards to the analysis offered by this chapter regarding motivation, information and power of main actors, the Water Commissionaire and the Ministry of Agriculture are considered as one actor (until 1996).

The Ministry of Agriculture was initially entrusted with the ministerial responsibilities over the Water Law and the Water Authority/Water Commissioner. As such, the Ministry of Agriculture had the highest authority and influence over the protection of water sources. In addition, it had a shared responsibility over the Streams and Springs Authorities Law and some influence via the Local Authorities (Sewerage) Law, as plans for the establishment of wastewater treatment plants require the approval of the Minister of Agriculture (art. 13). It was also involved via the Public Health Ordinance: according to article 65 when establishing regulations regarding effluent use for irrigation or other economic activity the Ministry of Health is to consult with the Ministry of Agriculture. Therefore, this Ministry is one of the main implementers of the relevant legislations.

The Ministry of Health was entrusted with the responsibility to protect the county's drinking water and as such had various powers to control water pollution, mainly under Chapter 6 of the Public Health Ordinance (this was also transferred to the Ministry of Environmental Protection upon its establishment), defining sewage as "nuisance". It also has the responsibility for the quality and use of effluent for irrigation (Adam, 2000). Via the Local Authorities (Sewerage) Law it is involved in approving sewerage works. As such, was also in a position to prevent water pollution.

The Ministry of Interior, as the Ministry responsible for the municipal sector, was entrusted with the ministerial responsibility over the Local Authorities (Sewerage) Law and can demand that a local authority will construct a wastewater treatment plant (art. 2). In addition, together with the Ministry of Agriculture it initially had the responsibility over the Streams and Springs Authorities Law. The Ministry of Interior is also to be consulted with, according to the Public Health Ordinance, concerning issues with implications for the local authorities (art. 3a).

The Ministry of Environmental Protection was established in 1989. Upon its establishment it assumed the responsibility - previously under other ministries, mainly the Ministry of Agriculture and Ministry of Health, for protecting the water sources and preventing their pollution. It now had the ministerial responsibility over the water pollution sections of the Water Law (art. A1 "prevention of water pollution"); the sections related to nuisances in the Public Health Ordinance, some responsibilities regarding wastewater treatment via the Local Authorities (Sewerage) Law and over the Streams and Springs Authorities Law. As such it became one of the main implementers of water pollution control in the following years.

The Ministry of Infrastructures was established in 1996 and received the jurisdiction over the Water Authority/Water Commissioner and the Administration for the Development of Sewage Infrastructures. By its establishment the link between water management and the agricultural sector was broken for the first time.

The Treasury Ministry, while not being a formal implementer, had a facilitating role via budgets allocated for this purpose, as elaborated in the following.

The Prime Minister's Office during the Rabin Government (established in 1992) prioritized development of infrastructure, wastewater treatment included. This government promoted relevant organizational change, allocated high budgets, as well as provided financial incentives for municipalities to treat wastewater, as elaborated in the following. As such it had a strong supportive and facilitating role.

As for the target group, since the chapter focuses on pollution from untreated domestic wastewater, and as the legal responsibility for wastewater collection, treatment and sanitary disposal is of the local authorities, the target group is defined as the municipalities / mayors.

3.3 Interaction processes between key actors

With respect to pollution of water sources by wastewater, two phases can be defined based on the enforcement of the relevant laws: 1) 1948 (the establishment of the State) until 1989; and 2) 1989 until the present. In the following, each actor's motivation, information and power are analyzed to explain the interaction processes between the main implementers and the target group, which in turn can explain the implementation processes of the pollution control legislation.

3.3.1 1948 until 1989

This phase is characterized by lack of enforcement. Only five court cases were filed by the Ministry of Health during the 1960s of which three addressed pollution by domestic wastewater. These, as Adam (2000) notes, were all the work of one official and were a rare exception. The Water Law, with the vast authority it provides for pollution prevention, was never enforced and sanctions prescribed by it, such as bringing criminal charges against polluters, went unused (Laster & Livney, 2009). The Springs and Streams Authorities Law was not implemented until 1989 when a stream authority was created for the first time with the establishment of the Yarkon River Authority (Gasith & Pargament, 1998). Indeed, the grim condition of the water sources (especially the streams), spoke for itself. Since relevant legislation was in place, had there been enforcement, this would have not been the case.

The main actor with this respect is the Ministry of Agriculture, as established above. Entrusted with the responsibility for the Water Law and with the sanctioning authority that the Law provides, as well as via its roles in other relevant legislations, it had vast authority and power to implement and enforce pollution control. With the Water Commission subordinated to it, it also had access to the relevant expertise as well as the information regarding the state of the water resources. It is, after all, the Water Commissionaire that was empowered to manage the State's water resources and had the means to do so. But what about its motivation? In the new State, agriculture was a very important economic sector but more than this, it became a national and political objective behind which stood the Zionist ideologies of settling the land, the right to work own land in own country, etc. As such, the Ministry of Agriculture enjoyed vast political support across the political

spectrum. It is against this background, that management of the water sources was entrusted to this Ministry. The Ministry of Agriculture, in fact, became the most important actor with respect to water management (with responsibilities also over other important water legislations such as the Water Drilling Law, 1955, and the Water Metering Law, 1955) and according to the parliamentary enquiry committee, managed the water sources exclusively and almost nothing could have been changed in water management without its cooperation (Israeli Parliament, 2002).

This Ministry's prime interest and goal, however, is to promote the agricultural sector and production, not to preserve the water sources as such (Adam, 2000). In the semi-arid country, agriculture on large scale requires irrigation, and the agricultural sector is the largest water consumer with ca. 70% of the water allocation (Central Bureau of Statistics, 2010) and as such utilization of water sources in support of agricultural production, outweighed other water management aspects (Laster & Livney, 2009). With a strong agricultural lobby, the Water Commissionaires were mostly affiliated with the agricultural sector, as above-mentioned, with preference to short term agricultural interests over long term water considerations (Adam, 2000). As wastewater is defined by the Water Law as a water source it was indeed perceived in this period by the Water Commissionaires primarily as an additional (cheap/free-of-cost) water resource to be utilized by farmers. The position of the Ministry of Agriculture was that wastewater - being first and foremost a water source for irrigation, should be managed and fall within the authority of the Water Commission thus the Ministry of Agriculture (State Archive, container GL2033/22, 6.1.54). To reduce costs involved and encourage farmers to utilize effluent, the Water Commission's/ Ministry of Agriculture's officials advocated a method which became known as 'agro-sanitation'. According to this method low-cost and low-tech facilities for primary treatment such as oxidation ponds and often only reservoirs, were constructed, following which the low-quality effluent was to be utilized for irrigation with further natural treatment at the root of the plant and the soil (State Archive, containers G5117; GL2033/26; GL4647, various documents; Shtreit, personal communication, 24.7.01). This method, however, contributed heavily to the pollution of the water sources. Not only that it produced low quality effluent, but when not utilized for irrigation, surplus effluents were discharged into the nearest stream. The facilities themselves became a source of pollution as they were not properly maintained and upgraded. Furthermore, wastewater treatment for the purpose of pollution prevention was grossly neglected. Since budgets were limited, municipal plans for construction of treatment facilities that did not include concrete plans for effluent reuse for irrigation, were rejected and not funded despite continuous pollution to water sources or to the environment, for example, in the cases of the towns of Nahariya and Zichron Ya'akov (Fleisher, personal communication, 15.5.01; Tal, personal communication, 14.5.01; State Archive, container GL2102 4/24(6), 11.4.67). All these resulted in steadily growing pollution. To conclude, the prime interest of the Ministry of Agriculture - the most influential actor, conflicted with the interests of preserving the water sources, and within this inner conflict of interest, the prime interests related to utilization of wastewater, prevailed. As such, this Ministry had vast power and information but no motivation to enforce pollution control laws.

The Ministry of Health was another important actor via the sanitary aspect of wastewater treatment and its responsibility to protect drinking water and public health. The Ministry, however, had insufficient information, power (in practice) and motivation to enforce the laws. Regarding information, the Local Authorities (Sewerage) Law, for example, requires

that a municipality maintains its sewage system in proper condition 'to the satisfaction of the health authority'. The Law, however, does not specify the type and amount of compliance required, nor does it specify which sanctions can be imposed, making its enforcement difficult. The Ministry of Health lacked also sufficient power to enforce the laws. Documents and correspondents' analysis reveals an on-going dispute between the Ministry of Agriculture and the Ministry of Health with respect to the authority related to wastewater management. The Ministry of Health, however, was smaller and weaker in comparison to the Ministry of Agriculture and in practice had little influence over the matter (State Archive, container GL2033/22, various documents). For example, in 1953 the Minister of Agriculture established the Sewage Committee—an inter-ministerial committee that would coordinate the different positions regarding wastewater solutions, and approve sewage plans. However, the Committee was to report to the Minister of Agriculture and out of eleven governmental members of the Committee six represented the Ministry of Agriculture (including the Chair) and only two the Ministry of Health, reflecting the power imbalance. Eventually, despite the different positions, the Ministry of Health approved the low-tech low-costs solutions that were advocated by the Committee, revealing passive cooperation. With respect to financial resources, the Ministry of Health had no own budgets for this topic (State Archive, container GL7345 2/13, September 1970). Finally, the Ministry of Health also lacked sufficient motivation. The Ministry of Health had other priorities to look after and within the Ministry, wastewater treatment received low priority. Pollution prevention and wastewater treatment were not considered a prime objective of this Ministry (Fliesher, personal communication, 15.5.01; Marinov, personal communication 23.5.01; Shelef, personal communication, 15.7.01). For example, the Public Health Ordinance allows the Minister to promulgate relevant regulations. However, the relevant regulations - 'effluent intended for use in irrigation', were only promulgated in 1981. The regulations restrict effluent irrigation but with respect to protection of public health, not the water sources, and were promulgated only in relation to a cholera outbreak that occurred in 1970 due to consumption of raw vegetables that were irrigated with untreated wastewater. The regulations allow irrigation with effluent based on permit system and for crops that are not meant for human consumption only, thus allowing irrigation of other crops. Moreover, the regulations did not specify the required effluent quality and merely prescribe that the dissolved oxygen concentration will be at least half a milligram per liter and that the effluent must not contain toxic compounds that may danger, in the view of the Director General of the Ministry of Health, the health of those that who come in contact with the effluent or with the irrigated crop (Gasith & Pargament, 1998). The fact that such regulations were promulgated at a relative late stage, do not address pollution of water sources and do not specify the required effluent quality, all reflect the lack of interest thus motivation to enforce water pollution control, by this Ministry. This lack of motivation can further explain the Ministry's weaker position in the actor's network and thus its passive cooperation.

The Ministry of Interior has a central role in the enforcement of the Local Authorities (Sewerage) Law and as such could have been an important actor. Entrusted with the authority to order municipalities to install proper treatment facilities, this Ministry had the power to enforce the Law and protect the water sources from pollution. The Ministry of Interior lacked, however, sufficient information. While the Ministry was represented in inter-ministerial committees such as the Sewage Committee, in practice it was a marginal actor. It lacked the technical and professional expertise and accepted the position of the Water Commissionaire and the Ministry of Agriculture with respect to their approach to

wastewater treatment (Hecht, personal communication, 12.6.01). For example, following the cholera outbreak the government established a new inter-ministerial committee for wastewater management which was meant to define relevant policy, as well as the National Sewage Project - its operative arm, meant to execute this policy. The Director General of the Ministry of Interior was appointed as the formal Chair of the inter-ministerial committee based on the Ministry's responsibility for the municipal sector and as wastewater treatment is an obligation of the municipalities. This, however, was a formal appointment only; the Director General admitted to have little information on the subject and in practice it was the Water Commissionaire that ran the committee (Kantor, personal communication, 8.5.01). It was the Water Commissionaire that also ran the operative arm and controlled the budgets. Most importantly, though, the Ministry of Interior lacked motivation. According to Adam (2000), the use of the authority given to it by the Local Authorities (Sewerage) Law would have prevented or reduced water pollution caused by discharge of untreated wastewater to the streams. However, she notes, the Ministry of Interior chose not to exercise this authority. Being the Ministry responsible for the municipal sector, the Ministry's primal goal is to support the local authorities. The low-tech low-cost facilities that were advocated by the Ministry of Agriculture meant lower costs for the municipalities and with little interest and expertise in this topic, the Ministry of Interior accepted them as suitable solutions (Hecht, personal communication, 12.6.01). An example of the Ministry's prime interest in the state of the municipalities rather than in wastewater treatment can be seen in the following. Following the cholera outbreak, the Israeli Government signed in 1972 an agreement with the World Bank concerning a loan for the purpose of upgrading wastewater treatment facilities. As per this agreement, the World Bank required, among other things, that the local authorities will ensure that the funds they raise with wastewater charges will be used for wastewater management, allowing them to repay the loan as well as maintain and operate the facilities. To comply, the Ministry of Interior issued an order by the General Director stating that local authorities are required to do so. This, however, was never enforced (Shtreit, personal communication, 24.7.01). In practice many of the local authorities used income from water and wastewater charges for other purposes, especially when in fiscal stress (Laster & Livney, 2009). Both the Ministry of Interior and the Treasury Ministry realized that enforcing this order would mean financial burden for the local authorities, and ignored it (Hecht, personal communication, 12.6.01). This, too, reveals that the Ministry of Interior's prime interest was to support the local authorities and not to protect the water sources.

An additional actor that should be mentioned is the Environmental Protection Service. The Service was established in 1973 as a department in the Prime Minister's office following the Stockholm Declaration of 1972. In 1976 it was transferred to the Ministry of Interior, mainly in order to affect local authorities' handling of sewage. The Environmental Protection Service, however, had mainly a research position and while it was represented in scientific forums, it had no decision-making power (Marinov, personal communication 23.5.01). As such it had the motivation and the information, but not the power. Nonetheless, it prepared the ground for the Ministry of the Environmental Protection that would be established at a much later stage.

The Treasury Ministry has a facilitating role via budgets. However, prior to the agreement with the World Bank, separate national budgets were not allocated for wastewater treatment. The position of the Treasury Ministry was that the local authorities are expected

to finance sewerage works by themselves, and that the wastewater solutions should be the cheapest ones available (State Archive, container GL4647/746, 11.12.1961). Following the cholera outbreak and per the agreement with the World Bank, the Treasury Ministry was to provide 60% of the projects' costs. With a clear interest to reduce costs, it followed the approach for low-cost facilities led by the Ministry of Agriculture.

The target group is defined as the local authorities and their mayors, as they were given the formal responsibility for wastewater treatment and could be legally charged for pollution of the water sources. The municipalities had insufficient information to carry out this task. The Local Authorities (Sewerage) Law, as established above, did not specify the type and amount of compliance required, as long the health authorities were 'satisfied'. In addition, most of the local authorities in these years were small and had little or no access to the required technical expertise (own personnel), and relied heavily on relevant central authorities such as the Sewage Committee. More importantly, they had insufficient resources. Prior to 1972 the government did not allocate separate budgets for wastewater treatment. Such funds became available after 1972 following the agreement with the World Bank, but these were assigned to the Central Government (the National Sewage Project, chaired by the Water Commissioner), which decided how to allocate the funds. Municipalities remained dependent on the central authorities to access these public funds. Raising private capital required the approval of the Treasury Ministry. This, however, was not considered appropriate during this phase. The only mayor at the time, trying to raise private capital, was the mayor of the coastal city of Haifa. Initiating the construction of a biological treatment plant during the 1950s, this mayor was a front-runner and ahead of his time. After establishing an inter-municipal cooperation and preparing the technical plans for the treatment plant, the final hurdle to overcome was the needed funds. The mayor, being extremely committed, managed to interest two French companies that would construct the plant with their own capital. In fact, a pioneer Build Operate Transfer (BOT) construction. The Treasury Minister, however, refused to approve this agreement, and only due to the mayor's determination, this was eventually approved. The Haifa treatment plant went into operation in 1961, decades before other municipalities followed. Other less determined and less capable mayors – would have not succeeded (Hophmayer-Tokich, 2005). And finally, the local authorities had no motivation. Most of the municipalities had little or no inner motivation and focused on housing and economic development. Sewerage systems were constructed in early stages to remove hazards from the population centers thus any pollution that was caused by wastewater, was – in most cases, not felt by the inhabitants. In the cases that the inhabitants did experience the nuisances, such as the city of Tel Aviv via the Yarkon Stream or the city of Hadera via the Hadera Stream, mayors were more pressed to take action. External pressure, by higher authorities, e.g. by law enforcement – was completely non-existent. The central authorities reflected that the lack of action was tolerated. Therefore, the target group had little information, very few capacities (power) and hardly any motivation to comply with the Law and treat wastewater. The main findings for this phase are presented in table 1.

To conclude, several actors are given the authority to implement water pollution prevention, but none of them do so. Some actors lack access to power and information while others have, however none of them have the motivation. The main reason for that is that protection of water sources is not the primal goal of any of them. The Water Commissionaire at this phase has the formal task and authority to protect the water sources and prevent their pollution, thus given the power and the information. However, subordinated to the Ministry

Actors	Motivation	Information	Power	Interaction processes
Ministry of Agriculture	Lacking; Primal goal – support agricultural production, not preserving the water sources. As such, advocated utilization of low quality (free of charge) effluent in support of agricultural production; No motivation to enforce wastewater treatment.	Via the Water Commission subordinated to it - has the expertise as well as the information regarding the state of the water resources	Authority/sanctioning (enforcement) resources as well as sufficient financial and personnel resources; Level of general political support – very high	Most powerful actor; However its power allows this Ministry to choose not to implement the Water Law or to implement according to own goals. This actor dominated the policy network based on its own goals and the wastewater management approach it advocated
Ministry of Health	Lacking; Pollution prevention and wastewater treatment – not primal objective, receives low priority within the Ministry	Lacking; the Sewerage Law does not specify the type and amount of compliance required, making its enforcement difficult	Lacking; insufficient enforcement resources; authority in practice; and financial resources aimed at wastewater treatment	Weak position in the actors network; little influence over the process due to passive cooperation
Ministry of Interior	Lacking; Primal goal – support the local authorities. Enforcing the Laws would have caused fiscal stress to the municipalities, which the Ministry of Interior was trying to avoid. Thus, no motivation to enforce wastewater treatment	Lacking; no expertise and technical know-how	Had the power via the Local Authorities (Sewerage) Law	Impartial actor (by choice); little influence over the process
Environmental Protection Service	High interest in protecting water sources	Has access to sufficient information via its experts and scientists	Has no power over the decision making or implementation processes	Marginal actor in the policy network
Target group: Municipalities / mayors	Low motivation to treat wastewater: little inner motivation, no external pressures, low self-effectiveness assessment	No specification of type and amount of compliance required (by the Sewerage Law) limited personnel	Very limited financial resources (no direct access to public nor private capital)	Weak position in the actors network; little influence over the process

Table 1. Characteristics and interaction processes, key actors; 1948- 1989 (lack of implementation)

of Agriculture and appointed as a representative of the agricultural sector, lacks the motivation to enforce the Law. The Ministry of Agriculture's prime values and interests are to promote agriculture, and securing water for irrigation is a high priority. Implementation

of pollution control instruments is not perceived as contributing to these goals. This Ministry is the most powerful actor in the policy network and in fact used its access to power and information to dominate the process for its own interests. Within the interaction process, this Ministry was not keen on sharing the vast powers it possessed over the management of the water sources. According to Laster and Livney (2009), for example, Stream Authorities were not established as the Water Commissioner did not intend to share his power with another authority and the Minister of Agriculture supported this position. All this reflects the influence of this Ministry over the implementation process. Other actors with some responsibilities and authority could have improved the state of affairs, but would or could not do so. They lack the motivation, information, and power in various degrees and with the Ministry of Agriculture being the most powerful actor, consciously allow it to take the lead as wastewater treatment is not a primal goal of any of them. Most of them, especially the Ministry of Interior and the Treasury Ministry, accept the approach advocated by the Ministry of Agriculture as it suits their own interests, and the only actor that shows some attempts to object – the Ministry of Health, has a weaker position in the interaction process and eventually passively cooperates with the Ministry of Agriculture's approach. The target group lacks information and power, and with no access to funds was highly dependent on central authorities. Municipalities also lack motivation due to low internal motivation and lack of external pressure. Furthermore, mayors' lack of motivation can also be explained by the self-effectiveness assessment concept. With little influence over the process and its outcomes, even mayors that may have preferred to take action, such as in the cases of Nahariya and Zichron Ya'akov, realized they have no capacity to take such actions and became de-motivated. The above-mentioned mayor of Haifa is a rare exception. As a result, the implementation process can be defined as avoiding/lack of implementation due to passive cooperation. Most of the actors were impartial and passively cooperated with the standpoint of the more dominant actor – the Ministry of Agriculture, by not hindering nor stimulating the implementation of the Laws. As such, have little influence over the interaction process and thus on the policy outcome. The target group – is also in a weak position in the interaction between the actors and has little influence over the process as well.

3.3.2 1989 until the present

Starting 1989 a new trend of enforcement of relevant legislation can be seen. In response, most of the municipalities throughout the country, including ones that have neglected wastewater treatment for decades such as the city of Jerusalem, Be'er Sheva, Karmiel and others, began constructing highly advanced wastewater treatment plants. Several factors can explain this, of which the establishment of the Ministry of Environmental Protection is the most important one.

The Ministry of Environmental Protection was established in 1989 as a small Ministry, meant to provide a solution for a coalition crisis. It soon after, however, became a crucial actor in pollution control enforcement. As above mentioned, it assumed the responsibility for protecting the water sources and preventing their pollution from other Ministries. As such, it has the power to enforce relevant laws. It also has the relevant information. Although the Ministry started as a small low-budgeted Ministry, it was staffed by highly trained team of professionals, also based on the Environmental Protection Service which prepared the ground and provided the newly established Ministry with the professional

expertise needed for the new tasks. Therefore the Ministry had access to power and information. These, however, were proven in the previous phase to be insufficient in the absence of motivation. More importantly, thus, the establishment of this new Ministry created for the first time an institution with an exclusive mandate to and interest in protecting the environment and the water sources (Adam, 2000). Furthermore, the Ministry's personnel and especially its first General Director were fully committed to create a change, and the first Ministers were environmentally-oriented and supported the development of relevant strategies and policies (Adam, personal communication, 6.9.01). As such this Ministry had clear motivation to enforce the laws. Its immediate actions with this respect, clearly reveal that.

Acknowledging that previously enforcement was non-existent, the Ministry's first action was to begin developing a comprehensive policy of forceful enforcement and the enforcement mechanism. As municipal wastewater was the main source of pollution the Ministry turned to establish a policy against polluting local authorities. The main Law this policy could have been built on was the Water Law (art. A1). The maximum penalty for water pollution according to this Article, however, was very low: only 4,500 NIS*, with no provisions for imprisonment. These sanctions were insufficient to deter polluting local authorities. The Ministry's first action was to amend the Law to allow more meaningful penalties. The amendment was completed in 1991, following which any polluter could have been penalized with one year imprisonment or a fine of 150,000 NIS, and in case of continued violation of the Law - seven days of imprisonment and additional fine of 10,000 NIS for every day of continuous pollution after a written warning was issued†. Furthermore, the amendment to the Water Law included also a provision for citizen suits, allowing an additional route for enforcement. In parallel the Ministry's officials started issuing warning letters to mayors demanding that they take actions to prevent pollution (Adam, personal communication, 6.9.01; Adam, 2000). In many cases the warning letters were sufficient, but in others lawsuits were filed. By 1995 fifty one lawsuits were filed by the Ministry of Environmental Protection against polluters, of which seventeen were against local authorities for violations of the Water Law (State Comptroller, 1996). Additional enforcement measure that was taken by the Ministry of Environmental Protection was an administrative measure of refusal to permit housing of newly built housing units unless the local authority in question had a proper wastewater treatment plant or advanced plans to construct one. In the beginning of the 1990s massive waves of immigrants from the former Soviet Union immigrated to Israel resulting in rapid development in most of the local authorities. At this point in time, taking such administrative enforcement measures put heavy pressure on mayors to treat wastewater (Marinov, personal communication, 23.5.01). In addition, the Ministry promulgated regulations on a wide range of issues related to water pollution (Adam, 2000), further enabling enforcement. The Ministry also promoted a policy towards stream rehabilitation. This includes establishing local administrations for stream restoration (30 such administrations were established by 2008) and regulating effluent discharge to streams. The latter - non-existent prior to the establishment of this Ministry, aims to enable base-line flow when potable water is unavailable, by permits system and by requiring stricter effluent quality when discharged to streams (Israeli Ministry of Environmental Protection, n.d.).

* Approximately \$ 450 at the time (Adam, 2000)

† In 2008 the Law was amended to further increase the fines to 350,000 and 23,000 for every day of continuous pollution.

The Ministry's policy of enforcement, however, was not easily implemented and met objections from other Ministries, such as the Ministry of Housing. Furthermore, until 1993 the Ministry of Environmental Protection did not have its own prosecutors and it relied on the Attorney General and the district attorneys to file lawsuits. These, however, were not keen on cooperating due to work load, low priority for environmental issues, and the availability of administrative measure of enforcement. Finally, bringing criminal charges against mayors can meet political objections and on occasions the Ministry's staff was unable to file suits against a mayor. Determined to enforce the laws and promote a change, the Ministry's officials turned to other solutions when needed, including transferring material to an environmental non-governmental organization so that it can file a civil law suit against the polluter, in case of political pressure against the Ministry of Environmental Protection taking such action. All these reveal that the newly established Ministry of Environmental Protection had a strong motivation to enforce water pollution control measures. This strong motivation enabled the Ministry's officials to strengthen the power and information initially available to them by amendment of the Water Law to create a meaningful enforcement mechanism. Small and low-budgeted, and often facing political opponents and objections by other Ministries, the Ministry's strong motivation to enforce the Law gave it a strong position in the policy network.

The Ministry of Health became a more meaningful actor in this phase. In 1992 the Ministry promulgated the base-line quality regulations for effluent standards. These regulations served as an important tool for enforcement as for the first time the local authorities could have been required to treat wastewater to meet clear standards. The new regulations compelled municipalities to establish advanced wastewater treatment plants in order to meet these standards. As such these regulations provided the Ministry of Health more access to power – with more authority at hand, and information with a clear frame of reference for enforcement. It should be noted that the regulations were co-initiated by the Ministry of Agriculture which by the end of the 1980s acknowledged for the first time the need to divert high quality effluent for non-restricted irrigation for the agricultural sector (Hophmayer-Tokich, 2010). In 2010 the regulations were amended by the Ministry of Health and the Ministry of Environmental Protection to include stricter standards. With respect to motivation, it seems that in this phase, the Ministry of Health has higher motivation to enforce the law. This can be explained by the drastic reduction in the power of the Ministry of Agriculture on one hand, and with the establishment of the Ministry of Environmental Protection on the other. By the end of the 1980s, in the fast growing market economy, agriculture lost both its ideological status and its economic significance. As such, the agricultural sector and the Ministry of Agriculture lost its political power. Regarding water management, with the transfer of the responsibility for water pollution control to the Ministry of Environmental Protection, and in 1996 with the transfer of the Water Commission (by then: Water Authority) to the newly established Ministry of Infrastructure, the Ministry of Agriculture lost most of its power over water management. This cleared the way for the Ministry of Health – traditionally a weaker opponent and passive cooperator of the Ministry of Agriculture with respect to wastewater treatment, to be in a stronger position to enforce the relevant laws. On the other hand, the establishment of the Ministry of Environmental Protection and the transfer of some of the Ministry of Health's authority over water pollution control and wastewater treatment to this Ministry, resulted in a new rivalry, this time between these two Ministries. It seems that this rivalry and the enforcement actions taken by the Ministry of Environmental Protection gave the Ministry of Health

additional motivation to enforce the laws and establish its position with this respect, as well (Tal, personal communication, 14.5.01; Balasha, personal communication, 14.5.01). As such, the Ministry of Health in this phase has better access to information and power, and higher motivation to enforce wastewater treatment.

The Ministry of Agriculture, as abovementioned, lost most of its power, both in general and specific to water pollution control. In addition to the above-mentioned, in 1992 under the Rabin Government the Administration for the Development of Sewage Infrastructure was established to replace the previous inter-municipal Sewage Committee and its operative arm. In contrast to the past, whereby the Water Commissionaires were traditionally – officially or not – chairing the National Sewage Committee, the new Administration was subordinated to the Ministry of Interior and represented by different Ministries, excluding the Ministry of Agriculture (State Comptroller, 1996). Furthermore, its operative arm was headed by professional wastewater engineers with a clear affiliation to advanced technologies rather than to agricultural interests. The advocated technical solutions were now advanced treatment technologies (Gurion, personal communication, 16.07.01). All these resulted in loss of power by this Ministry in this phase. At the same time, an interesting development is that the Ministry of Agriculture – for the first time, shows more motivation for a higher effluent quality and high level treatment, from its own interests. By the end of the 1980s consecutive droughts resulted in major cut-downs in potable water allocation for irrigation. At the same time, the global price of cotton – previously a very lucrative crop, dropped drastically. This forced farmers to shift to more profitable crops, which require high quality effluent. These two resulted in high interest of the agricultural sector in a reliable alternative source of water for non-restricted irrigation – high quality effluent. This explains the co-initiation of the base-line effluent quality regulations. To conclude, at the start of this phase a shift in the Ministry's motivation is observed, revealing higher motivation to treat wastewater to a high level, in combination with drastic reduction in power, thus much less influence over the enforcement process and lower position in the actors' network.

The Prime Minister's Office should be mentioned with respect to Prime Minister Rabin. The Rabin Government, established in 1992, prioritized development of infrastructure in general, wastewater infrastructure included, in light of the massive waves of immigrants from the former Soviet Union. Apart from establishing the Sewage Administration, mentioned above, this government allocated substantially increased budgets for wastewater treatment plants. If prior to 1992 the annual budget for wastewater treatment was 15-20 million NIS, this grew to 180 million NIS in 1993, 250 million NIS in 1994, 450 in 1995 etc. Moreover, in order to provide incentives for municipalities to engage in advanced wastewater treatment and apply for loans, partial grants up to 25%[‡] of the overall loan became available for municipalities that submitted plans and received their approval within the first three years (Reich, personal communication, 14.06.01). This provided local authorities with higher motivation on one hand, and sufficient resources (power) on the other.

With respect to the Ministry of Interior, its involvement in enforcement remains unchanged. The Ministry of Infrastructures was established in 1996 and received the jurisdiction over the Water Authority/Water Commissioner and the Administration for the Development of Sewage Infrastructures. This Ministry does not have power regarding enforcement of water

[‡] 25% for municipalities applying for a loan in the first year, 20% second year, 15% third year (Riech, personal communication, 14.06.01).

pollution prevention legislation, but has a clear mandate and objective to upgrade the State's infrastructure. Via the Sewage Administration it has control over the national budgets for wastewater treatment and has the professional staff to advise municipalities on that matter. As such it has a facilitating and supportive role.

The target group in this phase is facing a different situation. In terms of motivation, it now has a very strong motivation to treat wastewater, mainly due to external pressure from enforcement authorities. Many mayors received warning notifications, were warned that a law suite would be filed against them, and in some cases indeed faced lawsuits. In parallel, in the midst of a massive building and development phase, were not allowed to populate the newly built neighborhoods unless they had an existing or planned proper wastewater treatment plants. Mayors realized that for the first time not treating wastewater is no longer tolerated by the relevant authorities. At the same time municipalities are given the resources and the means to comply with the law. Regarding information, the municipalities now have clear standards to meet, thus have a frame of reference to what is asked of them. Most of the municipalities at this phase also have access to professional staff either via their own water departments, via inter-municipal cooperation, or private consultants. In any case, with the new Sewage Administration staffed with professionals not affiliated with the agricultural lobby, municipalities now have access to relevant information. And finally, municipalities now have access to financial resources, either in the form of loans from the government or by raising private capital which by the end of the 1990s was encouraged by the government and the Treasury Ministry. This gives municipalities more power in comparison to the previous phase, in which most of them were highly dependent on the central authorities. This can also be seen as influencing their self-effectiveness assessment, thus further motivating them.

To conclude, several factors co-aligned to change the interaction process between actors and result in the paradigm shift: the establishment of the Ministry of Environmental Protection, the drastic reduction in the power and influence of the Ministry of Agriculture with – at the same time – its acknowledgement for the need to direct high quality effluent for irrigation, and the Rabin Government's policy of investment in infrastructure. All these shifted the balance and altered the interaction between the relevant actors and resulted in the shift. With the establishment of the Ministry of Environmental Protection finally there was an institution that has access not only to power and information but also to motivation. With the sole interest in protecting the water sources, and with highly motivated staff to create a change, this Ministry started a new trend that could have not been overturned. In parallel, the drastic reduction in the power of the Ministry of Agriculture, that previously controlled almost exclusively the water management sector, including wastewater treatment, paved the way to a new interaction between the actors. With the new interaction, it can also be seen that the establishment of a Ministry that was determined to make a change and enforce the laws, influenced other relevant actors, previously with a weaker or impartial positions, especially the Ministry of Health, to embark on this trend and enforce the laws. Be it due to the new rivalry over authority, or due to actual interest in the needed change, the Ministry of Health became a relevant actor in the new trend of enforcement. Finally, enforcing the laws without providing the means to comply with the law would have made it very difficult for the municipalities to establish advanced wastewater treatment plants. The Rabin's Government allocated high budgets and gave strong financial incentives for municipalities to embark on the new trend and invest in wastewater treatment; it also provided professional assistance and framework via the new Sewage Administration, now headed by

wastewater engineers rather than representatives of the agricultural sector. This process is still on-going and with the stricter regulations recently promulgated by the Ministry of Environmental Protection and Ministry of Health, and with the further amendment of the Water Law in 2008 to increase the penalties that can be imposed on water polluters, it seems that the high motivation to improve the state of the water sources, continues.

As a result, in this phase the implementation process can be defined as achieving implementation. The interaction type, however, seems to not fully fit the types prescribed by the Theory. Since implementation is achieved, it can be described as cooperation as more actors share similar objectives. However, rivalry and power struggles hinder effective cooperation and coordination and it seems that the similar objectives are motivated by different reasons which result in more independent actions taken by different actors rather than active cooperation to achieve implementation. The Ministry of Environmental Protection's interest is to protect the water sources; the Ministry of Health aligns either due to its wish to establish its authority within the new rivalry with the Ministry of Environmental Protection over control or due to its own interest in protecting the public health; the Ministry of Agriculture's interest co-aligns as for the first time the agricultural sector acknowledges its need for high quality effluent for non-restricted irrigation as a reliable water source to replace potable water allocations for irrigation; the Prime Minister's Office prioritize infrastructure to support the absorbent of massive immigration wave. All these influence the interaction process and aligned to result in different actors taking actions, based on their different motivations and own-interest, to enforce the law and promote advanced wastewater treatment. Although the process was not always smooth and faced objections such as by the Housing Ministry and although the challenges in this field are far from being resolved, the new interaction process yielded enforcement trend and positive results. The target group was now being pressured into compliance and at the same time assumed the power needed for the task. With more access to information and resources, municipalities are now in a stronger position in the interaction process to influence outcomes. The main findings for this phase are presented in table 2.

Actors	Motivation	Information	Power	Interaction processes
Ministry of Environmental Protection	Clear ideology and unambiguous mandate to protect and preserve country's water resources. The first independent organization with the sole interest of protecting the environment	Highly trained and professional staff, experts and scientists, related to environmental as well as legal matters. The former Environmental Protection Service provided the needed base for the new Ministry	The Ministry assumes responsibilities and authorities previously belonging to other ministries. Despite little financial resources, the Ministry makes the most out of its authority/sanctioning/enforcement powers; soon after its establishment amends the Water Law to provide a meaningful enforcement tool and take immediate enforcement actions	Became a crucial actor in the policy network in terms of law enforcement

Ministry of Health	Higher motivation in comparison to previous phase. Mostly, power struggle with the newly built Ministry of Environmental Protection as a motivation to become a more powerful actor	The base-line quality regulations, promulgated by the Ministry of Health in 1992, gave a frame of reference for law enforcement	Increased: Enforcement resources and authority in practice (via e.g. the base-line quality regulations); Still lacks own financial resources aimed at wastewater treatment	Stronger position in the actors' network especially with respect to law enforcement; more influence over the process; aligned with other actors to promote advance wastewater treatment
Ministry of Agriculture	For the first time acknowledges the need to utilize high quality effluent in support of agricultural production due to several drought years and cut-down in potable water allocation for agriculture, leading to co-initiation of the base-line quality regulations	With the government's decision from 1992 to establish the Sewage Administration, headed by professional wastewater engineers and with the transfer of the Water Authority to the newly established Ministry of Infrastructure in 1996 lost its grip over the relevant information	Level of general political support - very low; lost most of its powers in the new advance market-based economy. With the transfer of the responsibility for water pollution control to the Ministry of Environmental Protection in 1989 and the Water Authority to the Ministry of Infrastructure in 1996, lost most of the relevant authority and financial resources	Much reduced power; less influence over the process but aligned with other actors (from own goals) to promote advance wastewater treatment
Ministry of Infrastructure	Objectives: upgrade national infrastructures	Received the jurisdiction over the Water Authority and the Administration for the Development of Sewage Infrastructures and as such has access to relevant information	Received the jurisdiction over the Water Authority and the Administration for the Development of Sewage Infrastructures and as such has relevant financial and personnel resources	Interests aligned with other actors to promote advance wastewater treatment
Target group: Municipalities /mayors	High motivation to treat wastewater mainly due to external pressures (law enforcement)	clear specification of type and amount of compliance required (by the base-line quality regulations); better access to technical know-how	Better access to financial resources (both public and private)	Target group is pressured into compliance with the law on one hand and given access to resources for implementation on the other thus in a better position in the actors' network

Table 2. Characteristics and interaction processes, key actors; 1989-present (implementation)

4. Conclusions

In the State of Israel wastewater treatment has been neglected for decades. Municipalities – legally responsible for wastewater collection, treatment, and sanitary disposal, established the collection systems to remove hazards from their population centers, but in most cases neglected the elements of treatment and sanitary disposal. Untreated or partially treated wastewater was discharged into the environment, mostly to the nearest stream or dry riverbed, resulting in on-going pollution of the scarce water sources. Advanced legislation was in place since early stages of the State, providing the sufficient legislative framework to protect and preserve the water sources but the laws were not enforced. The intended policy goals were thus not attained due to lack of implementation. Since the beginning of the 1990s a shift can be seen and most municipalities, including ones that have neglected wastewater treatment for decades, began establishing advanced treatment plants. This is mainly the result of forceful enforcement and the pressure put on municipalities and their mayors. While water pollution by wastewater is far from being resolved, there is - no doubt, a substantial improvement in comparison to the past. This chapter aims to analyze and explain the lack of implementation of the policy instruments – relevant legislation for pollution control, as well as the shift to its implementation.

The implementation processes in the Israeli case are analyzed from actor-centered approach based on the Contextual Interaction Theory. This approach assumes that since implementation of policy instruments is the responsibility of relevant actors in the policy network, they can be seen as a social interaction between key-actors. The characteristics of the actors involved, particularly their motivation, information and power, are analyzed as to explain the standpoint and activities of each of the actors in the policy network. These further explain the interactions between the key actors and in turn, the outcome with respect to the implementation process. Accordingly, the analysis offered in this chapter addresses the key actors in the implementation processes of pollution control legislation, their key characteristics, and the interaction between them.

The Israeli case shows a shift from a phase of lack of implementation prior to 1989 to a phase of achieving implementation following 1989. It also reveals that the Contextual Interaction Theory can explain well these implementation processes. In the first phase relevant actors had access to information and power in various degrees but none of the actors with the power to enforce the law - had also the motivation to do so. The analysis shows that none of the actors has a primal interest in protecting the water sources by requiring municipalities to treat wastewater as all of them had other more important priorities to look after. As such, the most influential actor – the Ministry of Agriculture, dominated the policy network based on the lack of motivation and relative lack of power and information of other actors, and avoided implementation of water pollution control to serve its own primal interest – utilizing wastewater for agricultural production. This Ministry advocated a low-cost low-tech wastewater management approach that served the short term agricultural interests but not the long term water considerations. Other actors passively cooperated with this approach either because it served their own interests as well, e.g. in the case of the Ministry of Interior, or because they had a weaker position in the network to influence the outcome, e.g. the Ministry of Health and the target group. This influenced the outcome of the implementation process – insufficient wastewater treatment and on-going pollution. The interaction between the actors had changed starting 1989, most importantly due to the introduction of a new actor – the Ministry of Environmental Protection with a sole interest

and high motivation to protect the water sources, as well as with a change in the key characteristics of the Ministry of Agriculture, with less power and higher motivation to promote advanced treatment. Wider contexts such as the massive immigration from the former Soviet Union and the rapid development it brought with it further influenced the implementation processes. In this new interaction, the Ministry of Environmental Protection promoted forceful enforcement and other actors participated in this process, e.g. the Ministry of Health, or supported it, e.g. the Prime Minister's Office, based on their own priorities. Putting pressure on the target group on one hand and providing it with means to comply on the other, gave municipalities motivation as well as information and power to comply. As a result, in this phase advanced wastewater treatment is achieved in many of the municipalities. Still facing many challenges, the enforcement trend continues.

Several lessons can be learnt from the Israeli case. (i) enforcement processes are indeed actor interaction processes and the result of this interaction in terms of the policy outcome can be well explained, thus predicted, by understating actors' access to motivation, information and power; (ii) key characteristics of the key actors can change over time and in turn result in changed outcome of the process; (iii) motivation seems to be the most important characteristic explaining implementation processes. Access to power and information alone were found to be insufficient as in the case of the Ministry of Agriculture. Furthermore, motivation can be used to create or increase access to better information and power as was the case with the Ministry of Environmental Protection. Understanding this, an intervention measure in cases of on-going pollution could be to create motivation either within the existing actors, e.g. the Ministry of Agriculture's acknowledgement of the need for utilization of high quality effluent for non-restricted irrigation, or by creating a new actor with high motivation, as was the case with the establishment of the Ministry of Environmental Protection; (iv) in the absence of an actor with access to both motivation and power, establishing an actor with motivation and information can in the long run prove to be useful as in the case of the Environmental Protection Service. While this actor had no power to enforce the law, it prepared the ground for such enforcement using its motivation and information and once an relevant organization with access to power was established – the Ministry of Environmental Protection, it could immediately embark on the tasks ahead using the information available by the Service; (v) once there is an actor with motivation and actions are taken, others may follow even if just to maintain and justify their authority over the matter. Pollution by untreated wastewater is a major environmental problem in many countries worldwide. Understanding these processes and interactions between key actors may assist predicting outcomes of policy processes and allow deliberate interventions to influence the motivations, information and power of the key actors.

5. Acknowledgements

The author is grateful to Nurit Kliot, the supervisor of the PhD study which the findings in this paper are based on.

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Water Pollution

Edited by Prof. Nuray Balkis

ISBN 978-953-307-962-2

Hard cover, 202 pages

Publisher InTech

Published online 24, February, 2012

Published in print edition February, 2012

Water pollution is a major global problem that requires ongoing evaluation and revision of water resource policy at all levels (from international down to individual aquifers and wells). It has been suggested that it is the leading worldwide cause of deaths and diseases, and that it accounts for the deaths of more than 14,000 people daily. In addition to the acute problems of water pollution in developing countries, industrialized countries continue to struggle with pollution problems as well. Water is typically referred to as polluted when it is impaired by anthropogenic contaminants and either does not support a human use, such as drinking water, and/or undergoes a marked shift in its ability to support its constituent biotic communities, such as fish. Natural phenomena such as volcanoes, algae blooms, storms, and earthquakes also cause major changes in water quality and the ecological status of water. Most water pollutants are eventually carried by rivers into the oceans.

How to reference

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Sharon Hophmayer-Tokich (2012). Interaction Processes Between Key Actors – Understanding Implementation Processes of Legislation for Water Pollution Control, the Israeli Case, Water Pollution, Prof. Nuray Balkis (Ed.), ISBN: 978-953-307-962-2, InTech, Available from:
<http://www.intechopen.com/books/water-pollution/interaction-processes-between-key-actors-understanding-implementation-processes-of-legislation-for-w>

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