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Public Participation in Environmental Decision-Making Processes.

The Asopos case.

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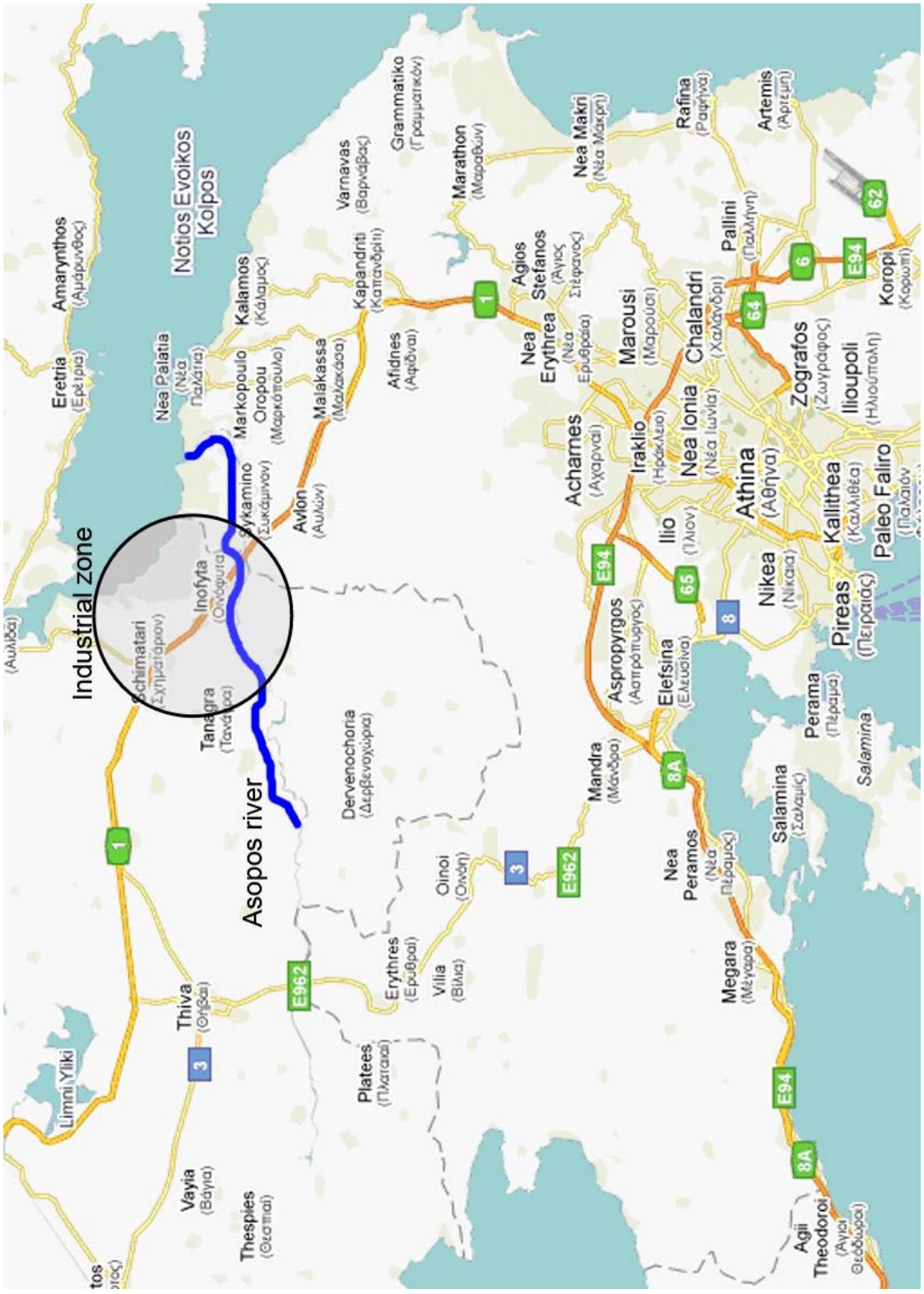
Preface

Asopos River runs through the boundaries of the Boetia and Attica Prefectures. Its main headwaters spring from the Kitheronas Mountain. Over its course, streams coming from the mountainous region between Parnitha and Dervenochoria are feeding Asopos with additional water. It has a total length of 54 kilometers and runs through the areas of Sikamino, Oropos, Schimatari and Oinofyta until it pours into Evoikos gulf. Seven municipalities (Sikamino, Oropos, Schimatari, Oinofyta, Tanagra, Avlona, and Thebes), a population of 200,000 inhabitants, are within the broad Asopos area. This area happens to be the largest industrial region of Greece, supporting 1,300 industrial facilities, including metal processing and food/beverage industries. A great number of these industries are operating without license, since they have failed to submit management plans for their wastes.

Asopos is now one of the dirtiest rivers of Greece because it has been subject to long-term industrial pollution. During the last decades, this river has been transformed into a hazardous running liquid that is fed by industrial sewages, transferring all kinds of dangerous substances to the underground water horizon and to the nearby seaside towns. The 'Asopos case' represents an intense environmental crisis with direct impacts on human health, social welfare, and the economic activities of the area (agriculture, fisheries, tourism, and food production).

The pollution of Asopos came into light as a result of the concern of residents of the towns of Oropos and Oinofyta. Oropos is an area that depends mainly on tourist activities and except from permanent residents one comes across with seasonal residents and tourists. Oinofyta is a town with a community that depends on work at industrial activities. One can find first, second and even third generation permanent residents. Most of them work in the local factories while some are self-employed. Alerted by the increase cancer incident rates, some local people organized in order to exercise pressure on the government for the implementation of the environmental regulations. Alerted by them, scientific communities went to Asopos to assess the environmental pollution and its impacts. As for the state, it has been totally inactive for a very long time.



Picture 1. The Asopos areas.

http://sibilla-gr-sibilla.blogspot.com/2011/04/blog-post_9526.html

1. Introduction

In 2000 we watched on the big screen the true story of Erin Brockovich, who started to investigate a suspicious case involving the Pacific Gas & Electric Company (PG&E). After extensive research she discovered that the company was trying to buy land that was polluted with hexavalent chromium, a deadly toxic material that PG&E had dumped illegally, poisoning the residents of Hinkley of South California. Brockovich continued to investigate, encourage and persuade residents to sue the company and finally managed to win big compensations on behalf of Hinkley's residents. In Hinkley the situation was the following: an industry which was operating without any oversight, chemical wastes containing (among others) hexavalent chromium, people getting sick and even dying. One person tried to persuade them to react and led their struggle against a multinational company. For many people in Greece the above situation is a very familiar one, particularly in the Municipality of Oinofyta.

1.1. Aim and research questions of the study.

In 1969, with a Presidential Decree, under a Greek dictatorial regime, industries were allowed to be transferred in the region near Oinofyta, setting an unofficial industrial area without proper infrastructures. Their settling was helped by the fact that these regions of Boetia were very close to Athens and the port of Piraeus. In 1979, with an additional Prefectural Decree, industries were free to dump their waste in Asopos under one condition: to have complete waste treatment. The implementation of this particular Decree was never an issue of great concern for the authorities. To this day, not only this Decree hasn't been properly enforced, but many industries continue to operate without the necessary licenses and without biological waste treatment.

During the eighties, permanent and seasonal residents of coastal areas around Asopos began to worry about the sea pollution; their concern was only about the environment. This concern extended in early 1990 due to many cases of dermal

infections in people who had swum in the river (Δασενάκη, Αύγουστος 17, 1992). At the same time, industries of the Asopos areas flourished and were highly profitable (Βήμα, Φεβρουάριος 7, 1988), without spending any money for waste treatment.

In 1996 the National Technical University of Athens undertook a technical study, under the title "Preliminary Study for the Construction and Operation of a Wastewater Treatment Plant in Asopos Area, Viotia" (Loizidou, 1998), which claimed that the underground waters of the region had been polluted by industrial wastes and were not fit for human use or even for irrigation. In November 2004, suspicions obtained the status of facts. Measurements of the General Chemical State Laboratory of Greece showed that even drinking water was heavily polluted and contained large concentrations of total chromium. Up until 2004, analyses of the area's water were only microbiological and not chemical. Between 2005 and 2007 no action was taken by the authorities.

In August 8, 2007 measurements showed the existence of hexavalent chromium (CrVI). Lead, chlorine and nitrates were also found. In 2009, a report by the Technical Chamber of Greece [Τεχνικό Επιμελητήριο Ελλάδος] stated: "to this day there has not been an organized plan for creating the infrastructure necessary" (TEE, 2009: 9). In February of 2010, the Ministry of Environment announced the following measures[1]: a) the commitment of Athens Water Supply and Sewerage Company (EYDAP)[2] to supply Thebes and Oinofyta with water exclusively from Mornos[3] for the next three years, b) the setting of a limit of hexavalent chromium at 3mgr/lt, c) the repeal of Presidential Decree 1969, which described Asopos as a recipient of waste, d) the prohibition of dumping waste from industries, which were forced to comply with environmental regulations, and e) the establishment of the Oinofyta Environmental Inspectors Office.

[1] www.ypeka.gr/ypeka/Default.aspx?tabid=389%sni[524]=277&language=el-GR

[2] EYDAP [ΕΥΔΑΠ] is the Greek organization responsible for: the design, construction, installation, operation, management, maintenance, expansion and replacement of water supply and sanitation.

[3] Athenians are also supplied with water from Mornos.

This study aims to describe how an issue relating to the environment and the public health could have as a result the participation of local people in decision-making processes, the creation of concerned groups/activist movements, and the cooperation of activist movements with experts. Moreover, this study seeks to present how lay people try to participate in environmental decision-making processes and find sustainable solutions. I will analyze the above taking as example the 'Asopos case'. More specifically, I decided to focus on the community of Oropos, since the public participation about the Asopos issue has been initiated there, and mainly on the community of Oinofyta, which has high mortality rates from cancer and an expert-activist and a lay-expert, who struggle to get involved in the decision-making processes. The research questions of this study are:

-How did lay people manage to participate in decision-making processes, going from exclusion to inclusion?

-How was a community-based environmental movements (like ITAP), consisting of expert-activists and lay-experts, able to organize people without a prior involvement in environmental issues under a common goal? How did ITAP assert the right to a clean environment and the right to be included in the (environmental) decision-making processes?

-How did the phenomenon of 'non-participation' influence the results of a decision-making process and the efforts of the activist movements?

-How did lay people conduct researches (researches in the wild) and what were the differences with the (confined) researches that were conducted by scientists?

-How did scientists contribute to the attempts of local people to understand the consequences of industrial pollution in their health and environment?

-Had the state, political parties and relevant (local) authorities an active role in the Asopos case?

1.2. Public Participation in decision-making processes.

Before modernity, scientific truth was inseparable from public demonstration. During the recent centuries, instruments and accuracy in measurement became inseparable components of science (Callon, 2003: 35), which gradually began to eliminate the public from its procedures. Nowadays lay people seem to come back by arguing that participation is particularly necessary in decision-making processes about science and technology policy, especially in regards to issues concerning environmental and health risks (Rowe & Frewer, 2000: 3).

Modern societies are exposed to many risks that are associated with scientific and technological advances (Short & Rosa, 2004: 135), such as environmental pollution and newly-discovered illnesses (Beck, 1992). According to Beck, an industrial society is unavoidably, also, a 'risk society'. Back in the 19th century, it was thought that governments and the industry were capable of calculating risks and solution. The calculability of risk is no longer given (Beck, 1992: 182). The risks produced by industrial development are frequently invisible. This is the case with toxins in the air, water and foodstuffs, which can have long-term effects or irreversible harm on plants, animals and people's health (Beck, 1992: 23). In a discussion about risk, the gap between lay and professional rationality in dealing with the harmful effects (Beck, 1992: 26) and the attempt of lay people to get involved in the decision-making process dominate.

Recent debates in science and technology studies have highlighted the importance of public participation in the field of science. Participation is the involvement of citizens in the decision-making process (Fiorino, 1996; Fulop, 2002), that is the involvement by a local population and additional stakeholders in the creation and conduct of a program or policy designed to change their lives (Jennings, 2000:1). Public participation is not about expressing complaints about a problem or just having a critical thinking. Participants desire access to appropriate information that will enable them to enhance their knowledge and acquire skills for critical thinking and active participation (Skavanis et al, 2005: 321). As active participants, citizens will be able to recognize, support and raise local issues.

According to Dobson, democracy is the only form of decision-making process that respects humans' interests (Dobson, 1996). Democracy allows people to assess their interests themselves and express without any kind of restriction their opinions. Public participation in policy making in science and technology is necessary to "reflect and acknowledge democratic values and enhance trust in regulators and regulatory systems" (Rowe & Frewer, 2000: 24). It seems that politicians need public participation to validate their decisions, like the scientists of 17th century needed the audience for their theories' validation and legitimization.

But is public participation a matter of 'supporting' democracy or is it something more? Participatory methods and/or formal democratic structures do not automatically or necessarily lead to the 'empowerment' of marginalized individuals or groups (Willems, 2009: 400). Democracy allows citizens to organize themselves in defense of their own interests and identities without the fear of external intervention (Fox, 1994: 151-152). According to Jennings, all community members should actively participate in order to assert a better quality of life - and not to enhance the importance of democracy - and understand the economic, social, environmental, political and psychological impacts of a certain event in their lives and in their community. Additionally, they should be aware of regulators' decisions and judge them (Jennings, 2000). After all, they will live with the consequences of these decisions (Ward, 1998).

According to Pretty (1998), there are seven types of public participation in decision-making processes[4]: manipulated[5], passive[6], participation by consultation[7],

[4]The types are recorded by the degree of their intensity, from the weaker to the most intense/powerful.

[5]In manipulated citizen participation the participation is only a pretense.

[6]Citizens possess any information that an 'external' actor (for example, state, professionals, or authorities) has transmitted to them. They don't decide anything; others make all the necessary decisions.

[7]Citizens usually participate in consultations or answering questionnaires.

redeemable[8], functional[9], participation through interaction[10], mobilization and support[11]. In the case of Asopos there are two types of public participation: the 'passive'[12] and the 'mobilization and support'[13] ones. The individual's participation choices are the outcome of the combination of values, beliefs, interests, internal drive (Skavanis et al, 2005: 323), personality[14], time, money, social affiliations, and professional relationships. Persons with strong pro-environmental attitudes and a greater sense of personal responsibility or people who have satisfied their personal needs are more likely to engage in environmentally responsible behavior (Kollmuss & Agyeman, 2002: 243). Altruistic behavior increases when a person becomes aware of other people's suffering, and, at the same time, feels a responsibility of alleviating this suffering (Kollmuss & Agyeman, 2002: 245). On the other hand, people with a strong selfish and competitive orientation or people with loose morals (Σωτηρόπουλος, 2004: 117) are less likely to act ecologically. Moreover, there are people who will not develop (enough) participatory action unless they are sure that this action will lead to a real 'win-win' solution (Held, 1987; Bora & Hausendorf, 2006: 479).

Why some people refuse to participate? Perhaps, the (obvious) answer is: due to lack of knowledge and awareness. Nevertheless, Festinger's theory (1957) implies that we tend to avoid information about environmental problems because they contradict or threaten some of our basic assumption of quality of life, economic prosperity, and material needs (Kollmuss & Agyeman, 2002: 255). Faced with the effects and long-term impacts of environmental degradation people feel fear, pain,

[8]People participate in exchange for food, money, or other motives. When the exchange is over, people stop participating.

[9]People can form groups in order to become 'familiar' with a problem, which is studied by a program.

[10]People participate in developing action plans, and they decided how available sources will be used.

[11]People take initiatives, independently from external institutions, in order to change the system. They have conducts with external actors and scientists for technical advice.

[12]We will see this type of citizen participation in the Asopos case in 3.4.

[13]We will see this type of citizen participation in the Asopos case in 3.2.

[14]Altruism, empathy, emotion, motivation, responsibilities, priorities (Kollmuss & Agyeman, 2002: 240) are some of the 'required' characteristics.

anger and guilt! People develop some defense mechanisms to deal with environmental issues. Some people refuse to accept the reality. Some others 'resign', believing that they cannot change the situation. Still others try to remove any feeling of guilt; they are not accepting any personal responsibility and/or blaming others for environmental problems (Kollmuss & Agyeman, 2002: 255).

As stressed by Dierking, when people are curious and interested in something there is a high possibility that they will follow up on that desire with action (Dierking et al, 2003). What happens when people are also at risk? What usually motivates people to take part in a decision-making process? When affected people recognize the risk, they feel threatened. As the result, they begin to get informed and organize themselves in order to be part of the decisions concerning them. Public participation is about gathering different viewpoints and the commitment of individuals in a common goal. Individuals with common problems, values, ideas, concerns, and vocabulary create 'non-governmental organizations' (Bitchsel, 1996), 'concerned groups' (Callon, 2003), 'activist movements' (Epstein, 1995), 'community-based environmental movements' (Kousis, 1997) to pursue their common goals.

According to Kousis, when there is a conflict between the state, industries and local communities over how to use and control ecosystem resources, community-based environmental movements often emerge (Kousis, 1997: 235). These movements are intended to prevent environmental degradation and its impacts on people's health. For Tilly, such movements are a "major vehicle for ordinary people's participation" (Tilly, 1994: 6-7). Some of their main functions are: to inform and be informed by the relevant authorities (whether state or local), to keep the local population informed about the developments in question and seek cooperation with the scientific expertise in order to find solutions.

These movements can become genuine participants in the creation of scientific knowledge. They are particularly interested in techno-scientific developments and applications (Epstein, 1995: 409, Callon & Rabehorisoa, 2008: 232), through which they can express themselves, and gradually they become stakeholders (Callon & Rabehorisoa, 2003: 194). They move on to build their own

strategic goals into science, to help create new social identities and to conduct researches in order to clarify the problem and explore possible solutions (Callon & Rabehorisoa, 2008: 232). Callon & Rabehorisoa consider that the intervention of concerned groups in research processes, as (potentially) genuine researchers, capable of cooperating with experts, can lead to surprising results and a new form of research, the 'research in the wild' (Callon & Rabehorisoa, 2003: 195). Lay people know very well what they need and what they want. Therefore, their intervention is essential for designing and implementing various technologies (Anshelm & Galis, 2009: 272) and making decisions.

Researchers in the wild are directly concerned with the knowledge they produce because they are the subjects and the objects of their research at the same time (Callon & Rabehorisoa, 2003: 202). Lay people do not reject the legitimacy of scientific expertise. For them, laboratory research and research in the wild are complementary (Callon & Rabehorisoa, 2003: 197). Laboratory research (or 'confined research') is the research that is conducted by specialists in the field (Callon & Rabehorisoa, 2003: 196), who are isolated in their laboratories, such as scientists who work on governmental projects (Woodhouse et al, 2002: 302), scientists who work for industrial projects, or scientists who work within an institution or university.

Concerned groups are consisted of lay people, expert activists and lay experts. Later, in this study, I will present a lay-expert and an expert-activist who conducted a research in the wild on the behalf of a concerned group, in which they were founders and active members. 'Lay-expert' (Epstein, 1995: 429) or 'quasi-expert' (Bucchi & Neresini, 2007: 463) is an activist who has not an academic training but s/he can act as a translator-mediator between experts and lay-people. S/he attempts to challenge the experts and alert the lay-people. Despite the knowledge s/he gain and the struggles s/he get involved in, lay-expert is not always welcomed to the table. Of course, there are some of them who are more insightful and informed than some of the scientists (Epstein, 1995: 419). On the other hand, 'expert-activist' (Epstein, 1995: 414) or 'advocacy scientist (Krimsky, 2000) is a

person who has an academic training and tries to solve a problem by her/himself, cooperates directly with lay people, considering her/his role as bifurcated between advancing the scientific knowledge base and communicating to the public, the media and policymakers (Brown, 2003: 20). An expert-activist sees flows in official responses, supports community's involvement and believes that the members of the community fail to receive fair treatment.

The traditional view is that decisions, especially decisions regarding technical issues, should be left in the hands of experts (Rowe & Frewer, 2000:5). Scientists argue that their authority and knowledge is independent of local conditions or experience, that it is standardized knowledge, applicable in any circumstances (Bocking, 2008: 618). But excluding an important actor, the people who experience the problem daily, and keep only the scientific knowledge does it provide us with a chance to find the right solution? Brian Wynne's *Sheepfarming after Chernobyl* (1989) illustrates that radioactive contamination in Sellafield, caused by the Chernobyl nuclear accident, was a case study of how scientific knowledge neglects and disdains lay knowledge. Residents of Sellafield observed abnormally high rates of cancer in children and animals, but the experts reassured and gave them advice on how to overcome the problem without taking into account the specific geological and plant conditions of the area or the personal experiences of farmers and thus the solution took time to be found.

Another view is that 'science is not enough' (Short & Rosa, 2004: 145). Callon & Rabehorisoa write: "When science is applied without taking local knowledge into account, it's often the poorer for it and vice versa" (Callon & Rabehorisoa, 2003: 196). To understand how important the cooperation between experts and lay people is, let's consider as an example the doctor-patient relationship (Rabehorisoa & Callon, 2002: 60). A patient (lay person) visits a doctor (expert) to solve his/her health problems. The doctor starts a dialogue with the patient in order to identify the problem and then recommends the proper treatment. The patient, already aware of his/her ignorance, cooperates by giving all necessary information and

follows the doctor's advice. If the doctor does not listen to the patient's description of his/her symptoms and if the patient does not follow closely the doctor's instructions, a prompt and effective treatment could not be found.

According to Jennings, participation is an opportunity to bridge the gap between experts and lay people (Jennings, 2000). Lay people are those who have the experience and are an available/'ready to use' resource and experts are those who possess the appropriate tools and methods to put together all these different experiences, and with their cooperation solutions can be found. Are, however, the two sides willing to bridge that gap and cooperate?

On the one hand, science tends to create expectations thus people in advanced industrial societies (typically) expect scientists to protect them (Epstein, 1995: 411) from the negative effects of industrial development. Nowadays, the science is seen as threatening the future of the environment and jeopardizing human health (Bucchi & Neresini, 2007: 454). The experts' failure to solve problems that arise constantly as 'they were supposed to do' increases public's dissatisfaction as well as "dissident voices" (Epstein, 1995: 411).

On the other hand, scientists tend to ignore activist movements/lay people by not listening to them and refusing to take part in a dialogue with them. Experts do not tend to appreciate and use the experiences and the 'know-how' of the locals (Callon, 2003: 53) and they tend to see lay people as backward actors. They lack a language to translate lay people's experiences, observations and conclusions into their own scientific knowledge. While lay people consider themselves to be equal to experts, recognizing that both of them have an equally necessary knowledge – after all, they are 'experts in experience' (Callon, 2003: 62), who have expertise concerning their own needs and desires (Anshelm & Galis, 2009: 272). However, experts fear that along with the experiences of lay people they will be forced to adopt their beliefs, views and prejudices too.

1.3. Previous researches about environmental pollution, public health, and public participation.

Several studies have dealt with the connection between environment and public health. Studies in chemical carcinogenesis at the National Cancer Institute begun at the end of 1940, but the turning point was the publication of *Silent Spring* (1962) by Rachel Carson, which triggered a national debate over chemical pollution. This debate in turn changed the meaning of chemical carcinogenesis by pointing to industries as threatening and dangerous factors. Her book documented the harmful effects chemicals have had on the environment. Its publication signified the ending of the era of public ignorance and introduced the idea of an environmental movement in the United States. According to Carson, cancer was the price humanity would pay for industrialization.

In 1981 the US Congress Office of Technology Assessment commissioned two British scientists to carry out an assessment of deaths from cancer. Doll & Peto estimated that 2% of cancer deaths were attributed to exposure by pollutants in the environment and 4% by exposure in occupational settings. As we see from Table 1[15], the percentages of cancer death due to smoking and diet are by far the highest. Doll & Peto stated that they do not have any evidence to support the widespread perception that most cancers can be prevented by control on chemical pollution of air, food and water or reducing occupational risk factors (Hilgartner, 1990: 520). The only cause of cancer whose influence has been well-documented is smoking, which along with alcohol, bears the patient's personal responsibility for her/his disease (Hilgartner, 1990: 532). Hilgartner pointed out that Doll & Peto's research is particularly indicative of two trends: a) persistence of scientists for many decades in the idea that smoking and other lifestyle factors cause cancer, and, b) 'indifference' to outside exposures, like exposure to industrial wastes, which also can cause cancer.

In the article "Cancer, Control and Causality: talking about cancer in a working-class community" (1991), Martha Balshem explained how patients tend to

[15]See Appendix A. Studies of Cancer.

blame external factors and try to prove that these factors are equally harmful to their health. She also described the relationship between the scientists and the citizens of a small community, 'Tannerstown', which is formed by workers and craftsmen. In personal interviews, residents had to answer questions about the causes of cancer (see table 2)[16]. Residents of Tannerstown thought that industrial pollution from the neighbouring chemical plants and air pollution were the main causes of cancer in their community. Balshem's study pointed to a 'conflict' between scientists/experts and local/lay people. Scientists wanted to impose their authority and to decide the action they have to be taken without taking into account the opinion of the local community. According to Balshem, the real source of the conflict between the two sides was not over the causes and the treatment of cancer - but over social power and control (Balshem, 1993). The author denied the right of scientists to introduce lifestyle changes - without taking into account the 'self-diagnosis' of the residents. Balshem suggested that the problem could be solved with their cooperation, since the residents know the problem 'from the inside' and the scientists have the tools to correct it.

Another important study was *Love Canal: Science, Politics, and People* (1982) by Adeline Levine, which described the story of a buried waste site in a Niagara Falls' neighbourhood, the disaster it produced and the residents' feeling of increased uncertainty about their health and welfare. More recently, Maruyama (1996) showed the toxic effects of mercury on human health, the legal history of events at Minamata and the conflicts faced by those who worked at Chisso. For decades the Chisso Corporation dumped melthylmercury into Minamata Bay Japan, resulting in high levels of mercury in fish caught by bay's residents, leading to miscarriages, congenital Minamata disease, and adult Minamata disease. There are several similar studies, which emphasize that the affected people have the 'right-to-know' the effects of the pollution in their lives. This is the case with *"Environmental Principles and Policies: An Interdisciplinary Approach"* (Beder, 2006). Other studies emphasize the right of the affected residents to organize themselves into groups and to claim

[16]See Appendix A. Studies of Cancer.

remediation, compensation, and justice. A good example is a study by Brown (2006), *"A lab of our own, Environmental causation of breast cancer and challenges to the dominant epidemiological paradigm"*.

The aforementioned studies described how industrial wastes have caused environmental pollution, and how environmental pollution has caused health problems. These studies analyze areas and communities that have many similarities with the Asopos areas. They refer to areas that have been sacrificed in the name of industrialization and modernization. Their residents gradually realized the consequences of the environmental pollution and had the courage to organize themselves into groups in order to manage an effective reaction. The present study focuses on how an environmental-health risk issue led to the participation of local people and how lay people made an effort to cooperate with scientists and relevant authorities in order to find proper solutions about the Asopos case, and gradually create community-based environmental movements.

1.4. The big decision: Neutral or not?

When you learn about the situation of Asopos, the first thing you feel is anger. The anger continues when you talk with people who have lost their loved ones, who were pressured not to speak and who are witnesses of the state's indifference. Before writing this study about Asopos I was not aware of the true dimensions of the problem or its actors. I believed that my interest for intense and scholastic research was due to the 'natural continuation' of my previous education and I thought of myself as a 'curiosity-driven' researcher (c.f. Woodhouse et al, 2002: 304). Writing this paper I felt that there was something else, probably an 'internal need for activism'. I suppose I felt that defending the right of (sick or not) residents of Boetia to participate, I simultaneously defend my own right to participate in decision-making processes.

Can you stay neutral in such an issue? It is probably easy to observe without interfering, but when you try to write down what you experienced it is very difficult

to remain neutral. Moreover, when you try to approach an actor (for instance, the industries or the state) and s/he doesn't want to help you and the access is definitely denied, it is very difficult to remain symmetrical and you have to record her/his view through indirect information. It becomes even more difficult when in the back of your mind lays the suspicion that the risk may be very close to you and perhaps now is your chance to do something, to participate. Therefore, I have to confess that a part of me was 'captured'[17] (c.f. Scott et al, 1990: 475) and passionate about the Asopos case, but another one (I hope the strongest one) tried hard to maintain my objectivity. I do not know what part of me eventually won; I just wish that my 'weak' part did not make me a bad and/or naive researcher!

1.5. Methodology.

This study focuses on issues concerning environmental pollution, public health, and public participation. A qualitative research depends on many processes (Valentine, 1997). An important process for my analysis was the review of the relevant literature through libraries or internet based searches. In addition, archival resources, questionnaires, personal observations (Eisenhardt, 1989: 534), academic researches/publications, directives, laws, and announcements of regulatory authorities were also very important and useful sources for my analysis. My analysis also based on a close reading of national Greek newspapers[18] articles and local Boetian newspapers[19] articles[20].

[17]When someone is literally captured s/he is without her/his willingness; I am not absolutely sure how unwilling I was for this 'captivity' or if I am ready to 'admit my partiality' (Woodhouse et al., 2002: 311).

[18]Καθημερινή [Kathimerini], Τα Νέα [Ta Nea], Το Βήμα [To Vima], Ελευθεροτυπία [Eleutherotypia], Έθνος [Ethnos], Η Αυγή [I Avgi], Οικονομικός Ταχυδρόμος [Oikonomikos Tachydromos], Ριζοσπάστης [Rizospastis].

[19]Διάβημα [Diavima], Η Φωνή του Ωρωπού [I Foni tou Oropou], Ανεξάρτητος Παρατηρητής [Anexartitos Paratiritis], Ελεύθερος Λόγος [Eleutheros Logos].

[20]The issue of Asopos is usually discussed in the following sections of the newspapers: i) political news, referring mostly to stating the political interests, the absence of government and the measures

I also collected significant findings through: i) semi-structured interviews (Kitchin & Tate, 2000), during which I was allowed to ask new questions, and ii) in-depth interviews (Cloke et al, 2004), which allowed interviewees to express their opinion clearly, without any restriction, and provide me with new aspects and insights. The interviews were conducted during the period from April 3, 2010 until September 30, 2010. Four representatives of local communities, one member of a political party, three journalists, seven scientists, and ten local residents were my interviewees[21].

The semi-structured interviews with ten local residents took place in the area of Oinofyta, Dilesi, Chalkis and Oropos, at the participants' homes or at the street outside their work. I promised to keep the anonymity of the participants and maintain confidentiality (c.f. Hoggart et al, 2002). Besides, I am not interested in their names but in their experiences. In addition, with this strategy all of them felt comfortable to be open and honest[22]. I chose the local residents based on their status and area of residence. I wanted my sample to have a variety of profiles; people who had someone close who got sick, who were sick themselves, who were working in the local factories, young people who have to learn to live under these conditions. Also, I did not want all participants to be from Oinofyta or Oropos in order to assess the level of information and awareness that exists in other affected areas. That was the reason why, I added people who live permanently or are seasonal residents in neighbouring areas (for instance, Chalkis and Dilesi). Apart from these two criteria the participants represent a random sample.

My contact with professional scientists was significantly more difficult than my contact with local residents of affected areas. I tried to communicate with most of the scientists who were involved in the issue. Unfortunately, I did not get a

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announced, ii) environmental section, as a major issue that should concern us all, iii) society, as an event happening next door, and iv) economy, due to the financial interests and the economic impact on the industry and the residents of areas.

[21] See Appendix C. List of interviewed informants.

[22]See Appendix C. List of interviewed informants. Appendix C includes a synopsis of my interviews with the local residents.

response from everyone. There is a strong possibility that experts will see you as an 'intrudor', as someone who came from nowhere to judge their work and to point out their mistakes. There were even some suspicious and hesitant talkers, who showed no willingness to trust me. Moreover, there were certain instances where 'access was denied' to experts' archives. Clearly, not all communications were so difficult. There were scientists who wanted to help me with understanding the problem of Asopos, through sharing their worries and scientific information. An epidemiologist, a sociologist, a psychiatrist, a geologist, a hydrogeologist, a chemist, and an economist who have dealt with the Asopos issue conducting (confined) researches were also my interviewees. Our communication in most cases was done via emails or phone-calls due to the lack of experts' time.

The communication with journalists, for the same reason as with the experts, was conducted via emails and phone-calls. However, our communication was more direct as they were more open and willing to share their views with me. I also chose four local representatives for in depth-interviews, based on their key-role and their activation in the Asopos case.

Furthermore, some interviews were canceled or were never planned. In particular, some of the interviews that were scheduled with residents were canceled for 'personal reasons' and some experts or people working in a relevant regulatory/municipal authority never respond to my invitation for an interview. Finally, the role of the state and of the industries will be analyzed in this study through indirect information, because access was repeatedly denied.

This study is divided into five chapters. Following this introduction, which includes the aim, the research questions, the theoretical concepts, the methodology of the study, and gives a brief overview of the Asopos case, the second chapter analyzes the period from 1969 until 2004; from the starting point for the establishment of industries around the Asopos river until the first detection of (total) chromium and other heavy metals in the Asopos water. The third chapter describes the period from 2004 until 2007 - the time period during which the suspicions of Boetians that Asopos is polluted with hexavalent chromium become an undoubted

fact and the first reactions by the locals are organized. The fourth chapter provides an analysis of the period from 2008 until today, during which everyone become aware of the real situation of Asopos and the state promises the application of 'strict cleaning measures'. The final chapter of this study summarizes the findings of the four other chapters through my conclusions.

1.6. Summary

Public participation is the right of local people to get involved in the decision-making processes that concern their communities and their lives. In the Asopos case 'passive' and 'mobilization and support' are the two types of public participation that dominate. Some citizens possess only the information that experts transmitted to them and others take initiatives and conduct scientists and authorities in order to find a solution for their community's problem. The way and the degree of participation vary accordingly with people's values, interests, personality, pro-environmental commitment and attitude.

There are people who refuse to believe the real dimensions of the problem feeling anger, guilt and fear and for that reason decide not to participate. However, there are people who desire to get involved in decision-making processes concerning them. People with common problems, common ideas, and concerns can form a concerned group. Concerned groups (or activist movements or community-based environmental movements), consisting of lay people, lay experts and expert activists, help citizens to pursue their common goals, keep the local population informed, and cooperate with experts. They even conduct their own researches, researches in the wild; without disregarding confined researches that are conducted by experts in their labs. After all, the cooperation of lay people with experts is very important, because lay people have the daily experience of a problem and experts have the appropriate theoretical tools to analyze and solve it.

2. The Asopos tragedy begins (1969-2004).

This chapter describes the 'tragedy of Asopos' from 1969 until 2004, namely from the factories' establishment around Asopos river till the first chemical analyses that proves its contamination. During this period, there are various actions by individuals-activists, who try to warn and persuade the state and the regulatory authorities that something is wrong. For the most part of this period, there is no organized public reaction and participation, because these individuals lack the necessary knowledge and information. However, after the publishing of a study of Loizidou, some residents of Oropos attempt to find out exactly what is happening. For a long time, there is no suspicion that the residents' health may be at risk. After 2000 the first traces of an organized reaction become apparent. An expert-activist and a lay-expert take on the role of the 'leader' of the local participation and mobilization for a clean environment, public health, safe food and water in Asopos. This reaction is primarily based upon information from international studies that prove the dire impacts of chemical pollutants on environment and human beings.

2.1. Asopos river vs. industrial development (1969-1998).

Before 1969 the local residents could swim and fish in the Asopos water as children[23], but after 1969 Asopos became the recipient of industrial wastes. In 1969, a Presidential Decree, under a Greek dictatorial regime offered incentives for the relocation of factories from Attica to Boetia – and more specifically to the area of Oinofyta-Schimatari (Εφημερίς της Κυβερνήσεως, Μάρτιος 20, 1969). Many industries moved and set an unofficial industrial area without precise rules for their operation, without undertaking any infrastructure project (e.g. road and water supply networks, biological waste treatments) or land-planning. At the same time,

[23]Ioannis Oikonomidis, local priest at the church of Saint Spyridona at Oinofyta & member of the activist movement 'Ινστιτούτο Τοπικής Αειφόρου Ανάπτυξης και Πολιτισμού' (ΙΤΑΠ) [Institute for Local Sustainable Development and Culture], personal interview April 19, 2010.

the Association for the Protection of Asopos River was founded in order to ensure that Asopos would not be a river of industrial wastes. The Mayors and Community Leaders of Schimatari, Oinofyta, Avlona, Sikamino, and Oropos were responsible for its proper functioning. Unfortunately, these people developed 'patron-client relationships'[24] with the industrialists, the local elite, and Asopos was once again unprotected.

Ten years later, the situation of Asopos was not good; industrial activities seemed to have serious impacts on the river. In 1979, with a Prefectural Decision, industries were allowed to pour their wastes into Asopos river but under one condition: they had to treat their wastes (Εφημερίς της Κυβερνήσεως, Δεκέμβριος 27, 1979). However, most of the industries continued not to use any biological treatment, although many had such systems installed, because they wanted to have low production-costs they kept on discharging their untreated wastes either directly to the river or through illegal wells.

During the 1980s, the condition of Asopos river and the neighboring Evoikos gulf was tragic (Στερεόπουλος, Δεκέμβριος 6, 1984). The pollution of the area was in an advanced stage and many birds and marine organisms had disappeared (Στερεόπουλος, Δεκέμβριος 6, 1984), since ten thousand tons were dumped into the river every day (Αυγή, Ιανουάριος 19, 1980). The local residents believed that the Prefectural Decision in 1979 was simply a way to reassure them, and not a way to make industries conform and protect the river and the sea (Η Αυγή, Ιανουάριος 19, 1980). In the early 1980s, the few demonstrations that were organized, called for the industries' relocation (Η Αυγή, Μάιος 14, 1981). They had no significant impact despite their intense character (Η Αυγή, Μάιος 14, 1981). Whilst the environment was gradually downgrading, the industries of Oinofyta were flourishing (Το Βήμα, Φεβρουάριος 7, 1988). Among the fifty most profitable industries in Greece, there

[24] A patron-client relationship is a personal, direct exchange (Kettering, 1988: 425), mostly of votes for favors (Fox, 1994: 153) over a long period of time among actors with asymmetric or different power. Usually, politicians reward a portion of their supporters with public resources in return for electoral support (Willems, 2009). Members of the region ruling elite collaborate with the government to extend their control over regional power structures and/or resources (Kettering, 1988: 432).

were two industries of Oinofyta (ΕΛΒΑΛ and ΕΜΜΑΝΟΥΗΛ ΚΑΖΗΣ) that in the future will also be in lists of companies that had polluted Asopos[25].

In the mid-1980s, the industrial concentration in Oinofyta was huge, with three hundred factories and sixty thousand workers. Over the years, the number of factories in the area increased steadily. A determinant factor for this development was the consent of the local residents who looked favorably to new jobs being created and the value of their property being increased. As Kovaios, who is the editor of the local newspaper Η Φωνή του Ωρωπού [I Foni tou Oropou], explains: "Everybody sold their land to buy a house or a better car. No one thought that there was a possibility to endanger their own lives"[26]. In 1988, Antonis Liakouras, President of the Association for the Protection of the Asopos river, tried really hard to reduce the power of industries and control their arbitrary actions, by suing them, by asking for the imposition of fines, and by encouraging locals to protest[27]. Unluckily, his attempts were unsuccessful.

In the end of 1980, following the apparent effects of Chernobyl, the environmental issues were transformed into a political issue. At the same time, the concept of 'sustainability' emerged, either as a concept that cannot be effectively implemented in practice (O'Riordan, 1988), or as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Marcuse, 1988). Although a handful of 'environmentally minded' citizens groups have long existed in Greece, Greek green movements started to rise in the late seventies, while their creation rate became almost exponential in the late eighties and early nineties (Botetzagias & Boudourides, 2004: 19). Environmental activism in Greece and other southern European countries emerged later than in Northern Europe, mainly because of the belated industrialization[28] and the

[25]See Appendix B. Fines to Industries.

[26]Vasilis Kovaios, personal interview, May 10, 2010.

[27]Athanasios Panteloglou, chemical engineer & President of the Institute for Local Sustainable Development and Culture, personal interview, April 3, 2010.

[28]The industrialization of Greece was not so rapid; therefore there were no immediate and intense

unfavorable political circumstances[29] (Τάχος, 1998; Αλεξανδρόπουλος, 2007).

In 1989 the most successful Greek green party, 'Federation of the Green Alternatives Groups'[30], was founded and in the election of 1989 and 1990 won a parliament seat by getting 0,58% and 0,77% of the national votes respectively. After a long period of internal conflicts and the dissolution of the party in 1993, Ecologists Alternatives contributed to the increase of public concern about environmental issues[31]; a concern that political parties took advantage and included in their political agenda[32] in the section "Environment" [33].

After 1990, the bad condition of Asopos became obvious. The bank of Asopos river was on the list of 'unsuitable for swimming areas of Attica' (Δασενάκη, Αύγουστος 17, 1992). Every year permanent and seasonal residents of affected areas were witnessing the increase in skin diseases of people swimming in the river. In 1996, for the first time, the Minister of the Environment, Physical Planning and Public Works [ΥΠΕΧΩΔΕ][34], Kostas Laliotis, recognizing that Asopos river was facing

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signs of environmental pollution.

[29]Greece was under a dictatorial regime (1967-1974), which inhibited any attempt for environmental policy.

[30]Federation of the Green Alternatives Groups was a federation which included more than one hundred environmental and alternative organizations.

[31]A detailed research of Papaioannou et al (1998), showed that the public in the nineties was very worried about environmental degradation (Papaioannou et al, 1998: 150). 89,9% believed that 'humankind uses nature in a dangerous way', 83,2% that the ecological development has natural and social limits which it cannot break without creating problems, and 81,8% if the present ecological model remains it is projected that the natural stocks will soon run out.

[32]For instance, 'the most important pre-election text on the environment' (Σαμιώτης, 1998:277) presented until 1993 was PASOK's electoral manifesto. However, this newly acquired interest in the environment was purely rhetorical and symbolic, since after PASOK's electoral win in 1993, Andreas Papandreou, the leader of PASOK, didn't mention any detail about his environmental program.

[33]Nevertheless, for over a decade, environmental policy was idle and the environmental consciousness reinvigorated after the fires during the summer of 2007.

[34]The 'Ministry of Environment, Physical Planning and Public Works' [ΥΠΕΧΩΔΕ] in 2009 renamed to 'Ministry of Environment, Energy, and Climate Change' [ΥΠΕΚΑ]. In this study, I will call it "Ministry of

acute pollution due to uncontrolled disposal of industrial wastes. He announced the creation of a) a Special Department for Environment Control consisting of qualified technical and scientific staff and b) a central wastewater treatment plant (Το Βήμα, Μάιος 5, 1996).

The above announcements were never implemented, but the Ministry of Environment assigned the National Technical University of Athens with the task to conduct a study in order to find solutions for the Asopos problem. This study, under the title "Preliminary Study for the Construction and Operation of a Wastewater Treatment Plant in Asopos Area, Viotia", which was completed in 1997 and was published in 1998, underlined the absence or the non-use of wastewater treatment plants in industries, and the large scale of the pollution (Loizidou, 1998: 86). The same study proposed the construction of a pipeline that would lead the wastes in a central wastewater treatment plant in Avlona, under one condition: the industries should pre-treat their wastes (Loizidou, 1998).

The cost for the completion of the first comprehensive study about Asopos was twenty million euros, a cost that according to the European Union the local industries had to pay. Loizidou's study remained in the drawers of the relevant authorities, since neither of the two major political parties[35], nor the representatives of local authorities seemed to be worried by its conclusions and proposals so as to take some action. Measurements, which were being made at eight spots of Asopos every month from 1996 until 1999, under the European Programme for Control of Surface Water, were particularly alarming (Περπεράς, Σεπτέμβριος 30, 2007; Γιάνναρου, Σεπτέμβριος 30, 2007). Interestingly, however, Minister Laliotis avoided making any announcements.

Environment'.

[35]The two major political parties of Greece are the centre-right 'New Democracy' [Νέα Δημοκρατία] and The Panhellenic Socialist Movement 'PASOK' [ΠΑ.ΣΟ.Κ].

2.2. The first suspicions of Boetians about the Asopos pollution: The mobilization of Oropos residents (1998-2000).

People who live and/or work at risk of industrial pollution have access to data which are inaccessible to scientists. In the last two decades, information about toxic hazards in communities and workplaces came from lay observation (Brown, 1992: 269). Residents in a contaminated area often observe (separately) effects on the environment and presume that something unusual is happening.

According to Oropos residents, the problem of Asopos was known from the 1970s. As participants 8 and 9[36] state: "We knew that the water was polluted since 1975, but nothing more than that. With our neighbors we discussed it a lot, but without realizing the gravity of the situation". Articles of local newspapers show that all were aware of the environmental disorder, the risk to public health from industrial development and the indifference of the state for the misconduct of the factories, which they were dumping barrels with thousands of tons of wastes directly in the Asopos river, thereby poisoning the waters of Evian Gulf. Many articles were published under the title: "Asopos river became a garbage dump and cesspool" or "The state is responsible for the environmental destruction in our region" (Η Αυγή, Μάιος 14, 1981; Η Φωνή του Ωρωπού, Ιούνιος 1983; Η Φωνή του Ωρωπού, Ιανουάριος 1996).

Although the two main political parties didn't pay any attention to the findings and proposals of the Loizidou study (Παντελόγλου, Σεπτέμβριος 2, 2009), residents of Oropos started to suspect Asopos pollution and to fear for their health. As Panagopoulos, President of the Federation of Unions of Oropos & resident of Oropos, claims:

> "We are fighting for the decontamination of the river. Instead of keeping their [government and local authorities] promises and announcements, allow industries to dispose their untreated wastes direct to Asopos. Certainly, there are political responsibilities. We can't take it anymore! Scientific studies proved that there is pollution!"[37]

[36]Participants 8 and 9 are Oropos residents.

[37]Panagopoulos Christos, personal interview, May 7, 2010.

Participation is an intervention in the administrative processes of decision-making and one way to be expressed is through individual actions of citizens (Fiorino, 1996), where the determining role is the bond that citizens have developed with the area (Skanavis et al., 2005: 322). People in Oropos were willing to start a local conflict against the producers-polluters. The area's income depended on a clean environment and not on industries. Thus, the first Union to mobilize was the Federation of Unions of Oropos, which in 1999 sued the industries of the area[38].

2.3. An expert-activist and a lay-expert working together (2000-2004).

As Beck supports, all industrial areas are risk societies and all people are equally affected by the pollution independently of their income, education, occupation or personal eating and living habits (Beck, 1992: 26). Accordingly, Athanasios Panteloglou, who is a chemical engineer and the President of the Institute for Local Sustainable Development and Culture [Ινστιτούτο Τοπικής Αειφόρου Ανάπτυξης και Πολιτισμού (ΙΤΑΠ)][39], claims: "We are all at risk. The danger is a fact! There are many toxins in our bodies and the effects of our chronic exposure to chemical pollutants are obvious...to all of us!"[40].

Panteloglou used to work for over thirty years in one of the many industries around Oinofyta. It was around 2000 when he realized that something was wrong, since the chemical recipes he had been making for many years were no longer baring the same result. Thus he began to suspect the water that came from Asopos and used by the factory. As he states: "Since 1996 we had the first signs that something is wrong. In 2000 I had the first laboratory evidences and I started my first speeches, in which I plainly talk to people about the danger"[41].

[38]See 3.1 for the conclusion of the trial.

[39]ΙΤΑΠ (ITAP) was founded in 2005 (see 3.2.)

[40]Athanasios Panteloglou, personal interview, April 3, 2010.

[41]Athanasios Panteloglou, personal interview, April 3, 2010.

An expert-activist is someone who has the training to identify a problem, find the most suitable solutions, allocate responsibilities, devise strategies, raise public awareness, and develop a 'group sense' (Brown, 1992:269). The first step for the radical change in the way people of affected areas of Asopos were organized and mobilized was made by Panteloglou. Usually an expert-activist cooperates directly with lay people. Panteloglou, though, in his attempt to convince and protect the locals from the danger, primarily transformed a lay person into a lay-expert. Ioannis Oikonomidis, a local priest, followed him when he was informed about the problem of Asopos in a meeting in 2000 at Oinofyta, under the title 'Environment and Child'. As Oikonomidis admits: "I've always wanted to be environmentally active, not only because of my profession but because of a wider concern about the future of my family"[42]. Oikonomidis realized how serious the problem was after he returned home from this meeting. While he was watching his oldest son gulping milk from his bottle, he realized that he was always preparing the milk formula using water from the tap.

Oikonomidis is the local priest at the church of Saint Spyridona at Oinofyta, a local resident since he was in Primary School and a son of an ex-employee in one of the local factories. Soon he took on the role of translator-mediator between Panteloglou and locals. He lacked specialized knowledge but he was willing to learn all the necessary biological, technical, chemical, political and social information. Due to Oikonomidis's chaplaincy, people could trust him and discuss with him their (health) problems. As a result, Panteloglou learned about

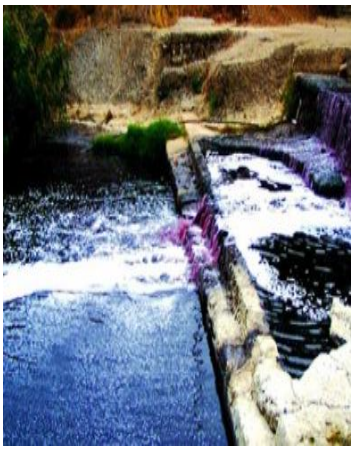
Picture 2. Ioannis Oikonomidis & Athanasios Panteloglou
http://www.enn.com/ecosystems/article/26533

[42]Ioannis Oikonomidis, personal interview, April 19, 2010.

personal experiences from the residents and Oikonomidis became related to environmental-public health issues.

For a long time the expert-activist and the lay-expert of Asopos conducted their own research, a 'research in the wild'. They cooperated daily, analyzing the limited data that they had, sharing information and creating a common perspective. As a group, they read about chemical pollution, asked around, and talked to scientific experts about the consequences of industrial pollution to the environment and public health. Panteloglou and Oikonomidis were aware of the industries' illicit behavior; that they were operating from the beginning without the necessary technical infrastructure project (such as wastewater treatment plants) endangering the health and safety of the local population. They constantly asked perseveringly for chemical analyses of the water, but no one was listening to them; even the local residents believed that they were two romantics or two weirdoes!

Picture 3. The 'Red Asopos' http://nefelikas.files.wordpress.com/2008/02/asopos-01.jpg



Picture 4. The 'Purple Asopos' http://nefelikas.files.wordpress.com/2008/02/asopos-01.jpg

Picture 5. The 'Brown Asopos' http://nefelikas.files.wordpress.com/2008/02/asopos-01.jpg

For the next four-five years, the impassivity and lack of concern by the residents defeated any expert-activist's and lay-expert's attempt to inform and be informed. Up until 2004, there was not any will for public participation or reaction. As the lay-expert says: "Everyone listened while shaking their heads, saying 'yes, we must do something immediately!', but no one ever did"[43]. Although people seemed to recognize the problem of Asopos, it was too early for them to accept it, to digest the new information.

Until 2004, analyses in the drinking water of Asopos were only microbiological and not chemical. This is rather strange because the area is industrial and even if the factories had operated by the letter of the law accidental leaks could happen. The General Chemical State Laboratory of Greece in November 2004 detected, for the first time, high concentrations of (total) chromium (CrIII) in the drinking water. In fact, the total chromium exceeded the allowed maximum of 50 mgr/lt. This was the tangible evidence Panteloglou and Oikonomidis needed. As Panteloglou notes:

> "We tried to persuade them [authorities] to proceed with analyses for hexavalent chromium immediately in order to confirm if there was that kind of chromium [hexavalent chromium] in our drinking water. Undoubtedly, only the existence of total chromium was enough for documenting that we were in a state of emergency. Instead of acting, they covered the problem up for the next two years".

Panteloglou and Oikonomidis distributed informative leaflets, activated Parents Associations, attempted a dialogue with the government and local authorities, kept pressuring the state to conduct more analyses, fearing the existence of hexavalent chromium in the water. People began to realize the seriousness of the problem and Panteloglou and Oikonomidis gradually became producers of information and knowledge. Both of them gave interviews and wrote articles for local newspapers with the intention to make the issue known. More indicative and scathing were the articles by Panteloglou, who tried to inform local citizens about scientific studies and formal statements concerning the seriousness of

[43]Ioannis Oikonomidis, personal interview, April 19, 2010.

the situation, denounce the inefficiency and indifference of the state and the relevant authorities and point out to the source of the pollution and those responsible for it.

According to Panteloglou and Oikonomidis their struggle has a motto: *"the cost of the non-solution to be greater than the cost of the solution"*. The polluter must pay to restore the river, the underground horizon and the fields, and for medical costs to the affected residents (Γιάνναρου, Ιούνιος 25, 2009) – that is the cost of the non-solution. Industries chose to operate by polluting and not using biological treatment, mainly for economic reasons. For that reason the residents have no choice but to make them pay from their pockets for the pollution[44]. If they don't achieve this, polluters have no reason to stop polluting.

2.4. The absence of the Greek scientific community.

The Greek scientific community was absent or (perhaps) restrained since the state assigned to scientists the conduct of a study, but afterwards no one was taking advantage of it. Nevertheless, two important studies were undertaken at the National Technical University of Athens, Loizidou's[45] and Stavropoulos's studies. The object of Stavropoulos's research was the recording of the groundwater's quality in the industrial area of Oinofyta. Stavropoulos carried out chemical analyses of water samples taken from twelve wells in order to study the quality status of the area's water. He found that its quality ranged from moderate to unfit for drinking, irrigating

[44]The path they chose had been followed beforehand by Brockovich in the Hinkley case. As Brockovich stated: "Take for example the PG&E Company. They had to pay $333 million for the first case and $335 million for the second. Company paid more than $50 million in fees and $50-100 million to clear the pollution. Let's sum it all up. We are talking about $1,000,000,000. If the same company had decided from the beginning to do the right thing and protect these people from the pollution, firstly, it would have saved lives and secondly no one would have sued them and they would saved their company tens of millions of dollars"
(http://www.youtube.com/watch?v=dyYw3pscvpM&feature=related)

[45]For Loizidou study see 2.1.

or even some industrial activities[46]. Moreover, the results of these chemical analyses on certain wells were compared with previous analyses made on the same wells. This research concluded that the downgrading of the groundwater's quality of the area was due to the complete lack of prevention and protection (mainly) against the industrial wastes (Σταυρόπουλος, 1990: 192). In addition, Stavropoulos noted that the protection of groundwater of the area was absolutely necessary, because if the pace of degradation continued, in few years would be totally unfit for any use (Σταυρόπουλος, 1990: 193).

The residents of affected areas, the expert-activist and the lay-expert had no other Greek study to rely on. Certainly, they took advantage of Stavropoulos's and Loizidous's studies, but they sought additional information sources. International studies and directives were a valuable source. As Panteloglou highlights: "We had to be ready. We had to know all about hexavalent chromium. I was so sure that hexavalent chromium was the main cause"[47]. During this period, many international studies about dangerous chemical substances and their consequences were published. Hexavalent chromium was almost in all of them.

The chromium in nature is trivalent (CrIII), while the hexavalent chromium (CrVI) has human origins. Since 1991, scientists (biologists, zoologists, psychiatrists, immunologists, toxicologists, ecologists, anthropologists) were certain that a large number of human-made chemicals that have been released into the environment could disrupt the endocrine system of animals and human (Bern, 1992). The damage to a person who will be exposed to chromium depends on the dose, duration, the method of exposure, its interaction with other chemicals, sex, age, family history and lifestyle of a person. The World Health Organization (1996) and the Environmental Protection Agency (1998) announced that hexavalent chromium in drinking water and air is carcinogenic to humans. The Directive 98/83/EC placed the upper limit of total/trivalent chromium in drinking water at 50mgr/lt. For hexavalent chromium

[46]It is worth noting that there are food industries using water of Asopos in their production process.

[47]Athanasios Panteloglou, personal interview, April 3, 2010.

there wasn't a limit since in 'normal' conditions it is impossible to be produced, but most countries adopted 50mgr/lt as an exposure limit for chromium in water. These levels were considered safe for protection against its mutagenic and carcinogenic effects.

The Directive 67/548/EEC, as amended by Directive 92/32/EEC, characterized hexavalent chromium as carcinogenic, mutagenic, oxidizing, toxic, corrosive, toxic during reproduction and dangerous for the environment depending on the conditions and the way it enters the human body (inhalation, ingestion or dermal contact). In February 2003, the European Union, recognizing the harmful effects of hexavalent chromium, adopted the Directive 2002/95/EC, which imposed restrictions on the industrial use of six high risk chemicals (Pb, Cd, Hg, CrVI, polybrominated biphenyls PBBs, and polybrominated diphenyl PBDEs).

Additionally, epidemiological studies in workers producing chromate and chromium metal coating showed that the hexavalent chromium enters the human body through breathing and eating foods and beverages containing it. More specifically, inhalation of dust containing hexavalent chromium can cause lung cancer and sinonasal cavity cancer. Ingestion of large amounts of hexavalent chromium can cause damage to the kidneys and liver, stomach ulcers, gastrointestinal irritation and even death. Dermal exposure to hexavalent chromium causes skin ulcer and severe allergic reactions (Costa, 1997).

2.5. Summary

The main causes of the Asopos tragedy has been: i) the declaration of Asopos as a receiver of industrial wastes, ii) the lack of planning and monitoring systems and the dumping of toxic wastes in Asopos river for decades by hundreds of industrial facilities, and iii) the patron-client relationships between the state and the local elite. Until 2000, no one got into thinking that even if all these industries were operating in full compliance with the relevant regulation, accidental pollution could still happen. Before 2004, everybody was afraid about sea pollution. No one thought the possibility that the underground water horizon of Asopos maybe be polluted by

heavy metals. The pollution of Asopos river came into light as a result of the concern by local people of the area. Their experiential knowledge preceded official and scientific awareness.

An expert activist is an activist with academic training who identifies a problem in a community and fights to find out a sustainable solution. A lay expert is an activist who acts as the mediator between experts and lay people. Scientific knowledge is not a necessary qualification for a lay expert, s/he already has her/his daily experience with her/his area's problem. Hence, during her/his cooperation with an expert activist s/he becomes capable of elaborating and transmitting scientific knowledge to lay people. The cooperation of an expert activist with a lay expert can have extraordinary outcomes. Panteloglou, a chemical engineer, and Oikonomidis, a local priest, as a team started asking, reading, talking about the problem, sharing information, creating a common perspective. Their initial struggle had as a result the detection of high concentrations of chemical substances and total chromium in the underground horizon of Asopos and in the drinking water.

3. Hexavalent Chromium: from suspicions to certainty (2004-2007).

In November 2004, analyses in Asopos show that the river is contaminated with total chromium and other chemical compounds. In August 2007, the General Chemical State Laboratory of Greece detects large amounts of hexavalent chromium in Asopos's groundwater and surface water. This section includes the actions taken after the detection of total chromium (CrIII) until the detection of hexavalent chromium (CrVI). The role of the state is very important during this period, because its inactivity results to the creation of community-based movements, like ITAP. ITAP attempts to mobilized the whole community, but the phenomenon of 'non-participation' is prevalent. Additionally, the Association of Greek Chemists and the Medical Association of Thebes take on a supportive role, providing locals with scientific information and expressing their concerns.

3.1. Environmental protection or economical growth? That is the question!

At the end of 2004 measurements confirmed the existence of chromium in the Asopos waters. Nevertheless, neither state nor industrial actors kept on investigating whether it was total chromium - a relatively harmless, non-bio-accumulative substance (Vasilatos et al., 2008) - or hexavalent chromium - a carcinogenic and mutagenic substance (Vasilatos et al., 2008)- that was detected. Also it was not examined where it came from. The only official action at the time was the dilution of the Asopos water with less harmful water[48]. Apparently, this technique was feckless, and the measurements at the beginning of 2005 showed a remarkable increase of the concentrations of chromium. Instead of drastic and immediate actions by the state, all investigations stopped until January 2007. In addition, Margarita Karavasili, who was the General Inspector for the Hellenic

[48] By this is meant that municipal authorities diluted and mixed cleaner waters with the contaminated Asopos waters in order measurements to detect concentrations of total chromium below 50mgr/lt (Παντελόγλου, Ιούλιος 13, 2009).

Environmental Inspectorate (October 2003 - July 2005) and had ordered continuous and persistent controls of Asopos's waters and industries, in July 2005, was dismissed[49] (Καραμανώλη, Οκτώβριος 7, 2008).

In 1999 the Federation of Unions of Oropos sued the industries of the area. In 2003 the relevant investigation was completed and it mentioned eighteen industries that degraded the environment, since their wastes contained chemical substances that have negative impacts on ecological balance and public health (Ελαφρός, Οκτώβριος 1, 2006). The Ministry of Environment recorded countless violations from various factories during its environmental inspections. None of these factories possessed a license for the treatment of dangerous wastes. The inspectors registered that uncontrolled and wide-spread dumping of untreated wastes was noted and the treatment of the dangerous wastes didn't comply with any of the instructions of ΚΥΑ[50] 13588/725/06 (ΦΕΚ 383 Β' 28-3-2006) (Εφημερίς της Κυβερνήσεως, Μάρτιος 28, 2006) and of Π.Δ.[51] 82/04 (Εφημερίς της Κυβερνήσεως, Μάρτιος 2, 2004).

On June 24, 2007 eight out of the eighteen industries accused were convicted. The rest were acquitted because they didn't give the correct names of their responsible officers. Finally, six of the eight industries were convicted for 'instant offense', meaning that at the time of inspection they were found to pollute. Industries, which were found guilty, received fines between 1,500€-5,000€ (Καθημερινή, Ιούνιος 24, 2007). The local community called the fines 'ridiculous' and the representatives of residents considered that sentences were not fair or enough, because they represented just a single digit percentage of industries' profit[52].

[49]In November 2009 Karavasili was appointed Special Secretary for the Environment and Energy Inspectorate. Karavasili is also an active member of ITAP.

[50]Κοινή Υπουργική Απόφαση (ΚΥΑ) [Joint Ministerial Decision]

[51]Προεδρικό Διάταγμα (Π.Δ.) [Presidential Decree]

[52]Athanasios Panteloglou, chemical engineer & President of ITAP, personal interview, April 3, 2010; Christos Panagopoulos, President of the Federation of Unions of Oropos, personal interview, May 7, 2010.

Accordingly, Lina Giannarou and Giannis Elafros, who are journalists of the national newspaper 'Καθημερινή' [Kathimerini], claimed that the fines were deficient, ridiculous, and they proved the state's iniquitous treatment to the local affected communities. Interestingly however, both of them characterized the fines 'predictable' due to the patron-client relationships between the state and the local elite[53].

In August 2007, the Chemical State Laboratory of Greece conducted water quality analysis. Important findings came into light regarding the severe pollution of surface and groundwater of the broad Asopos area, in Boetia. The sample water analysis results revealed high concentrations of hexavalent chromium (CrVI), lead, nitrates and chlorine ions. Hexavalent chromium traced at high concentrations ranging from 10mgr/lt to 330mgr/lt, in both surface and groundwater samples from the area (Γιάνναρου, Αύγουστος 10, 2007; Καρανίκας, Σεπτέμβριος 24, 2007; Καθημερινή, Σεπτέμβριος 28, 2007).

Hexavalent chromium is a highly toxic heavy metal, soluble in water, it can be migrated into the direction of the groundwater (Vasilatos et al., 2008) and it has been used in chemical industry for making pigments, in electroplating for coatings, manufacturing processes such as leather tanning, aircraft for anodizing aluminum (Θωμαΐδης, 2007). There isn't a safe limit for hexavalent chromium, since this human-originated chemical substance shouldn't exist even in tiny quantities[54]. Nonetheless, the state mistakenly identified hexavalent chromium with trivalent (or total) chromium and consequently set 50mgr/lt (the upper allowable limit for

[53]Lina Giannarou & Giannis Elafros, personal interviews, May 31, 2010.

[54]Chromium exposure is by now a well known cause of lung, nasal and nasopharyngeal cancers (U.S Department of Health and Human Services, 2008; Cone, 2009). Hexavalent chromium damages cellular DNA. Chromium is used in the leather tanning process, in the manufacture of dyes and pigments, as well as in wood preserving, chrome plating, and steel and other alloy production. Workers in all of these industries are at risk (Reudan, 2010: 32). Studies have shown a strong lung cancer dose-response relationship with human occupational exposures to hexavalent chromium. In addition, studies describe entire communities that are exposed to hexavalent chromium in contaminated soil and water following inappropriate disposal of the chemical by industrial users.

trivalent chromium) as the upper allowable limit for the hexavalent chromium as well.

The General Inspector of Public Administration, Leandros Rakintzis, in September 2007, ordered a number of investigations in order to find out which industries were polluting Asopos river. During his investigations, he discovered that the Prefecture of Boetia had provided with licenses industries which were dumping their wastes directly to the underground horizon of Asopos. The inspectors examined twenty six industries. None of them had declared to the authorities that it actually produces toxic wastes.

The ruling conservative party, New Democracy, and the industries tended, at least at first, to deny the severity of the problem and the undertaking of sound measures for the protection of the area's ecosystem and population. However, Giorgos Souflias, the Minister of the Environment, promised persistent controls, to find all illegal pipes that poured untreated industrial wastes directly to the Asopos river (Τα Νέα, Οκτώβριος 23, 2007). He also promised to supply all the area's residence with water from the aqueduct that also supplies water to Athens (Χαραλαμπίδου, Σεπτέμβριος 28, 2007). This was a key promise, because the Asopos area households were supplied with water from local wells, which were contaminated.

After the Minister's announcements, members from smaller parliament parties had questions. It's worth mentioning that during this period, the main opposition party, PASOK, was rather inactive[55]. The parties of the left were much more active in pressing for action on the Asopos case[56] (Τσιχλιάς, Ιούνιος 23, 2007). Mavroudis Voridis, member of a small Greek far right-wing political party (LA.O.S),

[55]PASOK and New Democracy can be characterized as 'accomplices' in the Asopos case, since they are rotating in country's governance and both of them stayed passive and developed patron-client relationships with the ruling local elite.

[56]The Communist Party of Greece (KKE) has been actively pushing the issue forward, Coalition of the Radical Left (SYRIZA) has been active in Asopos issue, and the Ecologists-Greens (the Green party of Greece) has been cooperating with ITAP very closely (see 4.3.2).

and Thanasis Leventis[57], member of the Coalition of the Radical Left (SYRIZA) wondered when the monitoring of water and an epidemiological study for the consequences of the Asopos pollution to public health will start (Βορίδης, 2007). In his reply, the Undersecretary of the Ministry of the Environment, Stavros Kalogiannis, focused on the new (heavy) fines that polluters would pay[58]. Two days later, Giannis Dragasakis, member of SYRIZA mentioned the tragic impacts of the Asopos pollution on public health, and, demanded from the Minister to move on radical changes of the Presidential Decree of 1969[59].

Decades ago, environmental policy-making was exclusively a state-centered affair. An environmental crisis was followed by a state response, sometimes accompanied by citizen action and sometimes by bureaucratic initiative. Citizens were participating only through election of their representatives (Ortolano, 1984). Greece is one of the few countries that have constitutional provision and the protection of natural and cultural environment is an obligation of the state (Spanou, 1998). Thus, one would expect that as soon as the problem of Asopos became known and documented, the relevant Greek authorities would take action to effectively tackle the problem in order to protect human health and environment. In reality, the state appeared unwilling to enforce the legislation tools in order to impose heavy fines to polluters or even close down polluting industries. Instead of getting more involved, the state stayed passive, permitting industries to act illegally and taking away from citizens the right to a clean and healthy environment.

This behavior can be easily understood since the state has also the role of the polluter! The Hellenic Aerospace Industry [Ελληνική Αεροπορική Βιομηχανία (ΕΑΒ)] a state-owned industry, is located in the area of Oinofyta and is subcontracting for big American and European airplane manufacturers. It produces for them aluminum parts, claiming that they bring advance technology and currency into country. The Asopos case is a typical example of the failure of the government to protect the

[57] http://www.syn.gr/gr/keimeno.php?id=7692

[58] See Appendix B.

[59] http://www.syn.gr/gr/keimeno.php?id=8020

health and welfare of citizens who possessed little power to act in their own behalf and the will of the government to promote unfettered economic development at the expense of citizens' rights to a clean and healthy environment.

3.2. Community-based environmental movements. The ITAP[60] example.

Industrialization creates a risk society (Beck, 1992), in which environmental concerns emerge. Analysts emphasize that public participation is one of the key elements of a democratic state system, which enables people to collect knowledge about the operation of the government; it promotes partnership and reduces corruption (Fulop, 2002). In the early 1990, the citizens' initiatives led to the development of environmentally concerned groups, since citizens felt the need to participate in the environmental decision-making processes (Bowlby, 1992). Accordingly, in the case of Asopos, activist movements consisting of residents of areas around Asopos were created to actively participate in the environmental decision-making processes. To use an expression by Beck, people 'became active today in order to prevent the crises of tomorrow and the day after tomorrow' (Beck, 1992: 34).

The Asopos case has three main sides. There are: i) power-holders (state/politicians and industries) who are the target of claims, ii) activists (expert-activist and lay-expert) who are in the middle, and iii) local population, on whose behalf activists are supporting sources of knowledge (c.f. Tilly, 1994: 15). Community-based environmental movements usually emerge as the consequence of conflicts between those three sides (Kousis, 1997). Their aim is to cure or prevent environmental degradation and its impacts in communities (Gould et al, 1991), reveal problems whose treatment requires intense and immediate research (Callon, 2003: 40), and are engaged in a political or cultural conflict (Diani, 1992: 13). Moreover, they do useful work in debating ecological issues (Turnock, 2004: 103),

[60]Ινστιτούτο Τοπικής Αειφόρου Ανάπτυξης και Πολιτισμού (ΙΤΑΠ) [Institute for local sustainable development and culture].

Picture 6. "Save Asopos"
[Σώστε τον Ασωπό]
http://asopossos.wordpress.com

challenging dominant interests, ideas and power relations (Doyle & McEachern, 2008), establishing alliances and networks of support and collaboration (Doherty & Doyle, 2006; Bichsel, 2006), increasing public awareness; they are the primary (and usually the most accurate) knowledge source for people (Brown, 1992: 270-271).

Most movements are autonomous initiatives with loose connection or dependency relations with political parties (Kousis et al, 2008; Close, 1998; Hobart, 1993: 7). They support local communities, deal with government, work with experts, engage in health studies, and provide social and emotional support. Groups can discuss their identity and their expectations and feed the research process with their own experience (Jasanoff, 1999). They have small number of members and limited financial resources (Bichsel, 2006). They plan public meetings, demonstrations, and marches, which are defensive, non-violent, but radical. Finally, they usually have a distinctive slogan. A typical example of a movement's slogan is the slogan of ITAP "Save Asopos" ["Σώστε τον Ασωπό"], for the rescue of the Asopos river (picture 6).

Over time, concerned citizens of the Asopos affected areas created activist movements, which dealt with the Asopos problem. Residents, without prior activist history or knowledge on environmental politics and public health, were educated and organized effectively. Some of the residents participated because of their ecological awareness and others because they felt threatened by the awful Asopos situation. Individuals, who were extremely upset because they felt cheated, decided to commit in a common goal and react to the state's indifference[61]. They created

[61]Christos Panagopoulos, President of the Federation of Unions of Oropos & resident of Oropos,

groups/movements that aimed to show their dissatisfaction and demand sustainable solutions for their problem. At Asopos, there was all the 'necessary conditions' for movements' emergence: a) an existing problem, b) inactivated/indifferent responsible authorities, and c) residents who (want to be) organized in order to react and protect their future (c.f. Smelser, 1962).

In Brown's words, "local opposition to environmental threats stems from scientific conclusions" (Brown, 2003: 8). In the case of Asopos, local opposition stemmed by the actions of Panteloglou and Oikonomidis[62]. The local movement Institute for Local Sustainable Development & Culture (ITAP)[63] is a typical outcome of local reaction against major industrial pollution. Panteloglou and Oikonomidis sought to communicate the knowledge they had obtained through their investigations and exercise pressure on the government for the implementation of environmental regulations and laws. Therefore, in 2005 they decided to create ITAP, a nonprofit, nongovernmental organization. Panteloglou and Oikonomidis tried to mobilize the local community, by calling public meetings, communicating with the Associations of Parents of the area's schools, writing information forms and articles, and conducting research in order to document their concerns and arguments. As participant 2[64] states: "If Oikonomidis and Panteloglou weren't activated, we would still have suspicions. They were our leaders, mobilized us with their arguments, and, most importantly, with the proofs that they provided us with".

According to ITAP[65], the followings should have been done the minute after

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personal interview, May 7, 2010.

[62]Later, scientific researches and conclusions were the reason for the locals to intensify their actions (see 4.2 & 4.4).

[63]'Ινστιτούτο Τοπικής Αειφόρου Ανάπτυξης και Πολιτισμού'.

[64]Participant 2 is a resident of Oinofyta and he had health problems.

[65]By 'according to ITAP' I primarily mean 'according to Panteloglou and Oikonomidis'. Karavasili Margarita (who is Special Secretary for the Environment and Energy Inspectorate), Vitoraki Maria (who is a member of Ecologists Greens), Zampetakis Giorgos (who is Senior Lecturer of Food Chemistry at the University of Athens), and Ktistakis Giannis (who is lower and Professor at the Dimokritio University of Thrace) are also members of ITAP(http://sites.google.com/site/itapoinofyta/)

the detection of hexavalent chromium: a) given that there was an environmental crisis, the area must had been declared in a state of emergency, b) the implementation of the relevant law (ΥΑ ΗΠ 13588-725-2006/12+13) (Εφημερίς της Κυβερνήσεως, Μάρτιος 28, 2006), which calls on the municipality to assess the situation, identify polluters and take drastic measures, c) the implementation of the law (3199/2003) for Water Protection and Management, d) the implementation of the law (ΚΥΑ Υ2-2600-01) (Εφημερίς της Κυβερνήσεως, Ιούλιος 11, 2001) for the Quality of the Drinking Water, e) supply of detailed information to citizens, f) termination of toxic water supply, and g) detailed toxicological and epidemiological analyses. Although all the above laws should have been applied after the detection of hexavalent chromium, the state did not follow any of the necessary measures in order to protect the public health and the environment. The state's inactivity gave the right to the industries to keep their illegal behavior and took away the right of citizens for a clean environment.

3.3. Cancer in Oinofyta: The Asopos research in the wild.

During the 19th century cancer was the terrible disease that threatened the longevity expectation, but after the 1940s cancer was accompanied by a picture of an invulnerable man fighting illness with the assistance of science (Gaudilliere, 2008: 494); a stereotype that has prevailed in Europe and United States. After 1970s, there was the perception that cancer was an inevitable fact of life and should be understood as a social and political problem that must be solved (Reed, 1983: 533). During the last quarter of the 20th century, the prevalent perception was that the environmental and public health problems are the product of out of-control-technological actions (Carson, 1962; Beck, 1992; Bocking, 2008: 608).

In Greece during the postwar decades deaths from cancer are relatively fewer than in other European countries. The mediterranean diet seems to have contributed to this (Τούντας, Μάιος 11, 2010). However, according to Tountas, who is Associate Professor of Social Medicine at the University of Athens and Director of the Institute of Social and Preventive Medicine, even though there was a decline in

death rates from cancer in most Western European countries over the past 20 years, in Greece there has been an increase due to urbanization, lack of preventative medicine, and, of course, high percentage of the smoking population (Τούντας, Μάιος 11, 2010).

Studies divide the causes of cancer in two categories: a) those which are related to modern lifestyle factors, mostly the personal habits of a person (smoking, diet, exercise) and b) those who are related to external environmental factors (chemical pollutants, air pollution). In the first category we find the most frequent and 'visible' causes. If you ask someone about her/his personal habits - for example how much s/he smokes - s/he can reply to you accurately (Colditz, 2009: 342). But if you ask the same person if s/he knows how polluted the area in which s/he resides is and if s/he was exposed to any carcinogenic compounds, e.g. hexavalent chromium, s/he won't know if and how much s/he has been exposed to (Reudan, 2010: 30).

Environmental degradation is not always immediately tangible (Kollmuss & Agyeman, 2002: 253). Very often, we only perceive the environmental pollution only after we see its severe damages. Furthermore, pollution in remote areas escapes our awareness. Because most environmental degradation is not immediately tangible, the information about environmental change has to be translated into understandable, perceivable information. For the Municipality of Oinofyta this sort of information was the burial records, which certified that many people had died from cancer.

After 2004 and the confirmation of chromium's existence, Panteloglou and Oikonomidis suspected that industrial pollution and chemical pollutants in drinking water could be the cause of cancers in their community. Therefore, they tried to understand what the impact of the Asopos pollution was on public health. More specifically, they tried to understand if chromium and industrial pollution was the cause for bad health condition and deaths of the residents.

Panteloglou and Oikonomidis were determined to conduct a research by their own, a research in the wild. They were asking for archive data that showed from exactly what the people in the region were dying. While they were hearing

about many cases of cancers, strange and rare illnesses, and many miscarriages by young women, doctors and local health centers didn't kept detailed archives. State authorities had nothing to offer to them as well. They decided to study the burial records registry, which recorded the causes of death in order to draw their own conclusions. They, also, took many interviews for all the incidents for which the cause of death wasn't recorded. They started door-to-door interviews with relatives of people who have died from cancer. They were searching for grandfathers, cousins and other relatives in order to learn the real cause of their death[66].

Picture 7. Diagram of deaths due to cancer at Oinofyta of Boetia (1988-2005)
http://www.amen.gr/index/php?mod=news&op=article&aid=452

This way a cancer registry was established. This document included columns with: the first name of the deceased, the year and the age of her/his death, the cause of death, and if the deceased had cancer[67]. According to the studied burial

[66]Athanasios Panteloglou, personal interview, April 3, 2010 & Ioannis Oikonomidis, personal interview, April 19, 2010.

[67]See Appendix D. Cancer registry of Panteloglou & Oikonomidis.

records, the death rate from cancer in Oinofyta jumped from 6% in 1988 to 32% in 2005 (Picture 7). Moreover, in this document I had the opportunity to observe the following:

✓ The main causes of death are related to heart (cardiac arrest, heart failure, and cardiomyopathy), brain (stroke, cerebral edema) and respiratory system (respiratory infection, respiratory failure, and cardiopulmonary arrest) problems.

✓ There are 193 entries. In theses entries, 93 were women and 98 were men while for 2 newborns sex isn't specified.

✓ There are 42 reported deaths from cancer (lung, colon, adenocarcinoma of the kidneys, brain, prostate, stomach, pancreas, oral cavity and leuchaimia).

✓ From these 42 entries, 25 refer to cancer as the leading cause of death while 19 of them refer to cancer as the sole cause of death.

✓ In 89 entries where ages are recorded, the average age of death (including people who died from all causes) is 70.6 years. If someone focuses on the cases related to cancer, it drops to 63 years.

Lay people were actually more productive at the time. Panteloglou and Oikonomidis were interested in informing, alerting and mobilizing the people. Research in the wild is a procedure through which lay people compare their experiences and build up their own expertise, which is as authentic as experts', even if it is different (Rabehorisoa & Callon, 2002: 62) and even if they do not follow the traditional route via the laboratory (Anshelm & Galis, 2009: 272). In contrast to confined research[68], research in the wild does not claim or possess 'scientific' purity. Yet, the Asopos research in the wild was repeatedly disputed. As the local priest highlights:

> "We never claimed that our effort should be treated as a scientific one. But no authority took it into account. Every employee of a relevant authority that examined our document automatically tried to make it look faulty and said to me '*you're not a statistician, you are a priest and burial records could be wrong*'. But

[68]Confined research is the research that is conducted by experts in their labs.

clearly for us it was the only proof, it was a good start and we couldn't ignore it"[69]

Their diagram and its percentages have been rejected by the authorities but the people of the area slowly began to trust them. Gradually, the residents of Oinofyta started to move on. As participant 4[70] points out: "When they started they had solid evidence. However, I can remember people who avoided accepting them so that Oinofyta didn't get 'a bad name'. But we are dying! The issue cannot be the reputation of the area!"

3.4. Non-participation. Another way to react (?)

Callon claims that a community that realizes that it had been living with industrial pollution for so long, becomes 'more and more tightly knit' (Callon, 2003: 41). Although a critical incident (like the increase in cancer rates) can serve as an impetus for local mobilization, in the case of Asopos, there is the paradox phenomenon of 'non-participation'. Why there are many people in Boetia who fail to join an activist movement or react by themselves? As Vagelis Zafiriou, who is a psychiatrist and a member of the Medical Association of Athens, admits: "The psychological impact that a specific disease, like cancer, or a pathological condition, like the fear of cancer, can have on the psychology of the residents, are very important"[71]. The fact that the residents of the region and the broader area feel so much at risk biologically, has also substantial and immeasurable consequences in their psychology status.

There are two reasons for the 'non-participation' phenomenon in the case of Asopos: i) the fear of stigmatization[72] and ii) the dependence everyone has from local

[69]Ioannis Oikonomidis, personal interview, April 19, 2010.

[70]Participant 4 is a resident of Oinofyta and he worked in the area's factories.

[71]Vagelis Zafiriou, personal interview, June 19, 2010.

[72]According to Callon, when there isn't an organized community-based movement fear of stigmatization dominates (Callon, 2002:63), consequently when there is a movement there isn't any

industries. People afraid to admit that they have cancer. They don't want their neighbor or their relatives and colleagues to find it out. As participant 5[73] declares: "Cancer is a taboo, the 'bad illness'. People are afraid of cancer itself. They believe that talking about cancer it exists but if they don't it doesn't". Those who are suffering from cancer avoid talking about it thinking that if they do the cancer will grow stronger, that the disease will be more severe and threatening. On the other hand they think that by ignoring the problem it would (magically) go away.

People are trying to make a living. They are struggling to survive. They ignore symptoms, doctor advice, and, after getting a month off work they return to their posts. As participant 4[74] states: "Not one of my colleagues ever told me that he suffered from cancer or had any type of health problems. But somehow I knew it. We never ever discuss it between us. It was an open secret!". Similarly, participant 2[75] underlines:

> "You understand it and you feel its existence. They may not say it out loud, but somehow everyone is aware of it. It may not be out in the open but you can notice it in the behavior of the women or their close relatives – that particular expression, it's just something that you notice in every single case".

It's not only the neighbors of an Oinofyta resident who can guess the secret behind closed doors. It is also the residents of the other surrounding areas who do not need to see that particular expression. As participant 7 and 10[76], comment: "When I hear that somebody from Oinofyta died – especially if he is young- I am not wondering or surprising. We all know! Cancer! It's a very common occurrence nowadays and for some time now".

According to my own view, people fatally follow the belief that the condition of their health is 'of their own making' – that somehow they did something wrong

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fear. In the case of Asopos, there is a community-based movement but there is the fear of stigmatization as well.

[73]Participant 5 is a student and resident of Oinofyta.

[74]Participant 4 is resident of Oinofyta and ex-employee of an area's factory.

[75]Participant 2 is a resident of Oinofyta and he had health problems.

[76]Participant 7 is a resident of Oropos and participant 10 of Dilesi.

and cause this 'punishment'. So the only choice that they actually make is to keep their problem behind closed doors, feeling the fear of stigmatization and extremely guilty.

In Oinofyta, where the majority of industries are located, people are highly economically dependent on industrial activity. The fact that the local community is highly economically dependent on the industrial activity is an element that makes the emergence of the local mobilization even more complicated. Participant 6[77] believes that there is a high dependence on the industry and the struggle against the industries is an uneven battle. As he points out:

> "Of course there is always dependence! A friend or a relative of yours will work there… You can't react!! You say such a thing because you are an outsider and you are totally out of this problem. They can't protest! They can't speak! They can only listen and be careful. I am speaking out because I don't work there anymore and I don't rely on them. Otherwise I don't know if I would be talking to you right now!".

The industry has for forty years penetrated into every part of the community. This, I find, explains why it is hard for the people to react. They have their shops in the area or their relatives may work at the factories. They can't change work. So they prefer to keep quiet in order to avoid trouble. People have been pacified, thus they cannot raise objections or say no. They are not 'allowed' to raise doubts.

Can people who are unwilling to participate and deny the severity of their area's problem handle bad information for their own future? It seems that they are not ready yet to accept, digest and elaborate that kind of data. The transmission of knowledge must be to the right people and (more importantly) at the right time. This is the primal competence for movements to survive in the long run. An institution, like ITAP, in light of a new knowledge (for instance the detection of hexavalent chromium), has to translate this knowledge into policy and action (c.f. Semsky, 2002: 392). They need to know what, why, where, and when to use their

[77]Participant 6 is a resident of Chalkis & a former factory worker at Oinofyta.

knowledge in order to be successful (Semsky, 2002: 391). Problems related to the management of knowledge accelerate and increase in scale and complexity, requiring movements that can create and maintain effective collective response (Short & Rosa, 2004: 146).

The phenomenon of non-participation is a new problem that the expert-activist and the lay expert of Asopos had to address. They had to figure out how to communicate the knowledge they accumulated. Knowledge management involves systematically and routinely creating, gathering, organizing, sharing, adapting and using knowledge, from both inside and outside of institution, to help achieve organizational goals and objectives. Knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information (Davenport & Prusak, 1998).

3.5. Experts express their concerns.

Lay observation and participation force scientists to step outside their traditional training and consider the knowledge and experience possessed by the locals to be very important (Brown, 2003:19). After the detection of hexavalent chromium in the Asopos waters two scientific associations, the Association of Greek Chemists and the Medical Association of Thebes, consisting of worried scientists, help locals to understand the impacts of the Asopos contamination on their community and their health. Moreover, they contribute substantially to the publicity of the Asopos problem. According to my interpretation, after the detection of many chemical substances, Greek chemists had to explain to the public what exactly these substances were and their impacts on environment and on public health. On the other hand, the Medical Association of Thebes was consisting of physicians who had to analyze hexavalent chromium's impacts on public health, and at the same time they had to deal with a serious problem of their area of residence; they were in danger as well.

The Association of Greek Chemists published, in 2007, a study on the hazards of hexavalent chromium, entitled "Thesis on the presence of hazardous CrVI in groundwater". It was written by a group of chemists with high technical competence in the field of environmental management and toxic metals. This study indicated that there is no legal/allowable limit for the hexavalent chromium (CrVI), which is more toxic and dangerous than the trivalent (total). It informed that water samples with chromium over 50mgr/lt are unfit for human and domestic use (Ένωση Ελλήνων Χημικών, 2007: 6). In addition, breathing air that contains high levels of CrVI may cause, depending on the quantity of air, irritation of the nose, nosebleeds, ulcers and holes in the nasal septum.

The intake of large amounts of hexavalent chromium from contaminated food or drinking water can cause stomach upset, ulcers, kidney and liver damage, and even death, depending on the level of infection. Skin contact with certain hexavalent compounds can cause ulcers (Ένωση Ελλήνων Χημικών, 2007: 7). The Association of Greek Chemists proposed the conversion and processing of wastes containing CrVI before placing them in the environment in forms of trivalent chromium (CrIII) and the prohibiting of the use of water for human consumption and domestic use. Furthermore, the monitoring of the quality of water, food and consumer products was also proposed (Ένωση Ελλήνων Χημικών, 2007: 39).

The Medical Association of Thebes, in a press release[78], published on January of 2007, stressed how damaging is practically any level of exposure to hexavalent chromium to humans. The Association also called for vigilance from the part of the authorities to find immediate solutions for restoring Asopos, and urged other local associations (that of the teachers, the trade association, pharmacists, etc) to be mobilized in order to find solutions fast.

The members of Medical Association of Thebes are not simply physicians who rush to make statements. They are themselves residents of Thebes and the

[78]The Press Release begins as follows: "The Medical Association of Thebes with responsibility follows with great concern the quality of groundwater and water supplied for human consumption in our region to be compromised by carcinogenic hexavalent chromium".

surrounding areas, who face the same risk and thus they had to mobilize themselves. Thus, the Association of Thebes was much more informed and sensitive than other Medical Associations[79]. Physicians proposed to the government, after the detection of CrVI, to proceed with continuous measurement in Asopos for hexavalent chromium as well as measurements in blood and urine of local people. In addition to Medical Association of Thebes, there were also individual physicians who had expressed concern and stressed the harmful effects of hexavalent chromium on people. As Poluxeni Nikolopoulou-Stamati, who is Associate Professor in the Department of Environmental Medicine at the Medical School of Athens University, points out:

> "There is no doubt that the CrVI is carcinogenic. Not only is forbidden to drink water contaminated with it, but to use this water for cooking also. Dangerous even to wash, because it can enter the body through the pores of the skin or the respiratory tract when washing in the shower […]. I do not accept to drink water with 5mgr/lt chromium even if the limit is 50mgr/lt" [80].

3.6. Summary

Before 2007 there was only the suspicion about the existence of hexavalent chromium in Asopos. This is why newspapers wrote a lot about the pollution of the river, but within a context of a general environmental concern. After 2007, the problem of Asopos had tremendous dimensions and environmental concern was transformed to fear for environmental and public health degradation. The state was clearly inactive during this period. However, two scientific communities, the Association of Greek Chemists and the Medical Association of Thebes, played a key role legitimizing locals' claims and highlighting the severity of the Asopos condition.

Panteloglou and Oikonomidis created a community-based environmental movement, ITAP. The aim of a community-based environmental movement is to

[79] Vagelis Zafiriou, psychiatrist and a member of the Medical Association of Athens, personal interview, June 19, 2010.

[80] http://kapodistriako.uoa.gr/stories/124_th_01/index.php?m=2

cure and/or prevent environmental degradation and its impacts in local communities, increase public awareness, deal with the government, and establish networks of support with experts. In the case of Asopos, confined researches, researches conducted by experts (for instance, Loizidou's and Stavropoulos's studies), were a good reason for Panteloglou and Oikonomidis to start their own research, a research in the wild. Panteloglou and Oikonomidis, through ITAP, desired to feed the research process with their own experience. Moreover, they tried to transmit to the locals the knowledge they gained from their research and exercise pressure on the state for the implementation of environmental regulations.

Activists and community-based environmental movements were concerned about the progress of the issue and tried hard to change the bad condition. Unfortunately, the phenomenon of non-participation dominated. People were accepting their fate, thinking that they were guilty for their own physical status, and/or hide their illness in order not to be socially stigmatized.

4. The rhetoric about a sustainable solution (2008-2011).

In the previous sections I presented the establishment of industries around Asopos, official measurements that revealed extensive pollution and existence of heavy metals and chromium in Asopos and in drinking water of surrounding areas, and the detection of the carcinogenic hexavalent chromium in the Asopos river. Furthermore, in the previous sections I presented the intense effort of an activist expert and a lay expert to awake and mobilize the residents of the affected areas through a community-based environmental movement. However, the phenomenon of 'non-participation' was particularly noticeable. This chapter presents the actions of the stakeholders that took place from 2008 until the present. During this period the state is appeared to be concerned about the Asopos issue. People are more tied together, better informed, communicating with each other and gathering at meetings for Asopos. During this period Greek studies dominate. Scientists of various disciplines have realized that not only have to explain the consequences of hexavalent chromium on public health or the environment, but they have to come up with proposals for immediate and sustainable solutions.

4.1. Asopos can be a river again!

In February 2008, new measurements in Asopos proved that the underground water horizon of Asopos was heavily contaminated by industrial activities (Βγενής, Απρίλιος 8, 2009). Yet, during the spring of 2008, minister of Environment, Giorgos Souflias, claimed that new measurements detected significantly less hexavalent chromium in the Asopos waters (Γιάνναρου, Μάρτιος 16, 2008). On July 31, 2008 Souflias proudly sustained that Asopos river is no longer contaminated and the drinking water was suitable for consumption. As he stated: «Today, Asopos river is clean! It still remains the problem of the underground waters in some places; but do not forget that this problem existed for many decades, apparently it cannot be solved in one day!" (Καρανίκας, Ιούλιος 31, 2008). At the

same period, Theologos Mimidis, who is an Associate Professor in the Department of Environmental Management at the Agricultural University of Athens, showed that the pollution continued unabated (Καρανίκας, Σεπτέμβριος 24, 2008). The concentrations of hexavalent chromium were up to 148 mg/lt. Hence, the impressive here was that a previous study of Mimidis, during the winter of 2008, demonstrated concentrations of hexavalent chromium over 100mgr/lt (Καρανίκας, Σεπτέμβριος 24, 2008). Apparently, the claims of Souflias that during this period the measurements showed a minimum quantity of hexavalent chromium were untrue.

In the summer of 2008, one year after the outbreak of the 'hexavalent chromium in drinking water' scandal, there was no significant change (Καθημερινή, Σεπτέμβριος 30, 2008). The polluters continued their well-established practice, the state and local authorities continued to remain indifferent and ineffective and public health was still at huge risk (Οικονομίδης, Μάρτιος 12, 2008; Παντελόγλου, Μάρτιος 12, 2008; Παντελόγλου, Ιούνιος 13, 2008). In the end of the year the Ministry of Environment announced the commitment to supply the area with clean water from the aqueduct that supplies water to Athens. In the meantime, the state published the names of the polluting industries. Residents and activist movements of affected areas proclaimed that they intended to sue the industries that caused the Asopos pollution and demand compensations for their health problems due to polluted water and the contamination of the underground water horizon of the Asopos areas (Ανεξάρτητος Παρατηρητής, Νοέμβριος 26, 2008).

The national election in October of 2009 brought PASOK to power and Tina Mpirmpili was appointed as Minister of the Environment. The new Minister got immediately involved with the Asopos issue (Ρόββα, Φεβρουάριος 9, 2010). Four months after the election she announced the following:

> "We recognize that the acute and complex problem of pollution from hexavalent chromium in Asopos unfortunately was worsened after the inexcusable indifference displayed in recent years by the state and particularly since 2007, when hexavalent chromium was first detected in drinking water and groundwater" (Γιόγιακας, Φεβρουάριος 9, 2010).

In February of 2010, the Ministry of Environment announced the following measures (Εφημερίς της Κυβερνήσεως, Μάιος 31, 2010): a) the commitment to supply Thebes and Oinofyta with clean water within a three-year period, b) the setting of limit of hexavalent chromium at 3mgr/lt and the record of public health status, c) the repeal of the 1969 Presidential Decree, which designated Asopos as a recipient of waste, d) the prohibition of waste dumping waste from industries, which were forced to comply with environmental regulations and pay for the environmental restoration, and e) the establishment of the Oinofyta Environmental Inspectors Office and the construction of a central wastewater treatment (Γιόγιακας, Φεβρουάριος 9, 2010).

Some of the above measures, for instance the repeal of the 1969 Presidential Decree and the setting of the limit of hexavalent chromium at 3mgr/lt, were applied. Nevertheless, the huge problem of the drinking water in Asopos affected areas still exists. Although EYDAP[81] conducted researches for the safest and immediate water supply of the Asopos areas, there is not an assignation in a relevant company for their implementation[82]. Therefore, the problem of the contaminated drinking water has not been solved till this day.

4.2. Experts working for sustainability

After the assertions of the Association of Greek Chemists and the Medical Association of Thebes about the hexavalent chromium and its impacts on environment and public health, experts from other disciplines dealt with the issue of Asopos. Government scientists and academic researchers published studies, highlighting the severity of the problem. Moreover, many studies of academic researchers demonstrated the critical situation of Asopos and proposed measures for the protection of the environment and local population. Below I will present some indicative studies by government scientists and by academic researchers.

[81]EYDAP [ΕΥΔΑΠ] is the Greek organization responsible for: the design, construction, installation, operation, management, maintenance, expansion and replacement of water supply and sanitation.

[82]www.ypeka.gr

Panagiotis Giannoulopoulos, hydro-geologist and member of the Institute of Geology and Mineral Exploration (IGME)[83], conducted a research for the hydro-geological conditions of the Asopos basin and the state of pollution and degradation of groundwater (Γιαννουλόπουλος, 2008). He claimed that the various metals and pollutants that were identified in their majority were the result of industrial, urban and agricultural pollution. He found that the underground waters of Asopos were extremely toxic - the concentration of hexavalent chromium exceeded 100mgr/lt and the concentrations of nickel, nitrates, phosphate, and total chromium were also high. Furthermore, the greatest damage was the 'catastrophe' identified in the industrial area of Oinofyta[84].

Similarly, Giorgos Hatzinikolaou, who is an environmentalist-with specialty on rivers and a member of the Hellenic Centre for Marine Research[85], after tests on samples of the Asopos water, assessed that in many locations of the Asopos river, the water is of bad or poor quality and nothing can survive in it, "since Asopos is not a river anymore but a source of infection" (Χατζηνικολάου, 2008). As he noted: "In Asopos nothing can survive! In fact we found only one type of fry larva, which can only live in conditions of zero oxygen" (Χατζηνικολάου, 2008).

The study of Thomaidis et al. (2007) pointed out that compounds of hexavalent chromium are very toxic and carcinogenic and metallurgic industries seemed to be the producers of pollution. Likewise, Technical Chamber of Greece

[83]Institute of Geology and Mineral Exploration (IGME) [Ινστιτούτο Γεωλογικών και Μεταλλευτικών Ερευνών] focuses on contributing to the economic development of the country and improving the quality of life through the exploitation of minerals and energy raw materials, water resources and natural resources in general, with care for the environment. It is supervised by the Ministry of Environment.

[84]Panagiotis Giannoulopoulos, personal interview, April 21, 2010.

[85]Hellenic Centre for Marine Research [Ελληνικό Κέντρο Θαλάσσιων Ερευνών (ΕΛ.ΚΕ.ΘΕ)] aims to carry out scientific and technological research, and experimental development, dissemination and implementation of the hydrosphere, its organisms, its interface with the atmosphere, the coast and the sea bottom, the physical, chemical, biological and geological conditions. It is supervised by the Ministry of Environment.

(TEE)[86], two years later, published a 93-paged report entitled "The Problem of Asopos – Proposals to Address it" (TEE, 2009), claiming that Asopos represents an "example of contempt for public health and the environment" (TEE, 2009: 9) and that "the wastes are generated mainly by the textiles, dyeing, finishing, food industries, metallurgical and chemical plants" (TEE, 2009: 29). The report included details for hexavalent chromium, law and actions by related agencies, statements of the Ministry of Environment, proposals by the National Technical University of Athens and the Institute of Geology and Mineral Exploration. The same research suggested that it is necessary to construct roads, land-planning of the region, sewerage network and wastewater treatment plants. The lack of this infrastructure amounts to environmental degradation, but also jeopardizes the viability of the businesses (TEE, 2009: 9).

This report recognized that an organized plan for creating the necessary infrastructure for the efficient operation of the plants has not been implemented, and in particular to protect the environment, such as building roads, planning organization of the region, construction of a sewerage network, construction of waste treatment and monitoring of the environmental parameters in the region (TEE, 2009:30). This report was considered to be a direct intervention by the state and was the first scientific work that State didn't hide away in a drawer[87].

[86]Technical Chamber of Greece is an institution functioning under public law and supervised by the Ministry of Environment. The Technical Chamber of Greece is by law the Technical Consultant to the state and the corporate body of all qualified engineers in Greece, its main objective is to promote, in general, the technological level in Greece.

[87]Unfortunately, there were scientists whose studies ended up in an Office's drawer. This happened, for instance, with Giannoulopoulos's research, when the State and the Central Bureau of Water claimed that the research was lacking in the documentation of findings, while scientists and colleagues of Giannoulopoulos argued that the study was a 'detailed research where both the variety of pollutants and the geographical area are analyzed' (Καρανίκας, Φεβρουάριος 19, 2009). Considering the findings of this research, the Ministry of Environment was supposed to proceed immediately to a detailed assessment of the polluted sites, the types of pollutants and their diffusion in groundwater. On the contrary, the state remained inactive, regardless if this research was conducted by an official state-agency.

The results and analyses of academic researchers were similar. Giannis Zampetakis, who is Senior Lecturer in Food Chemistry at the University of Athens, stressed the chemical burden that the agricultural and livestock producing had been submitted to. He underlined that the production of food-bulbs, which bio-accumulate heavy metals, in toxically polluted areas may be extremely dangerous to people's health. As he noted: "We should examine how food is produced in areas with contaminated water and judge scientifically whether such produce is safe" (Ζαμπετάκης, Οκτώβριος 27, 2009). According to him, in addition to the presence of hexavalent chromium, the presence of nitrates, lead, mercury, cadmium, copper and zinc is remarkable.

Another academic research demonstrated the distribution of hexavalent chromium in the area of the Asopos and its interaction within the system of the soil-plant-underground water horizon. According to Economou's study, there was considerable pollution from hexavalent chromium to the ground and to the crops, which can have serious consequences to the human health (Economou et al., 2011). Apart from determining the intensity and extent of the contamination, the study went on exploring ways to restore the damage. Maria Economou, who is a Professor in the Department of Geology at the University of Athens, asserted that the Asopos condition was critical, thus the only solution was the removal of chromium from industrial wastes[88]. This removal would require a low-cost process, which would be based on new technical methods and technologies, such as 'groundwater bioremediation' (Laskou & Economou, 2007).

All the above confined researches (academic and governmental) reached, after many measurements and laboratorial analyses, approximately at the same conclusions. Some of their conclusions were: i) the environmental degradation of the area was a fact, ii) the pollution of Asopos was due to industrial wastes, which contained various heavy metals, iii) there wasn't any appropriate land-planning of the region, wastewater treatment plants or suitable infrastructures, and iv) local

[88]Maria Economou, personal interview, April 21, 2010.

communities were in a constant danger.

In the case of Asopos, after the detection of hexavalent chromium in 2007, government and academic researchers were interested in integrating lay knowledge into their research[89] and addressing the Asopos issue[90]. Unfortunately, regardless of the experts' will to incorporate lay knowledge and lay experience into their laboratory researches, in the most cases, their outcome was not a mix of scientific method with lay know-how, but 'closed' researches with many non-human parameters embodied and analyzed.

The traditional view is that decisions, especially the technical ones, should be left in the hands of experts (Rowe & Frewer, 2000:5). Scientists consider their authority and knowledge to be independent from local conditions and lay experience (Bocking, 2008). According to Callon & Rabeharisoa, if you do not take into account the science for the solution of your problems you will not have efficient results (Callon & Rabehorisoa, 2003: 196). Accordingly, Phoibi Kountouri, who is Professor in the Department of European and International Economic Studies at the Economic University of Athens, stated: "The accumulation of scientific knowledge on this issue [Asopos issue] should never be stopped. Each day, each moment we must enrich the solution for Asopos with scientific knowledge. Otherwise there will be terrible mistakes"[91].

However, Giannis Zampetakis, who is Senior Lecturer of Food Chemistry at the University of Athens and a member of ITAP[92], consider that science should be independent only from the ruling (local-)industrial elite. He stressed the need for a science free of industry sponsors or other external factors (Ζαμπετάκης, Ιανουάριος

[89]Panagiotis Giannoulopoulos, personal interview, April 21, 2010; Maria Economou, personal interview, April 21, 2010.

[90]Certainly there were scientists who didn't consider that there was so much danger from the presence of CrVI in Asopos. The chemist Theoni Mouratidou and the chemist-environmentalist Nikiforos Iliopoulos emphasized that water containing up to 50mgr/lt of hexavalent chromium could be safe and the areas that had concentrations of hexavalent chromium below this limit they had nothing to afraid of (Ελευθεροτυπία, Οκτώβριος 10, 2007).

[91]Phoibi Kountouri, personal interview, April 21, 2010.

[92] Institute for Local Sustainable Development and Culture (ITAP).

29, 2010); a science completely selfless and impartial, which can incorporate the lay knowledge and identify the need for immediate and urgent solutions. According to Zampetakis, scientists should involve lay people/local population in decision-making processes because lay people live everyday with their area's problem and with the contamination's impacts. Zampetakis highlighted repeatedly in his articles the leading role that science should play in the Asopos issue. As he argues:

> "Scientists were called upon to find feasible and practical solutions; holistic solutions, which solve real problems and not just cover them up. For example, the problem of Asopos with the carcinogen hexavalent chromium cannot be solved by domestic water filters because the contaminated water is also used in food production and we know that food bulbs bio-accumulate chromium" (Ζαμπετάκης, Ιούλιος 10, 2008).

My opinion is in accordance with the opinion of Zampetakis. Mistakes could happen if there is not a mixture of lay experience with scientific methods and when an actor is eliminated. Science should be uncorrupted and objective. Moreover, lay people are a 'ready to use' resource and scientists are the experts who know exactly how to take advantage of this resource. Therefore lay people and scientists must find a way to cooperate properly for addressing the problem and come up with immediate and sustainable solutions.

4.2.1. The Asopos confined research agrees with the Asopos research in the wild: The first epidemiological study in Greece.

According to Constantinos Fytianos, Professor in the Department of Environmental Chemistry at the Aristotle University of Thessaloniki, until 2009 no serious statistical epidemiological study has taken place in Greece that compares the increase in concentration of toxic compounds (for example arsenic, hexavalent chromium) with the increase in the number of deaths due to cancer[93]. However, the Ministry of Health and Social Solidarity on December 16, 2009 announced the conduct of an epidemiological study in the area of Asopos, by the Institute of

[93]Constantinos Fytianos, personal interview, May 19, 2010.

Preventive Medicine, Environmental and Occupational Health ('Prolepsis')[94].

Prolepsis sought to examine whether the pollution of the environment created a risk to the health of residents and workers in the region. For the purpose of the programme a Health Centre in Oinofyta and a team consisted of physicians (psychologists, sociologists, nurses, epidemiologists, and infectious diseases specialists) were established. The programme promised anonymity, scientific competence, transparency, ongoing information and support to any issue relating to health. The program was a study of morbidity rates for the last 10 years, aimed to record the health status of the local population using epidemiological methods in order to observe if there was an 'actual' problem[95]. The reaction of the local residents about the programme varied. According to Melina Stoltidi, there were people who participated with great enthusiasm; there were others who got informed first and then they participated; and there was a significant portion who didn't participate. In her own words: "In any research you are ready to witness denial and doubt. But generally I think we went well enough"[96].

Scientific institutes and associations usually provide scientific information and confer legitimacy on the locals' claims and mobilization (Brown, 2003: 8). Nonetheless, scientific information may be ignored by the public as irrelevant to its need, or because there is a distrust in the source, believing that it represent interests other than their own (Bucchi & Neresini, 2007: 451; Jennings, 2000: 4), or because public consider this information as a part of a 'theoretical academic research' which is not providing any immediate and sustainable solution. This is the case with Panteloglou and Oikonomidis who were clearly opposed to the 'Prolepsis research'[97],

[94]Institute of Preventive Medicine, Environmental and Occupational Health [Ινστιτούτο Προληπτικής, Περιβαλλοντικής και Εργασιακής Ιατρικής], is a non-profit organization, active in the field of medical research, health promotion, environmental and occupational health, and it is supervised by the Ministry of Health and Social Solidarity (www.prolepsis.gr).

[95]Melina Stoltidi, sociologist and a member of Prolepsis, personal interview, May 3, 2010.

[96]Melina Stoltidi, personal interview, May 3, 2010.

[97]The ITAP's aim is to conduct toxicological tests, namely bio-monitoring (blood, urine, tissue) on the

because the Ministry of Health and Social Solidarity commissioned the study to Prolepsis, a non-profit organization, and conducted it 'outside' of the National Health System [Εθνικό Σύστημα Υγείας][98].

According to Panteloglou and Oikonomidis, the problem the citizens of Asopos were facing cannot be assessed by a 10-year long study, even if it is conducted by skilled and responsible academic researchers. As the lay expert of Oinofyta admits: "We have publicly expressed our opposition to such approaches - they do not 'serve' our situation. Prolepsis wanted to fill in questionnaires to prove if there is an increase of deaths from cancer! Only academic interest such process may have"[99]. According to ITAP, this questionnaire-based research serves only academic purposes and its final conclusions of these questionnaires cannot be used, for example, in the court as strong evidence against the industries. This epidemiological research conducted by a non-profit organization and not by the relevant/official Greek agencies[100]. Moreover, these questionnaires do not prove the bad condition of local people's health. This, I find, is easy to understand, since there are many individuals who are not aware of their bad health condition, of how much and for how long are exposed to carcinogenic or other chemical substances. They fill in the questionnaire without knowing their true health condition and the conclusions of this confined research cannot be the correct ones. For that reason, until this day, ITAP persistently demands for all the necessary toxicological tests on the local population and 'official' actions to be taken.

In September, 2010 the epidemiological study confirmed the findings of the expert-activist and the lay expert, noting the huge increase of deaths from cancer in

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general population, with special emphasis on specific groups of vulnerable people. This can only be done directly by the National Health System and the Ministry of Health and Social Solidarity.

[98]Athanasios Panteloglou, personal interview, April 4, 2010 & Ioannis Oikonomidis, personal interview, April 19, 2010.

[99]Ioannis Oikonomidis, personal interview, April 19, 2010.

[100]Athanasios Panteloglou, personal interview, April 4, 2010 & Ioannis Oikonomidis, personal interview, April 19, 2010.

Oinofyta[101]. As Elena Riza, who is an epidemiologist and a member of Prolepsis, observed: "It could be argued that a possible cause of the increase in death rates from cancer is the long presence of hexavalent chromium in the Oinofyta water […] Oinofyta have more deaths from cancer than any other Boetian area"[102].

From 2005 Panteloglou and Oikonomidis after their research in the wild, which included door to door interviews and analyses of the burial records, have showed that the death rate from cancer in Oinofyta jumped from 6% in 1988 to 32% in 2005[103]. Although Panteloglou and Oikonomidis worked differently from Prolepsis team[104], the confined research of Asopos totally agreed with the Asopos research in the wild. The Asopos confined research[105], which based on questionnaires and voluntary participation of local people, presented in September 2010 the exact same results[106].

4.3. Taking into account the local community: Ecologists-Greens and ITAP, a 'reciprocal' relationship.

The aim of the establishment of Greek Ecologists-Greens in December 2002 was the creation of an independent, interventionist, ecological movement. In the

[101] http://www.skai.gr/news/health/article/150617/ypsili-thnisimotita-apo-karkino-sta-oinofyta/

[102] Elena Riza, personal interview, September 30, 2010.

[103] See 3.2.

[104] For instance, the expert-activist and a lay expert sought information from dead people, their burial record, from which they had only a cause of death (for example cardiac arrest, stroke, and respiratory infection and in many cases cancer) and from their relatives. On the other hand, Prolepsis team sought information from living people. However, these people were not aware for their true health condition.

[105] The Asopos confined research was conducting in all the neighboring/affected areas of Asopos and the Asopos research in the wild only in Oinofyta. Yet, their results for Oinofyta were the same.

[106] It is worth mentioning that during the interview with Melina Stoltidi, I repeatedly asked her for some first, offhanded results of the Prolepsis research, but she (kindly) refused to tell me anything about the results and conclusions of the research – in contrast to Panteloglou and Oikonomidis who shared with me all the details and documents of their research. After all, their results had nothing to do with academic publications and their only concern was simply to publish the Asopos problem.

basic principles of Ecologists-Greens included the: sustainability, social justice, participatory democracy, and respect for diversity, parity, protection and restoration of natural ecosystem (Οικολόγοι Πράσινοι, 2008: 3). In contrast to the ecological parties of the past, which tried to promote the ecological cause by ignoring the public or by incorporating it without taking its priorities into account (Botetzagias & Boudourides, 2004) Ecologists-Greens work closely with the local communities and support their fight. As Maria Vitoraki, member of the Ecologists-Greens claims: "We tried to help in every way that we can. With member participation, technical assistance, and bibliography research for similar cases"[107].

The Ecologists Greens and local communities have a 'reciprocal' relationship, a relationship which both sides pursue. Ecologists Greens in order to raise the environmental awareness of public and to promote the rise of an ecological movement, and the local communities in order to demonstrate the problem of their area and participate in decision-making processes. A typical example of reciprocal relationship is the relationship of Ecologists Greens with ITAP. The conference in Brussels in 2009, organized by the European Green Party in cooperation with the Ecologists-Greens of Greece and the Institute for Local Sustainable Development and Culture (ITAP), under the title: "Unsustainable Patterns of Water and industrial waste Management in Greece: the cases of Asopos river basin, lake Koroneia and Korinthiakos Gulf, was one of the most remarkable accomplishments of their relationship (Γιάνναρου, Μάρτιος 25, 2009). This conference revealed some issues, like the consequences of the contamination of Asopos on public health, environment, agriculture, and the economy of the affected areas. The European

Picture 8. 'The Asopos case' in Brussels
http://asoposos.wordpress.com/2009/04/16

[107]Maria Vitoraki, personal interview April 21, 2010.

Committee accepted that hexavalent chromium is a serious toxic and should not exist in any amount in drinking water. Furthermore, the European Committee was pledged to increase pressure on the Greek state (Οικολόγοι Πράσινοι, Μάιος 19, 2009).

The Ecologist-Greens maintain that the uncontrolled waste management of industries in the Asopos area is an enormous ecological, political and financial scandal and that the Asopos case is a characteristic example of failed environmental policies and corruption of political authorities (Οικολόγοι Πράσινοι, Μαρτίου 4, 2009). They underlined that the clean production of industries based on green technologies and green chemistry (Οικολόγοι Πράσινοι, Απρίλιος 15, 2009), the restoration of environment, the protection of water from other sources of pollution, the monitoring of the water's quality, the protection of public health must be the main goals of the State (Οικολόγοι Πράσινοι, 30 Μαρτίου 2008).

4.4. Forms of Boetians' public participation

Local mobilizations for the protection of environment and public health began in 2007 after the detection of hexavalent chromium in the Asopos water[108]. When minister of Environment, Souflias, claimed that Asopos river was clean (July 2008), local residents 'went up in arms' (Σπανούδη, Ιούνιος 9, 2010). Lay people do not accept data that contradict their lived/daily experience (Brown, 2006: 585). Panteloglou and Oikonomidis[109] managed to organize ordinary people under a

[108]ITAP, Coalition of Boetians for the Protection of the Environment [Συμπαράταξη Βοιωτών για την Προστασία του Περιβάλλοντος], and the Federation of Unions of Oropos are the most active Asopos concerned groups and they are organizing many meetings and protests.

[109]It is worth mentioning that on December 29, 2009 the Academy of Athens, honoured Ioannis Oikonomidis for his social and environmental work. Specifically he was merited for his acts of social virtue and humanity made in the last two years in Greece in a field in which the state lacked or was inadequate. In an interview he gave after the award ceremony Oikonomidis said: "On the one hand, I feel sad because if the local authorities had done their job properly this fight wouldn't be needed in order to publish this issue. On the other hand, I am happy because this is the best way to recognize

common goal. In the last four years people in Boetia have been mobilizing and organizing protests, marches, blocking of motorways, concerts, conferences, meetings. Protests by the residents of affected areas were intensified in 2009, demanding every relative agency to take all the necessary measures for the restitution of Asopos. For the first time, a significant part of Boetians have realized the problem and mobilized. Scientists tried to help lay people understand the true dimensions of problem, by conducting researches and attending lay meetings.

On November 18, 2008 residents of Oinofyta held a meeting. Interventions and solutions for restoration were discussed with main speakers: the Professor at the National Technical University of Athens Maria Loizidou, the Prefect of Boetia Klearchos Pergantas, the Mayor of Oinofyta Giorgos Theodoropoulos and the chairman of Boetians industries Nikos Koudounis. The participants noted that while there are technical studies to address the problem and experts can find a sustainable solution, there is no political will to implement them (Ανεξάρτητος Παρατηρητής 2008, Νοέμβριος 26).

One of the most impressive protests for the 'tragedy of Asopos' took place in January 2009 in Athens in front of the Parliament at Sintagma metro station[110]. ITAP in cooperation with another community-based environmental movement, the Coalition of Boetians for the Protection of the Environment, treated passers-by and passengers in the subway little bottles with the polluted water. With this event members of the movements had the opportunity to inform citizens of Athens about the unresolved problem of Asopos's pollution and its serious consequences for the environment and the public health (Ελαφρός, Ιανουάριος 15, 2009). Two months

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the efforts of the environmental organizations" (Χατζηγεωργίου, Δεκέμβριος 30, 2009).The Academy of Athens has the legal status of a Legal Entity of Public Law and is supervised by the Ministry of National Education and Religion. The Academy is composed of three Sections: the Sciences, Humanities and Fine Arts, and Ethical and Political Sciences. The main purpose of the Academy of Athens is the cultivation and advancement of the Sciences, Humanities and Fine Arts, the conduct of scientific research and study, and the offer of learned advices to the state in these areas.

[110]Sintagma metro station is the most central metro station in Athens.

later, residents and members of activist movements of East Attica, Boetia and Evia gathered at the toll of Schimatari. They were disappointed and upset with the repeated statement of Souflias that "Asopos is clean". They handed out to the drivers little bottles with 'clean' wastewaters. As Spanoudi, who is an active member of the Coalition of Boetians for the Protection of the Environment, notes: "This kind of protests helped us to communicate our problem"[111].

Picture 9. A Boetian protest: *"We demand declassification of the Asopos river. No more toxic wastes"* http://ioannastergiou.files.wordpress.com/2009/09/asopos.jpg.

In May 2009, the Women's Federation of Boetia, in collaboration with the Prefecture of Boetia, organized a meeting entitled "Humans and Environment", to aware people for environmental issues in the region of Boetia. This meeting ended with the following conclusion: that everyone must protect the environment because people did not inherit it in order to destroy it, but they have borrowed it to deliver the best of it in future generations" (Διάβημα, Μάιος 21, 2009). In 2010, in a form of invitation local newspapers published the time and place of the Geotechnical Chamber of Greece (ΓΕΩΤΕΕ) conference under the title: "Asopos: an open environmental wound - Present and Future". It was a conference with many

[111]Despina Spanoudi, personal interview, July 21, 2010.

speakers, mainly from the scientific field, who showed in detail the problems of the Asopos and set guidelines for the decontamination and environmental restoration of the river and the surrounding area.

4.5. Summary

Asopos, after forty years as a receiver of industrial wastes, was declassified as such. During this period the state was more active and willing to protect the environment and the public health. Despite that, measures that have been announced are still pending. During this period scientific communities took center stage and many scientific studies were conducted. All of them noted that the main cause of Asopos pollution is the industrial activity taking place in the surrounding areas and the health and living standards can be improved only through the reconstruction of the ecosystem of the river. All the experts underlined the bad condition of Asopos, expressed the need for restoration of the river. Moreover, the Asopos activist movements, with various forms of protesting, they managed to communicate the problem widely.

Although lay people believe that research in the wild and confined research are complementary (Callon & Rabeharisoa, 2003: 197), in the Asopos case they were not. Yet, their results were the same. The Asopos confined research, in 2010, showed the same results with the Asopos research in the wild, which was conducted in 2005. Those two researches followed totally different paths and their own methods. Panteloglou and Oikonomidis started door-to-door interviews, studied all the available archives and gradually become producers of information and knowledge. The Prolepsis research, the Asopos confined research, followed the traditional route via the laboratory and used as a basic methodological tool a questionnaire. Boetians' participation in this confined research was optional and people had to answer questions about their medical history and their present medical condition.

5. Summary and Discussion

In this final chapter I will review my empirical results, in relation to the theoretical framework that I have analyzed in my introduction. I started my analysis with the industries' establishment around Asopos in 1969 and I ended it with the recent announcements by the Ministry of the Environment in 2010. I described how the Asopos problem began from the establishment of industries around Asopos river, how local people realized the tremendous impacts environmental pollution had on their area and health, and what role state and scientists chose to play. In fact, local people, the state, and the scientists were the protagonists of the three main chapters of this study. More specifically, in chapter 2 the central theme was the initial mobilization of local communities and the cooperation of an expert-activist with a lay expert; in chapter 3, the state's indifference and inactivity dominated, and finally, chapter 4 viewed the scientists' contribution in the Asopos issue through their researches.

In 1969 with a Presidential Decree many industries were allowed to be transferred in the surrounding areas of Asopos, setting an unofficial industrial area without any infrastructure project or land-planning. For many decades, industries kept on discharging their untreated wastes directly to the river or through illegal wells. During the 1980s, the industrial concentration and the industrial development in the Asopos areas were huge, but at the same time the condition of the river was tragic.

After 1990, the awful condition of Asopos became apparent. Hence, there wasn't any drastic measure or action by the state and the local authorities. The Asopos pollution came into light as a result of the concern by local people. In 2000 the Oropos residents fearing of the sea pollution decided to take action and demanded the decontamination of the river and the full compliance of the industries with the laws. At the end of 2004, measurements confirmed the existence of total (trivalent) chromium in Asopos's groundwater and surface waters. The Ministry of Environment recorded various violations from many factories during its

environmental inspections. Nevertheless, the industries, which were found guilty, received tiny fines and they continued undisturbed to dump their wastes in the river.

In August 2007, the Chemical State Laboratory of Greece conducted water quality analysis, which revealed high concentrations of hexavalent chromium (a highly toxic, carcinogenic, and bio-accumulative heavy metal) and of other heavy metals. One would expect that the minute after the detection of hexavalent chromium in the drinking water of Asopos, the state and the relevant Greek authorities would be activated to efficiently tackle the problem. Instead, the government (the conservative ruling party, New Democracy) denied the severity of the problem, and it remained inactive, imposing again (very small) fines to the industries, which were never been paid.

Until 2008, the state strained to hide this serious problem that was existed for forty years and did not take any efficient measures permitting industries to act illegally and taking away from citizen the right to a clean and healthy environment. This inactivity can be understood, if we take into account the patron-client relationships, which had been developed between the state and the local-industrial elite and the fact that between the industries-polluters there was a state-owned industry. Despite of the state's inaction, there were members of political (small) parties who pursued to highlight the seriousness of the Asopos condition and pushed the state to do something immediately. Additionally, the political party of Ecologists-Greens developed a reciprocal relationship with the local community and made essential efforts to publish the problem abroad.

As the reader will recall, scientific communities during the first period of the Asopos case (1969-2004) were essentially absent. Therefore, international studies helped local people to understand the dimensions of an area's environmental pollution. After the detection of hexavalent chromium the Medical Association of Thebes and the Association of Greek Chemists widely expressed their concerns. After 2008 scientific studies that carried out demonstrated that the presence of hexavalent chromium in groundwater and surface waters was clearly indisputably linked to illegal discharge of industrial, hazardous wastes to the river and that the reconstruction of the river's ecosystem should be the first priority of the state.

The national election in October of 2009 brought PASOK (The Panhellenic Socialist Movement) to power and the new Minister of the Environment announced sufficient measures for the Asopos problem. Unfortunately, till this day they are pending and although Asopos river, after forty years as a receiver of industrial wastes, was declassified as such, many industries continue to operate without the necessary licenses and without biological waste treatments.

Public participation is the involvement of a local population in the administrative processes of decision-making (Fiorino, 1996), it is an important element of a democratic state system. Public participation enables people to collect knowledge, recognize a problem, and solve local issues. Participation is an instrument of change that can help break the exclusion of subordinated people and provide them with the basis for their direct involvement in decision-making processes.

The idea that local people can be empowered through participation has spread and is actively advocated by the majority of local activist organizations. People with different viewpoints and proposals, but with the same problem, commitment and concerns can form a concerned group/activist movement/ community-based environmental movement. These movements are an influential vehicle for citizens' participation (Tilly, 1994: 6-7), an effective way for public participation in environmental decision-making processes. They often emerge from a conflict between the state, the industries and the local communities over how to use ecosystem resources (Kousis, 1997: 235). Debating ecological issues, challenging dominant interests, establishing networks of support are some of their main functions. Still, their most important function is that they inform on time and accurately the local people about their community's problem and its true dimensions.

In the Asopos case, residents without any prior activist history and knowledge on environmental politics and public health decided to organize themselves and react to the state's indifference and to the industries' illegal

behavior. The Institute for Local Sustainable Development and Culture [Ινστιτούτο Τοπικής Αειφόρου Ανάπτυξης και Πολιτισμού (ΙΤΑΠ)] is a typical example of a community-based environmental movement. Athanasios Panteloglou, a chemical engineer, and Ioannis Oikonomidis, a local priest, created ITAP in 2005 in order to cure and prevent environmental degradation and its impacts in local communities around the Asopos river, increase public awareness, try to mobilize the local communities, deal with the government and establish networks of support with experts.

The first suspicions about the pollution of Asopos were from the Oropos residents, who were primarily upset about the sea pollution. Panteloglou was the first who realized the true dimensions of industrial activities and immediately started a struggle against the industries. In this struggle he had the valuable help and support of Oikonomidis. What motivated a chemical engineer and former factory manager and a priest to look for a way to participate in the decision-making processes? Both of them insisted that at first they felt their lives and their family's life threatened, but later they felt the obligation to publish the problem and to be mobilized. They felt the need to extend their personal responsibility and commitment for a better quality of life.

Panteloglou, a chemical engineer, had all the necessary knowledge and academic training to identify the Asopos problem, allocate responsibilities, and devise strategies. As an expert activist desired to advance the scientific knowledge base and communicate the problem to the surrounding communities of the Asopos river, the media and policymakers (c.f. Brown, 2003: 20). Although, an expert activist cooperates directly with lay people, in the case of Asopos, Panteloglou chose to 'transform' a lay person into a lay expert first. Oikonomidis, taking advantage of his chaplaincy, acted as a mediator between the expert activist and lay people. Oikonomidis didn't have the specialized knowledge of Panteloglou but people, because of his profession, could trust him and share their daily experiences with him. Panteloglou and Oikonomidis managed to turn suspicions into proof and gradually gained a seat at the table of discussions; they made the transition from exclusion to

inclusion (c.f. Callon & Rabeharisoa, 2008: 232). Certainly, they still are fighting to make 'the cost of not solving the problem, greater than the cost of the solution'.

Activist movements are extremely interested in techno-scientific developments (Epstein, 1995: 409; Callon & Rabeharisoa, 2008: 232) and they can become genuine participants in the creation of scientific knowledge. Though, lay people are capable not only of participating in research processes, but are capable of conducting their own researches as well. Lay people are 'unofficial' experts. They do not have the necessary academic training, the proper authority and/or a laboratory to conduct a research, but they know what the need and what they want, they have the 'know-how' and the will to make huge changes for the sake of their community. They attempt to feed the research process with their own experience. The Asopos research in the wild conducted by Panteloglou and Oikonomidis was based on burial records, personal experiences and interviews. Panteloglou and Oikonomidis cooperated daily, analyzing the limited data and archives, conducting door to door interviews, talked to scientific experts about the consequences of industrial pollution to the environment and public health.

Confined research is the research conducted by scientists who work for government, an industry or within a university or an institution. For concerned groups, research in the wild and confined research are complementary. In the case of Asopos this was not quite precise. Confined researches conducting during the first period (1969-2004) by scientists who worked within a university (that is Loizidou's and Stavropoulos's studies) were a good reason, a starting point, for Panteloglou and Oikonomidis to start their own research, the Asopos research in the wild. Furthermore, the Asopos confined research conducted by the Institute of Preventive Medicine, Environmental and Occupational Health ('Prolepsis'), in 2010 showed the same results and draw the same conclusions with the Asopos research in the wild which was conducted in 2005. Following a total different path, through laboratory and scientific methodology, the Asopos confined research confirmed the results of the Asopos research in the wild after five years.

The individual's participation depends on a combination of values, beliefs, interests (Skavanis et al, 2005: 323), and personality. People with pro-environmental attitude, activist and altruistic behavior are more likely to participate in a concerned group. On the contrary, people who are selfish and competitive (Σωτηρόπουλος, 2004: 117) or they are not absolutely sure that their actions will lead to the desirable result (Held, 1987; Bora & Hausendorf, 2006: 479) are less likely to be (ecological) activated.

Callon argues that when there is not an organized activist movement fear of (socially) stigmatization dominates (Callon, 2002: 63). Accordingly, when there is a movement there is not any fear of stigmatization. Although the emergence of environmental movements and the growing environmental and public health awareness could make easier for someone to get informed, react and participate, in Asopos's issue and particularly in the community of Oinofyta, there were many residents (sick and healthy) who did not participate in ITAP's/local struggle. According to Jennings, ignorance is the most significant factor which may limit the potential for the public to contribute to complex policy decisions, and when ignorance is not an obstacle anymore lay people are free to act (Jennings, 2000: 5). Even though residents of Oinofyta had been informed thoroughly by Panteloglou and Oikonomidis, they were very afraid of being socially stigmatized or unemployed. Thus, they chose not to participate in any decision-making process or in any fight against the polluters and they kept their problem behind closed doors, accepting their fate.

Lay people have knowledge and competencies, which enhance and complete those of experts. Governmental and scientific bodies need to pay greater heed to the public, become more responsive to it (Jennings, 2000: 4) and involve it in policy decision-making when it is feasible. Lay knowledge shouldn't be conceived as an obstacle to be overcome, neither as an additional element that simply enriches professionals' expertise, but rather as essential for the production of knowledge

itself (Bucchi & Neresini, 2007: 452; Callon, 1999: 89) and of sustainable solutions. Sound solutions to environmental problems require action beyond experts and political elites. The cooperation between experts and lay people may be difficult but not impossible. Both of them are equally essential for the production of knowledge and both of them have a substantial contribution to make. Mistakes could happen if there is not a mixture of lay experience with scientific methods and if an actor is eliminated. For instance, neglecting information coming from the lay people imply legitimacy questions and potential conflicts. Citizens should participate in the decision-making processes on environmental issues (Short & Rosa, 2004: 144), since this is the only way to ensure the representation of their interests. All concerned and affected people should have an equal opportunity to influence the decision-making processes._

6. Appendices

Appendix A: Studies for Cancer

Table 1. Proportions of Cancer Deaths Attributed to Various Different Factors – Doll & Peto's Table

Factor or class of factors	Percent of all cancer deaths (%)
Tobacco	30
Alcohol	3
Diet	35
Food additives	1
Reproductive and sexual behavior	7
Occupation	4
Pollution	2
Industrial products	1
Medicines and medical procedures	1
Geophysical factors	3
Infection	10
Unknown	3

Table 2. Factors reported to causes of cancer, according to residents of Tannerstown- Balshem's table.

Factors related to lifestyle	Appearance Of Cancer (%)	Environmental factors	Appearances Of Cancer (%)
Diet	35	Environmental pollution	64
Smoking	16	Heredity	34
Behavior	7	Fate	17
Proper exercise	5	Food additives	14
Exposure to Sun	5	Unknown causes	9
Alcohol	4	Occupation exposure	7
Regular checks	4	Anxiety	6
Personal care	4	Germs	2
Other factors	4	Other factors	2
Total	84	Total	155

Appendix B: Fines to industries

Table 3. November 7, 2007[112]

	INDUSTRIES	FINES (€)
1.	ALLUMINCO A.E.	250.000
2.	EUROPA PROFIL ΑΛΟΥΜΙΝΙΟ Α.Β.Ε. (ανοδίωση προφίλ αλουμινίου)	200.000
3.	ΕΛΒΑΛ Α.Ε.	180.000
4.	ΜΑΪΛΗΣ Α.Ε.Β.Ε	160.000
5.	ICR ΙΩΑΝΝΟΥ Α.Β.Ε.Ε	77.800
6.	BERLING ABEE	62.000
7.	Β.Α. ΑΡΣΕΝΙΔΗΣ Α.Ε.Β.Ε.	61.200
8.	ETEM Α.Ε.	54.000
9.	VIOMETALE Α.Ε.Β.Ε	53.000
10.	ΒΑΦΙΚΗ Α.Ε.	50.000
11.	EUROPA PROFIL ΑΛΟΥΜΙΝΙΟ Α.Β.Ε (ηλεκτροστατική βαφή προφίλ αλουμινίου)	47.000
12.	PROFILCO Α.Ε.	36.000
13.	ΓΑΛΒΑΝΙΣΤΗΡΙΑ ΕΛΛΑΔΟΣ Α.Β.Ε.Ε	32.400
14.	ΕΠΑΛΜΕ Α.Ε.	32.000
15.	ΠΡΟΤΑΛ Α.Β.Ε.Ε	26.000
16.	ΜΑΣΤΕΡΣΟΛ-Ν.ΧΟΥΣΤΟΥΛΑΚΗΣ (μονοπρόσωπη ΕΠΕ)	22.000
17.	EUROPA PROFIL ΑΛΟΥΜΙΝΙΟ ΑΒΕ (διέλαση προφίλ αλουμινίου)	21.000
18.	SIRCA HELLAS Α.Β.Ε.Ε	11.700
19.	ΣΤΕΡΓΙΟΥ ΠΕΤΡ.ΝΙΚΟΛΑΟΣ	6.500
20.	ΤΥΠΟΧΗΜΙΚΗ Α.Β.Ε.Ε	32.400

[112] www.minenv.gr/.../2007-11-07.**prostima**.se.eteries.sti%20perioxi.asopou.doc

Table 4. February 22, 2008[113]

	INDUSTRIES	FINES (€)
1.	ΕΑΒ	150.000
2.	ΧΑΛΚΟΡ Α.Ε	60.000
3.	ΕΚΤΥΠΩΣΕΙΣ IRIS ΑΕΒΕ	60.000
4.	ΒΙΟΚΟΤ Α.Ε.	45.000
5.	ΣΚΛΙΑΣ ΑΛΕΞΑΝΔΡΟΣ	44.000
6.	ΑΣΗΜΑΚΗΣ Α.Ε.Β.Ε	20.000
7.	ΖΟΥΡΑΣ Α.Ε.	18.000
8.	ΕΜΜ.Ν.ΚΑΖΗΣ Α.Ε.Β.Ε	15.000
9.	ΕΛΦΙΚΟ Α.Ε.Ε	10.000
10.	STAMPA GROUP Α.Ε	8.500
11.	KERAKOLL ΕΛΛΑΣ	8.000
12.	Ν. ΜΠΟΥΛΕΛΑΚΗΣ Α.Ε.Β.Ε	4.000
13.	ΑΦΟΙ ΜΠΕΛΛΟΥ ΕΠΕ	3.400
14.	ΚΝΩΣΣΟΣ ΕΠΕ -ΑΦΟΙ ΜΠΡΟΚΟΥ	1.100
15.	ΑΛΟΥΜΙΝΙΟ ΠΑΠΑΔΑΚΗ ΑΕΒΕΕ	1.000

[113] www.minenv.gr/.../**2008**-02-**22**.**prostima**.stin.perioxi.toy.asopoy.potamoy.doc

Table 5. July 15, 2009[114]

1.	ALLUMINCO A.E EUROPA	250.000
2.	PROFIL ΑΛΟΥΜΙΝΙΟ Α.Β.Ε. (Ανοδίωση προφίλ αλουμινίου)	200.000
3.	ΕΛΒΑΛ Α.Ε	180.000
4.	ΜΑΙΛΗΣ ΑΕΒΕ	160.000
5.	Ε.Α.Β	150.000
6.	Μ.Ι. ΜΑΪΛΛΗΣ Α.Ε.Β.Ε. – ΣΥΣΤΗΜΑΤΑ ΣΥΣΚΕΥΑΣΙΑΣ	130.000
7.	ICR ΙΩΑΝΝΟΥ Α.Β.Ε.Ε.	77.800
8.	ALAPIS CROP SCIENCE	66.500
9.	EUROPA PROFIL ΑΛΟΥΜΙΝΙΟ Α.Β.Ε.	64.500
10.	ALLUMINCO A.E	64.000
11.	BERLING ABEE	62.000
12.	Β.Α. ΑΡΣΕΝΙΔΗΣ Α.Ε.Β.Ε.	61.200
13.	ΕΚΤΥΠΩΣΕΙΣ IRIS ΑΕΒΕ - ΕΚΤΥΠΩΣΕΙΣ	60.000
14.	ΧΑΛΚΟΡ Α.Ε. – ΣΩΛΗΝΟΥΡΓΕΙΟ	60.000
15.	ETEM AE	54.000
16.	VIOMETALE AEBE	53.000
17.	ΒΑΦΙΚΗ ΑΕ EUROPA	50.000
18.	PROFIL ΑΛΟΥΜΙΝΙΟ Α.Β.Ε. (ηλεκτροστατική βαφή προφίλ αλουμινίου)	47.000
19.	ΒΙΟΚΟΤ Α.Ε. - ΠΤΗΝΟΣΦΑΓΕΙΟ	45.000
20.	ΣΚΛΙΑΣ ΑΛΕΞΑΝΔΡΟΣ – ΧΟΙΡΟΤΡΟΦΕΙΟ	44.000
21.	PROFILCO AE	36.000
22.	ΓΑΛΒΑΝΙΣΤΗΡΙΑ ΕΛΛΑΔΟΣ ΑΒΕΕ	32.400

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23.	ΤΥΠΟΧΗΜΙΚΗ ΑΒΕΕ	32.400
24.	ΕΠΑΛΜΕ ΑΕ	32.000
25.	ΑΦΟΙ ΜΠΕΛΕΓΡΑΤΗ – Β. ΛΕΟΝΤΑΡΗΣ ΟΕ	28.000
26.	ΠΡΟΤΑΛ Α.Β.Ε.Ε.	26.000
27.	ΜΑΣΤΕΡΣΟΛ – Ν. ΧΟΥΣΤΟΥΛΑΚΗΣ ΜΟΝΟΠΡΟΣΩΠΗ ΕΠΕ	22.000
28.	BATANODE METALSTAR Ε.Π.Ε.	21.500
29.	EUROPA PROFIL ΑΛΟΥΜΙΝΙΟ Α.Β.Ε. (διέλαση προφίλ αλουμινίου)	21.000
30.	ΑΣΗΜΑΚΗΣ ΑΒΕΕ ΚΑΤΆΣΚΕΥΕΣ ΜΗΧΑΝΗΜΑΤΩΝ ΔΙΕΛΑΣΗΣ	20.000
31.	ΖΟΥΡΑΣ Α.Ε. ΑΝΑΘΡΕΠΤΗΡΙΟ ΠΟΥΛΑΔΩΝ	18.000
32.	ΑΦΟΙ ΛΕΙΒΑΔΙΤΗ ΑΒΕΕ	17.500
33.	ΕΜΜ. Ν. ΚΑΖΗΣ ΑΕΒΕ – ΧΥΤΗΡΙΟ	15.000
34.	ΑΣΦΑΛΤΙΚΗ ΑΒΤΕ	14.000
35.	SIRCA HELLAS ΑΒΕΕ	11.700
36.	ΕΛΦΙΚΟ Α.Ε.Ε. - ΒΑΦΕΙΟ	10.000
37.	ΚΩΝΣΤΑΝΤΙΝΟΣ ΜΑΚΡΗΣ & ΣΙΑ Ο.Ε.	9.000
38.	STAMPA GROUP Α.Ε/ - ΚΑΤΑΣΚΕΥΕΣ ΑΛΟΥΜΙΝΙΟΥ	8.500
39.	«HUSQVARNA CONSTRUCTION PRODUCTS ΕΛΛΑΣ Α.Ε.Β.Ε.»	8.500
40.	KERAKOLL ΕΛΛΑΣ – ΧΗΜΙΚΑ-ΔΟΜΙΚΑ ΥΛΙΚΑ	8.000
41.	ΣΤΕΡΓΙΟΥ ΠΕΤΡ. ΝΙΚΟΛΑΟΣ	6.500
42.	PANEL PRESS ΑΒΕΕ	5.500
43.	ALFA PRESS ΑΒΕΕ	5.500
44.	EXTRACO Α.Ε	5.000

45.	«SYNGENTA Hellas A.E.B.E.»	4.600
46.	ΝΙΚΟΛΑΟΣ ΜΠΟΥΛΕΛΑΚΗΣ ΑΕΒΕ – ΜΕΤΑΛΛΙΚΑ ΚΟΥΦΩΜΑΤΑ ΑΛΟΥΜΙΝΙΟΥ	4.000
47.	ΑΦΟΙ ΜΠΕΛΛΟΥ ΕΠΕ	3.400
48.	ΚΑΔΜΟΣ ΑΕΤΕ	3.000
49.	ΔΗΜΟΤΙΚΑ ΣΦΑΓΕΙΑ ΘΗΒΩΝ	3.000
50.	ΚΝΩΣΣΟΣ ΕΠΕ - ΑΦΟΙ ΜΠΡΟΚΟΥ	1.100
51.	ΑΛΟΥΜΙΝΙΟ ΠΑΠΑΔΑΚΗ ΑΕΒΕΕ	1.000

Appendix C: List of interviewed informants

Representatives of local communities

- Oikonomidis Ioannis, local priest at the church of Saint Spyridona at Oinofyta and member of the Institute for Local Sustainable Development and Culture (ITAP). Interviewed April 19, 2010.

-Panagopoulos Christos, President of the Federation of Unions of Oropos. Interviewed May 7, 2010.

- Panteloglou Athanasios, chemical engineer and President of the Institute for Local Sustainable Development and Culture (ITAP). Interviewed April 3, 2010.

- Spanoudi Despina, member of Boetian Coalition for the Environment. Interviewed July 21, 2010.

Representative of political party

- Vitoraki Maria, member of Ecologists Greens & member of ITAP. Interviewed April 19, 2010.

Journalists

- Kovaios Vasilis, editor of the local newspaper "Η Φωνή του Ωρωπού". Interviewed May 10, 2010.

- Giannarou Lina, journalist of the national newspaper "Καθημερινή". Interviewed May 31, 2010.

- Elafros Giannis, journalist of the national newspaper "Καθημερινή". Interviewed May 31, 2010.

Scientists

- Riza Elena, epidemiologist and member of Prolepsis. Interviewed September 30, 2010.

- Stoltidi Melina, sociologist and member of Prolepsis. Interviewed May 3, 2010.

- Giannoulopoulos Panagiotis, hydrogeologist and member of IGME. Interviewed April 21, 2010.

- Zafeiriou Vagelis, psychiatrist and a member of the Medical Association of Athens. Interviewed June 19, 2010.
- Kountouri Phoibi, Professor in the Department of European and International Economic Studies at the Economic University of Athens. Interviewed April 21, 2010.
- Economou Maria, Professor in the Department of Geology at the University of Athens. Interviewed April 21, 2010.
- Fytianos Constantinos, Professor in the Department of Environmental Chemistry at the Aristotle University of Thessaloniki. Interviewed May 19, 2010.

Local residents

Participant 1 is a 39 years old woman, mother of two children, resident of Oinofyta since she was in primary school. In the last three years, three of her family members died from cancer as well as many other residents of Oinofyta. She welcomed me in her home and she spoke without fear or limitations, wanting to make the problem of the region as widely known as possible. The cancer does not seem to frighten her. The thing that infuriates her the most is that nobody dares to discuss about how to solve it and keeps it as a secret behind a closed door. She doesn't't believe that smoking caused the cancers, and she protects herself by the products of the region and the water. Trying to remember all those who died from cancer she realizes what they had in common; they were all people locked to themselves and did not say anything about their disease. She is optimistic about the reversibility of the situation and would love to leave everything behind. Interviewed May 24, 2010.

Participant 2 is a resident of Oinofyta, around 45 years old. He lives with his wife and 2 children and he had health problems (adenocarcinoma of stomach) which now belong to the past. He was a smoker but he is sure that it wasn't this to blame for his situation, even though many were telling him so. Now he pays attention to what he eats and drinks. If there wasn't a problem with his health he believes that he would not speak out. In his eyes everybody is guilty. In the future he would like to see coexistence between industrial plants and residents but he would not bet on it.

Interviewed April 19, 2010.

An immigrant, just before his 30s, working in one of the regions factories is participant 3. In the brief discussion that we had, he did not seem to be aware about the problem in the area despite living at Oinofyta for a year. He eats local products and drinks from the tap water. Participant 4 is a resident at Oinofyta since he can remember himself. He worked for several years in the area's factories, but could not bare the idea anymore that he was putting himself in danger and sought work elsewhere. From the time that he heard that the water is polluted he began to pay attention to what he eats and buys. While explaining to me how the factory works, he realized the negligence and indifference of the people responsible for running the factories. With a pessimistic tone he told me that only when these people will start to caring about this place, this place will be saved. Interviewed April 19, 2010.

I had a brief discussion with participant 5, a 17 year old student from Oinofyta which appeared to be well informed by her school for the problem in the area and very sensitive about it. In her house they used to eat without any concern but now each time they eat they pause to think whether it's poisoned. She and her classmates would like to leave the area because they can't do anything to change the situation. Pessimistic was also participant 6, the 41year old former factory worker at Oinofyta and resident of Chalkis. Analyzing the operation of the factory he pointed out the indifference of the owners. He realized the problem early on, seeing his colleagues going for routine medical tests and not coming back the following day.

Residents of Oinofyta were informed by the two activists, Panteloglou and Oikonomidis, those who worked at the factories realized by themselves what was going on, while residents of Oropos were informed by the local newspapers which for many years have been covering the issue. Participant 7 is a 22 years old student. She recalls stories from her parents and grandparents describing their 'carefree years'. Now she only listens to 'No' - 'Do not eat that', 'Do not drink this' and 'Do not go for a swim there'. She believes that surely there are other causes of cancer, it can be smoking the diet – or maybe not. She does not know what can be done to improve the situation, but stresses that the health of the residents should have priority.

Participants 8 & 9 are close to 70, a seasonal and a permanent resident of Oropos respectively. Both of them can not believe that the river, previously bustling with life, has become so dirty. They must constantly think what they eat and in what danger are their children and grandchildren. In order to protect themselves they shop most of their food from Athens. Both of them have heard the past 20 years a lot of promises but they are still hoping that things will improve. Finally participant 10, aged 55, is a seasonal resident of Dilesi. In 2000 she bought her country house there to get away from 'dirty' Athens and arrived in an environment even more polluted. 3-4 years ago she was in her cottage every weekend, now she goes only once a year. She concludes that the situation will not improve; the special interests will always exist. She would like to see the environment clean and not to hear of illnesses.

Appendix D: Cancer registry of Panteloglou & Oikonomidis[115]

	First name	Year of death	Age of death	Cause of death	Cancer (yes/no)
1.	Stavroula	2006	86	Stroke	N
2.	Chrisoula	2006	75	Cardiac arrest	N
3.	Dimitrios	2005	70	Respiratory failure	Y (lung cancer)
4.	Dimitra	2005	89	Heart and respiratory failure	N
5.	Galina	2005	48	Cardiac arrest	Y (cancer of the large intestine)
6.	Ioanna	2005	68	Adenocarcinoma of kidneys	Y
7.	Evagelos	2005	23	Serious body injuries (car accident)	N
8.	Georgios	2005	57	Respiratory failure	N
9.	Pavlos	2005	61	Unknown causes	N
10.	Maria	2005	87	Heart and respiratory failure	N
11.	Vasileios	2005	86	Old aged	N
12.	Ioannis	2005	32	Serious body injuries (car accident)	N
13.	Anastasios	2005	70	Stroke	N
14.	Alexandra	2005	89	Pulmonary edema, heart failure	N
15.	Athanasios	2005	70	Cardiac arrest	Y
16.	Dimitra	2004	95	Pulmonary edema,	N

[115] The document is in my own translation.

				heart failure, old aged	
17.	Spiridoula	2004	72	Cardiac arrest	N
18.	Georgia	2004	84	Cancer	Y
19.	Anastasios	2004	76	Upper respiratory infection, heart & kidney failure	N
20.	Anna	2004	62	Serious body injuries (car accident)	N
21.	(newborn)	2004	0	Unknown causes	Y (according to ear-witnesses)
22.	Sotiria	2004	73	Coronary disease	N
23.	Georgios	2004	68	Cancer	Y
24.	Georgios	2004	60	Cardiac arrest	N
25.	Athanasios	2004	78	Cardiac arrest	N
26.	Vasiliki	2004	73	Cerebral edema, respiratory infection	N
27.	Antonia	2004	89	Stroke	N
28.	Alexandra	2003	72	Pulmonary edema, coronary disease	
29.	Stiliani	2003	84	Intracerebral hemorrhage	N
30.	Efstathia	2003	67	Acute aortic dissection	N
31.	Eleutherios	2003	44	Myocardial infarction	N
32.	Paraskevi	2003	57	Cerebral edema	N
33.	Nikolaos	2003	59	Septic shock, pneumonia	Y (brain cancer)
34.	Konstantina	2003	41	Cardiac arrest	N
35.	Alexandra	2002	90	Cardiac arrest	N
36.	Ioannis	2002	80	Prostate cancer with generalized	Y

				metastases	
37.	Eleni	2002	90	Cardiac arrest	N
38.	Vasiliki	2002	69	Hepatic coma by hepatitis C	Y
39.	Eleni	2002	68	Cardiac arrest, heart failure	N
40.	Evagelia	2002	81	Cardiac arrest, heart failure,	N
41.	Konstantinos	2002	66	Cardiac arrest	Y (stomach cancer with metastases)
42.	Konstantinos	2002	78	Coronary disease, cardiomyopathy	N
43.	Charalampos	2002	68	Heart failure, hepatic coma, hepatocellular carcinoma	Y
44.	Athanasios	2002	62	Acute renal failure, cardiac arrest	Y (according to ear-witnesses)
45.	Panayiotis	2002	89	Heart failure	N
46.	Anastasios	2002	88	Heart failure, stroke	N
47.	Ioannis	2002	82	Stroke	N
48.	Eleftheria	2002	81	Multiple organ failure	N
49.	Patra	2002	86	Cardiac arrest, pulmonary edema	N
50.	Kanellia	2002	85	Heart failure, respiratory infection, stroke	N
51.	Alexandra	2002	83	Stroke, pulmonary edema	Y (according to ear-witnesses)
52.	Dimitrios	2001	68	Left coronary artery	N

				thrombosis	
53.	Ioannis	2001	83	Cardiac arrest	N
54.	Konstantinos	2001	31	Unknown causes	N
55.	Omiros	2001	67	Cardiac arrest, cancer	Y (lung cancer)
56.	Michail	2001	56	Cancer	Y (lung cancer)
57.	Grigorios	2001	66	Cancer	Y (cancer of the large intestine)
58.	Athanasios	2001	48	Cardiac arrest	Y (brain cancer)
59.	Chariklia	2001	74	Multiple organ failure	N
60.	Eleni	2001	74	Cardiac arrest	N
61.	Eirini	2001	81	Heart failure	N
62.	Evagelos	2001	72	Heart failure	N
63.	Theodora	2001	51	Serious body injuries (homicide)	N
64.	Konstantinos	2001	51	Serious body injuries	N
65.	Antonios	2001	61	Cancer	Y (lung cancer)
66.	Eleni	2001	79	Cardiac arrest	N
67.	Kiriakoula	2001	72	Cardiac arrest	N
68.	Ioannis	2001	57	Serious brain injuries	N
69.	Nikolaos	2001	26	Multiple organ failure, cancer	Y
70.	Georgios	2001	65	Stroke, heart failure	N
71.	Vasilis	2000	20	Fractures, internal bleeding	N
72.	Stamatia	2000	75	Unknown causes	N
73.	Dimitra	2000	92	Cardiac arrest	N
74.	Alexandra	2000	50	Cardiac arrest	Y (brain cancer)
75.	Aristidis	2000	80	Prostate cancer	Y
76.	Georgios	2000	28	Serious body injuries (car accident)	N

77.	Othonia	2000	83	Heart failure	Y (pancreatic cancer)
78.	Dimitrios	2000	66	Acute myocardial infarction	N
79.	Anastasios	2000	75	Heart failure	N
80.	Agathoula	2000	77	Heart attack, pulmonary edema	N
81.	Ioannis	2000	70	Cardiac arrest	N
82.	Nikolaos	2000	89	Acute pulmonary edema	N
83.	Alexandros	2000	62	Cardiac arrest	Y (adenocarcinoma of the stomach)
84.	Konstantinos	2000	68	Lung density	N
85.	Sophia	2000	73	Hepatic coma	N
86.	Paraskevi	1999	85	Cancer	Y (pancreatic cancer)
87.	Afroditi	1999	88	Stroke	N
88.	Konstantinos	1999	52	Lung congestion	N
89. [116]	Arsenios	1999	72	Stroke	N
90.	Ilias	1999		Old aged	N
91.	Ilias	1999			N
92.	Chrysoula	1999		Parkinson	N
93.	Athanasios	1999			N
94.	Sanoula	1999		Car accident	N
95.	Dimitrios	1999		Stroke	N
96.	Georgios	1998		Cancer	Y
97.	Maria	1998		Cancer	Y

[116] After this entry, the document becomes more synoptic. For instance the column of 'age of death' is not filled.

98.	Thomas	1998		Cardiac arrest	N
99.	Georgios	1998			N
100.	Ioannis	1998			N
101.	Maria	1998			N
102.	Athanasios	1998		Old aged	N
103.	Panayiota	1998		Old aged	N
104.	Vasileios	1998		Cardiac arrest	N
105.	Antigoni	1998		Old aged	N
106.	Maria	1998			N
107.	Chryso	1998			N
108.	Euthalia	1998			N
109.	Pavlos	1997			N
110.	Olga	1997		Old aged	N
111.	Georgios	1997			N
112.	Nikolaos	1997		Cancer	Y
113.	Dimitra	1997		Old aged	N
114.	Emmanouil	1997			N
115.	Vasileios	1997		Leuchaimia	Y
116.	Konstantinos	1997			N
117.	Sotirios	1997			N
118.	Savvas	1997			N
119.	Dimitrios	1997		Stroke	N
120.	Athanasia	1997		Old aged	N
121.	Dimitrios	1997		cancer	Y
122.	Konstantinos	1997		Cancer	Y
123.	Dimosthenis	1996			N
124.	Dimitrios	1996		Cardiac arrest	N
125.	Georgia	1996		Cancer	Y
126.	Vasiliki	1996		Old aged	N
127.	Maria	1996		Old aged	N

128.	Konstantina	1996		Old aged	N
129.	Stavros	1996		Heart failure	N
130.	Taxiarchis	1996		Old aged	N
131.	Dimosthenis	1996		Cancer	Y
132.	Christos	1996			N
133.	Ioanna	1996			N
134.	Ioanna	1996			N
135.	Georgios	1996		Car accident	N
136.	Stavroula	1996		Homicide	N
137.	Georgia	1996		Old aged	N
138.	Anastasia	1996		Cardiac arrest	N
139.	Theodoros	1996		Heart failure	N
140.	Anastasios	1996		Stroke	N
141.	Stavros	1996		Old aged	N
142.	Panayiota	1996		Old aged	N
143.	Sophia	1995		Old aged	N
144.	Christos	1995		Old aged	N
145.	Giannoula	1995		Old aged	N
146.	Seraphim	1995		Navy accident	N
147.	Alkistis	1995		Car accident	N
148.	Dimitra	1995		Old aged	N
149.	Konstantinos	1995		Cancer	Y
150.	Stamatia	1995		Old aged	N
151.	Evagelia	1995		Old aged	N
152.	Christos	1995		Cancer	Y
153.	Dimitra	1994		Stroke	N
154.	Maria	1994		Old aged	N
156.	Theodoros	1994		Old aged	N
157.	Stavros	1994		Old aged	N
158.	Sophia	1994		Car accident	N

159.	Konstantina	1994		Old aged	N
160.	Georgios	1994		Cancer	Y
161.	(newborn)	1994			N
162.	Georgia	1994		Old aged	N
163.	Eleni	1993		Old aged	N
164.	Konstantinos	1993		Old aged	N
165.	Evgenia	1993			N
166.	Aspasia	1993			N
167.	Efstathios	1993			N
168.	Evagelos	1993		Cancer	Y
169.	Panayiotis	1993		Cancer	Y
170.	Konstantinos	1993		Cancer	Y
171.	Nikolaos	1993		Cardiac arrest	N
172.	Sophia	1993		Old aged	N
173.	Paraskevi	1993		Old aged	N
174.	Christos	1993		Cancer	Y
175.	Evaggelos	1993			N
176.	Chrusoula	1992		Old aged	N
177.	Aikaterini	1992		Old aged	N
178.	Kali	1992		Old aged	N
179.	Eleni	1992		Old aged	N
180.	Aikaterini	1992			N
181.	Anastasia	1991		Old aged	N
182.	Maria	1991		Old aged	N
183.	Alexandros	1991		Old aged	N
184.	Aikaterini	1991		Old aged	N
185.	Evagelia	1991		Old aged	N
186.	Athanasios	1990		Cancer	Y (Prostate cancer)
187.	Ageliki	1990		Old aged	N

188.	Panayiotis	1989		Car accident	N
189.	Spiridon	1989		Stroke	N
190.	Ilias	1989		Car accident	N
191.	Dimitra	1989		Car accident	N
192.	Georgios	1989		Old aged	N
193.	Lemonia	1989		Old aged	N

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