Water Management, Expertise and Techno-politics in Energy and Agriculture in Greece, 1940–2014: The Case of the Acheloos River

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INTRODUCTION

On 19 January 2014, the journal *Eleftheria* (Ελευθερία), an historic press in the city of Larissa at the heart of the prefecture of Thessaly, published an article entitled 'Acheloos: Wish or Curse?'.[1] The article reported the continuing conflict over the dams and suggested tunnels for the diversion of the river Acheloos. The renowned project of Acheloos' diversion has been one of the major incomplete technological infrastructures in modern Greece, and this debate has frequently featured both in the local and national press. Since the 1970s it has been a contested project and an ongoing, technological, political and cultural struggle between supporters of the diversion (comprising communities of power engineers, hydraulic and civil engineers, farmers' associations, local politicians and political parties in Thessaly) and its opponents. There have been fierce legal battles and court cases in Greece and the European High Court.[2]

Acheloos is the second longest river in Greece at a length of 280 km and the one with the highest mean annual flow (137 m^3/s).[3] In Greek mythology, Acheloos was the god and father of the living rivers and since antiquity the river's history, function and role for the population of the adjacent regions and the environment has been part and parcel of the collective memory. The river basin is estimated to be 5,472 km^2 and is located in Western Greece, while the river crosses five different prefectures: Aitoloakarnania, Karditsa, Arta, Trikala and Evritania. Its source is located at Mount Lakmos on the south side of the Pindos mountain range, and it eventually flows into

the Ionian Sea. It is estimated that the annual outflow of the river is between 2.5–3.5 billion m^3 of water. The first 160 km is known as the upper part of the river and the management of water in that part is what has triggered contemporary conflicts (see Map 1). In the lower part of the river, dams were planned and built from the 1960s.

The river basin includes four natural lakes (Trichonida, Lysimachia, Amvrakia and Ozeros), a series of artificial lakes due to four dams (Kremasta, Kastraki, Stratos I and II) as well as an estuary with wetlands and lagoons. These are of high environmental importance, have been protected by the Ramsar Convention and belong to the NATURA 2000 zones of environmental importance and conservation.[4] The majority of the population residing in the areas around the river basin work in the agriculture sector, while the lagoons have been used extensively for aquaculture. In the water drainage area in the lower part of the river there is an extensive irrigation and drainage network of

MAP 1: Map of Greece showing the location of Acheloos in Western Greece. The arrow points to the site of the contested diversion project on the upper part of the river.

Source: Εκτροπή των υδάτων από τον Αχελώο στην Θεσσαλία, 1979

canals: more than 40 per cent of the land in the region of Aitoloakarnania has been used for agriculture purposes.[5] As a key cotton production area Thessaly needed water for furthering the intensification of the relevant farming activities, so the diversion of the river has been conceived as a major project to secure irrigation water for the area. Currently, Thessaly consumes one-fifth of the country's water, fostering long-term pressures for the implementation of the diversion as critical infrastructure work.[6]

The case of the water management of Acheloos has acquired an emblematic status in Modern Greek history as a series of public infrastructures linking public discourses of 'development', 'modernity' and relevant dominant ideologies and technological determinist approaches, within the contemporary political history of Greece. The present study aims to bring together the history of technology with environmental history, using the case of the river Acheloos to examine the way that natural common resources and technological infrastructures co-produced energy, agriculture and environment. We reconstruct the story of the use of the river water, and the engineering plans, visions and the ideologies that were inscribed on them, from even before the Second World War. Following existing historiography, we argue that natural common resources acquired meanings through technologies and technological infrastructures that engineers and experts proposed or contested.

The article is directly influenced by the groundbreaking approach of Disco and Kranakis, who recently provided an historically informed approach to aid understanding the concept of natural common resources. They attempt to understand natural common resources within the context of technological regimes, industrial capitalism and national policies. In doing so, they introduce the term 'resource space' to show that the space of natural common resources is not defined only by geomorphologies but also by technologies, politics and natural resources. They equally argue that we need to historicize the formation of 'resource spaces', the political process of their configuration and to unravel the changes in the meanings and the conceptualization of natural common resources under different periods and within different socio-technical regimes.[7] Disco and Kranakis emphasize technologies that expand or shrink 'resource spaces', that include and exclude human and non-human actors. In this framework, the 'technization' of common resources can become the condition for defining new areas of tension between the state, local communities and authorities. The approach raises questions about who controls 'resource spaces' as well as the risks and uncertainties that technology and industrialization might introduce for the environment due to the increase of scale and the complexity of socio-technical ensembles.

In this historiographical framework, we are studying the role of experts in the configuration and reconfiguration of Acheloos as 'resource space'. We argue that until the late 1970s the management of water and relevant experts' discourses prioritized the hydraulic potential of the river for energy purposes, and that since this period, the diversion of the river has been linked both to the national priorities relevant to agriculture, and discourses of peripheral 'development'. In the 1990s the project of river diversion faced fragmentation due to the reactions and different understandings of Acheloos' 'resource space' by national and transnational regulatory and legislative expert institutions, engineering and environmental experts, as well as by civil society actors.

WATER, TECHNOLOGICAL DETERMINISM AND THE MANAGEMENT OF NATURAL SOURCES IN TWENTIETH-CENTURY GREECE

> The productive use of water for each country and above all for poor countries like Greece, is of major importance for the welfare of the population. We can argue that the resolution of economic problems of water management can be the necessary condition for the growth of the country. This is a well-known principle that bypasses any other aspect of the problem.
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> ['Γενική έρευνα της υδατικής καταστάσεως της Ελλάδας', *Τεχνικά Χρονικά*, 1942: 35]

In January 1942, amidst the German occupation, the engineering journal *Technical Chronicles* (*Τεχνικά Χρονικά*) published a report on water management which was presented as the national cornerstone of Greece's growth and development. The report was pessimistic about the industrial prospects of the country. It argued that trade transactions with foreign countries, and engineering innovations that exploited natural resources and maximized economic energy production could restore the lagging industrialization of the country (which resulted from the pitfalls and drawbacks of Greece's geography). The report, written and signed by technologists in the Department of Public Works in the Ministry of Transport, made clear that technological and scientific research was necessary for the 'rational' management of water and the implementation of a national water policy. According to the report, techno-scientific rationalism would increase productivity and would contribute to the systematization of approaches, and the decrease of any fragmented responses to problems and issues that emerged as a result of local needs. In turn, technology and the technocratic understanding of the problems would provide the setting for the organized use of water resources and would provide an organized response to natural disasters like floods.[8]

These opinions represented the principal conceptualization and ideological understanding of socio-technical problems and their solutions by water management infrastructures in twentieth-century Greece. Hydraulic works – the construction of large-scale infrastructures for water management oriented towards water supply, irrigation or energy – started to attract the interest of the technical world in 1917 following the establishment of the Department of Public Works in the Ministry of Transport. This department became the centre of national policymaking for technological infrastructure. Harbours, bridges and hydraulic works were planned by that department as an attempt on the part of the state to rationalize its policies and technological infrastructures. There was an emphasis on the importance of hydraulic research, as demonstrated in 1917 by the establishment of the Research Office of Hydraulic Works (Γραφείο Μελετών Υδραυλικών Έργων).[9] The office facilitated intensive projects after the First World War and emphasized the systematic management of water even further after 1922.

The early years of the twentieth century marked a dominant discourse that linked water, the 'God-given source' with the reconstruction and the development of Greece. The engineers' arguments were influenced by the emerging technocratic ideology. Initially water supply was the major concern among the technical community, yet by

the eve of the Second World War the use of hydraulic resources and the construction of relevant public works were at the centre of the engineers' attention.[10] A major public work of symbolic, political, social and technological importance was the water supply of Athens from the artificial lake of Marathon, constructed at the meeting point of the Varnava and Haradrou rivers.[11] Engineers promoted the technocratic vision[12] of building a national economy based on the use of technology in industrial production and social governance as part of Eleftherios Venizelos's prime ministerial agenda for bourgeois modernization at a time of increasing urbanism and population exchange with Turkey.[13]

Particularly prominent among the engineers was Theologos Genidounias, who played a key role in securing engineering consensus over the appropriateness and feasibility of the work, and in persuading the government of its viability. For Genidounias, the prospective artificial lake was proof of the ability of the technocratic way of understanding and ordering the world. Educated at the Eidgenossische Technische Hochschule in Zurich and with much experience in hydraulic works in Turkey and Egypt, Genidounias wanted to see extensive public works and irrigation channels for agriculture, the use of hydraulic potential for industrial production, and the creation of extensive water supply networks for urban centres. Genidounias believed that post-war economic reconstruction would only be achieved with engineers at the forefront of the reconstruction and with public works as a governance tool. He argued that:

> The realization of the national wealth is a wide program whose initiation we should not postpone. We ought to take immediate action if we want to maintain what we have achieved so far and we aim to be included among the developed and progressed countries and those that do not want to vanish. For that we have the appropriate human intellect.[14]

In the interwar period the interest in the hydraulic potential of the country remained strong yet attempts at implementation remained fragmented. Water management and the optimal use of river water was linked mostly with the prospects of hydroelectricity and irrigation. Rivers, lakes and streams were conceptualized as sources of hydroelectric power only for the regions of the two largest urban centres of Athens and Thessaloniki. In 1922, Genidounias suggested using three streams in the North Peloponnese to generate electricity for Athens.[15] The engineering company Galileos had suggested the use of Stymfalia Lake for hydropower generation and electricity transmission in Athens. In 1932 in his sixty-six-page treatise on the hydraulic potential of Greece, electrical engineer Alexandros Galatis argued that hydraulic public works would be necessary for the national economy. Galatis argued that Stymfalia should be used for electricity production for the Peloponnese while Ladonas in the Peloponnese, and Fidaris, Mornos and Acheloos in the prefecture of Aitoloakarnia could be used for producing electricity in order to supply Athens. In northern Greece, he identified the river Aliakmonas as a major source of hydraulic power, yet electricity demands in Thessaloniki were low enough to prevent investments.[16]

During the years of the Greece's reconstruction post-Second World War – a period of 'technological nationalism' – the use of natural resources for power became a core issue of concern.[17] Politically centre-right engineers like Theodore I. Raftopoulos,

who was consultant to the National Bank, suggested a plan for an electricity network that considered the Desaretian lakes on the northern borders of Greece as a Greek natural common resource. On the other hand, left-wing engineers, while arguing in favour of large-scale electricity generation viewed the Desaretian lakes as a transnational natural resource that should be exploited by several Balkan countries. Finally, the American engineers, who were considered more authoritarian, credible and 'rational', ousted this proposal due to mountainous morphology and the lake's proximity to communist countries.[18] After the Second World War the American consulting company EBASCO tried to combine both interests by promoting a plan of comprehensive electricity production that would be based on native natural resources: water and lignite (coal). The necessary infrastructures for the water management of the rivers Agras, Ladon, Acheloos and Louros were conceptualized as critical infrastructures in an integrated system capable of providing energy by using indigenous energy resources.[19]

In 1950 with the establishment of the Public Power Company (PPC) and the design of the national electricity grid, these plans became part of the national energy programme, and gradually hydroelectricity was integrated into the energy mix of Greece. The spirit of 'technological nationalism' became part of the public policy paradigm that prioritized the use of native natural resources in electricity production, and most importantly lignite and water.[20] The paradigm and the relevant public political discourses were forged further during the 1970s; particularly after the energy crisis of 1973 when the use of oil started to decrease dramatically.[21] PPC's hydroelectric projects were designed to serve both for electricity production and irrigation because from 1959 onwards, five-year state planning programmes were implemented for the increase of the number of irrigated farms.[22]

In the late 1970s the joint issue of environmental impact and liabilities started to emerge as a consideration in the management of natural resources (see also Chapter 8 in the present special issue about public conflict over the nuclear power station in Karystos). Yet still the paradigm of water management in which large-scale hydraulic infrastructures should be a priority remained strong in public policies.[23] In 1996, Professor Themistoklis Xanthopoulos, major hydraulic engineer at the National Technical University of Athens and with a prominent role in technological policy of relevant infrastructures during the preceding two decades, promoted the ideology of 'technological nationalism', arguing that large-scale hydroelectric infrastructures were and would be public infrastructures of multiple purposes.[24] He argued that large-scale hydroelectric infrastructures were necessary for the management of water resources, because the low rate of exploitation of water resources and the hydraulic potential of the country, meant that large-scale dams should be considered as major critical infrastructures both for energy and the agriculture sector, with the aim of increasing the numbers of irrigated farms in the plains of Central and Northern Greece. Xanthopoulos argued that technological infrastructures should be considered as major factors for national economic growth. While acknowledging the contribution of small dams in the management of water resources he stressed that the period of large-scale infrastructures was far from being over. In the late 1990s Xanthopoulos promoted the appropriation of science-based 'rational' water management models and practices. He argued that in the emerging liberal European paradigm of water

management, and the market-led paradigm, the emphasis on scientific principles of water management would result in a cost-efficient and effective management of the native water resources that would consider the 'environmental cost and impact' of the infrastructures.[25] As we shall see in the case study the latter has been a major consideration for legislative and regulatory national and transnational institutions. Furthermore, it would acquire different framing by different actors, stakeholders and knowledge communities.

WAKING THE 'SLEEPING GIANT' IN POST-WORLD WAR GREECE: COMPETING VISIONS AND TECHNO-SCIENTIFIC TENSIONS

Dams, transmission lines and the river

Early surveys and studies of the potential of Acheloos were conducted during the interwar period. In 1923, the Swiss engineer Senn conducted a study of the hydraulic potential of the rivers of Mornos and Acheloos in the prefecture of Aitoloakarnania. It was the same period that Alexandros Sinos, Professor of Technological Mechanics at the National Technical University, was employed by the state to conduct studies of the rivers.[26] However, the first proposal and visionary plan was developed in 1925 by Apostolos Koutsokostas, professor in the National Technical University of Athens. Acheloos was presented as a critical infrastructure for increasing the productivity of agricultural land in Thessaly. In August 1936, just days after the establishment of the dictatorship of General Ioannis Metaxas – a nationalist and fascist regime – the government permitted the American engineering companies Hugh L. Cooper and Chemical Construction Corporation of New York to conduct studies on Acheloos's hydraulic potential.[27] In 1938 their report identified the promising hydraulic potential of the river for power generation.[28] Two years later, on 24 January 1940, the dictatorial regime of Metaxas signed a contract with the Hellenic Hydroelectric and Metallurgical Company (founded by the two American companies and American banks) for the exclusive use of the water and the banks of Acheloos for a period of seventy years. The construction of three dams and hydroelectric power stations in the locations of Kremasta, Kastraki (known as Kriekouki) and Prevetzas were specified in the contract. Furthermore, the agreement gave the company rights to establish electrometallurgical and electrochemical industries in the area. Plants for the production of nitrogen fertilizers and aluminium were planned: the latter due to the abundance of the necessary mineral sources in the area.[29]

The plans did not materialize due to the advent of the Second World War, but from this time onwards, the Acheloos River became part of all suggestions and energy studies that took place during the Nazi occupation (1941–1944)[30] and the following Civil War (1946–1949).[31] Yet during and just after this period, left-wing economists and engineers severely criticized the agreement that gave exclusive rights to a private company. Dimitris Batsis, a Marxist economist, lawyer and scholar, argued that the so-called 'Cooper contract' was an imperialist achievement towards the exploitation of the country's natural resources and its industrial potential. The

combination of power generation for industrial purposes made the contract profitable for its foreign capital and monopolist interests.[32] The contract was part of the public policy of a dictatorial and absolutist regime that promoted the interests of foreign capital through interventionist policies.[33] Similarly in 1945 the politically left-wing engineer Stavros Stavropoulos called for the '[c]ancellation of the contract today with no prior discussion with anybody'.[34] Both Batsis and Stavropoulos demanded national planning and nationalized industrial units and development patterns.

In 1950 the American company EBASCO recommended the establishment of a nationally integrated transmission and distribution system. The system considered Acheloos to be an important natural resource and argued that it should be used to secure the stability of electricity production, the autarky of the electricity regime and the independence of Greece from imported oil, as in the pre-Second World War period of oil-fuelled plants. Kremasta was recommended as the site for the establishment of the dam. EBASCO's network design plans made the Kremasta dam an indispensable piece of infrastructure for the implementation of the substitution programme of oil-based power plants. Acheloos was thus conceived as a natural resource that would be critical in the early phase of system integration and electricity grid building. The report suggested that the Kremasta dam be completed by 1955. In order to further emphasize the necessity of the project EBASCO argued that the Kremasta dam would contribute substantially to flood control in the lower part of the river.[35] It was an attractive argument since the drainage area was agricultural and the rural population in the adjacent region derived its income from farming and livestock breeding.[36]

By the late 1950s consulting engineering companies and state engineers framed the management of the water of Acheloos as one related predominantly to energy production. The PPC implemented its technocratic plans for a comprehensive exploitation of the hydraulic power of the Acheloos and Tavropos rivers. The intervention in Acheloos would include three dams along the lower part of the bank of the river in the regions of Kremasta, Kastraki and Stratos in the Acheloos basin in the prefecture of Aitoloakarnania. The dams in Stratos and Tavropos were planned with the aim of increasing the energy production potential of the 'resource space' of the river. The PPC planned further exploitation of the hydraulic dynamic of Acheloos by constructing two more dams in Avlaki and Mesohora.

Attracted by the increased interest of the PPC to develop a programme of exploitation of the hydraulic potential of Acheloos, consulting companies from Europe[37] – mostly from Italy[38] and France[39] – expressed interest in providing consulting and contracting services to the Greek state in that phase of the country's energy programme.[40] Despite the strong interest by European consultancies, the established role in energy policy by American engineering companies such as EBASCO, who had forged a trust relationship with the Power Company, meant prioritization was given to American consulting services. It was the American engineers who emphasized the emerging technocratic ideology in which large-scale infrastructure was expected to increase the productivity of the country.[41] In this framework, the construction of the Kremasta dam, the so-called King Paul Dam, started in 1959 and by 1965 was completed with four energy production units.

From 1960 to 1966, the Engineering Consultants, Inc. of Denver Colorado, functioned as the design consultants, supervisors and coordinators of the whole project.[42] They suggested and constructed a fill-type dam that remained the highest such damn (at 160 m) in Western Europe during the 1970s. By early 1963 a fifth production unit with a reversible turbine was being discussed for the power plant at Kremasta.[43] Its introduction was deemed as important because it was conceived as critical infrastructure not only for the stability of the whole electricity system of the country but also for the introduction and economic viability of prospective nuclear power stations.[44] Papamatheakis, a power station engineer of the PPC, in his report to the Company's Department of Technology Planning, argued that: '. . . from the years 1974 or 1975 the Corporation would be forced to nuclear power for the base loads of covering demand'. He continued by stressing that '[a]fter 1974 in an increasing percentage the PPC would need integrate more hybrid units for irrigation and power production in order to increase the load of nuclear units . . .'.[45] He had reservations over the premature integration of a fifth unit, believing that it might result in the increase of the cost of production due to the necessary investment. Yet still – in an ironic way – he understood that water was a way to secure nuclear power production in the energy mix of Greece, since electric power from any prospective nuclear station that for technical reasons had continuous function, could be directed to that unit to work in the reverse mode for irrigation purposes. In the first half of 1966, the PPC considered and designed a high voltage transmission line from the Acheloos plant to the metropolitan area of Athens. The line was designed as a critical infrastructure to secure, first, the exploitation of the hydraulic potential of the river in the most optimal way; secondly, the energy demands of the metropolis as it was projected for the 1990s; and thirdly, as the best way to interconnect the hydraulic complex of Acheloos with the prospective nuclear power plants that in the mid-1960s were intended to be established close to the capital.[46]

The reconceptualization of Acheloos as 'resource space' in the 1970s

The period of Colonel Georgios Papadopoulos' dictatorship (1967–1974) saw the reconsideration of the use of Acheloos. The Papadopoulos' regime was a political system with a clear anticommunist, nationalist and militaristic agenda and with populist economic and agriculture policies intended to overcome public reactions and opposition to the undemocratic government.[47] There were a series of foreign and local consultants who conceptualized and forged the expansion of the 'resource space' understanding of the river as a natural source for energy and agriculture. Engineering companies like Swiss Electrowatt (1968), the Canadian Surveyer, Nenniger and Chenever (SNC) (1972), Greek experts from the National Technical University of Athens, and the Doxiadis Consulting Engineering Company contributed to an alternate framing of the water management strategies for the Acheloos basin. They provided different understandings of the vitality of Acheloos in the much sought 'development' of the Thessaly region as well as the whole country. It was during the years of dictatorship that Thessaly, the major agriculture centre of Greece, began to take centre stage in the engineering plans and discourses surrounding the use of Acheloos.

In 1968 the Swiss company reported on the water management of Acheloos after the dictatorship's request. The Swiss company considered different scenarios for the irrigation and energy problem of Thessaly and linked it to Acheloos' water and to the management of the upper basin of the river, and the necessary dams and diversion tunnel. The Swiss company had also considered the scenario of no diversion and of solving the problem of water demand in Thessaly with the construction of five small dams (Krias Vrisis/Pineios, Pylis/Portaikos, Mouzaki/Pliouris, Smokovo/Sofaditis, Paleoderli/Enipeas) and relevant ponds, as part of a plan for the irrigation of 136,720 hectares of agricultural land. It was argued both technically and economically that the diversion would increase the uncertainty and the economic and technological risks. The engineers argued that the diversion would decrease the hydraulic potential of the river and would increase the cost of energy production from hydraulic power in the lower part of the river. They also acknowledged that the diversion would be a complex socio-technical project with major difficulties related to its finances as well as the socio-economic repercussions to the region of the lower Acheloos.[48] The Swiss report made the junta regime reconsider their plans for major interventions in the region in order to further boost agriculture in Thessaly. The Ministry of Public Works began giving greater attention to water management on the plain of Thessaly rather than the diversion project. Yet the diversion would encounter further major reconceptualization in the 1970s as Thessaly's water demand became a major concern for policymakers, engineers and the governments of the period.

In 1972, the link between the water management of Acheloos and the irrigation problems in the Thessaly basin became stronger through the intervention of the PPC engineer, Stylianos Magerias.[49] While reservations had already been expressed by foreign consultants for a combined use of the river for energy and irrigation, it was the visionary study and arguments of Magerias – an engineer who had come from the USSR and who was well-versed in the ideology of large-scale public infrastructures – that gave direction to the technocratic discourse.[50] In a report entitled 'Thessaly's development into a major energy, agriculture and river navigation centre of Greece' he laid out his visionary scheme that made provision for the diversion of three rivers: Upper Aoos, Upper Acheloos and Upper Arachos.[51] In this scheme, Thessaly was conceptualized as an energy production centre for the rest of Greece with the construction of large-scale hydroelectric stations. Magerias introduced a complex plan that involved a series of interconnected basins, of dams and diversions, the construction of a number of ponds and two artificial lakes, as well as the construction of five hydroelectric power plants.[52] The installed generation capacity would be 5 million KW securing energy of 6 billion KWH, an amount that would double the national electricity production at that particular moment.[53]

Thessaly was also to be an agricultural centre where intensive agricultural production would be facilitated by an extended irrigation system. According to his plan the irrigated fields would be 3.5–4 million km^2. In this scheme, the Pineios River would become the backbone of a complex of rivers with the parallel establishment of river ports in Trikala and Larissa to secure the connection of the agriculture area with the Aegean Sea.[54] There was an obvious difference between the proposals of Magerias and Swiss Electrowatt. Magerias believed that Thessaly's water resources were insufficient to secure the development of agriculture in the region. He developed a

plan based on the view that Thessaly could not be self-sufficient in water. Ideologically, his plan was informed by the dictatorship's priorities on large-scale technical public works, yet they were still contested within the engineering circles of the PPC.

On 14 December 1972 an ad hoc committee of eight engineers was established, led by the hydraulic engineer, A. Therianos.[55] The committee was composed of PPC engineers (including Magerias) with the exception of H. Meitanis from the consulting engineering company SNC. Magerias's participation and arguments were not enough to persuade his fellow committee members of the importance of the scheme – they expressed reservations over the economic feasibility of such a grandiose scheme with multiple diversions. Magerias did not sign the report produced by the committee, and accused Therianos, along with the director and subdirector of the PPC, of unfair treatment of his estimations and deliberate distortion of his plans.[56]

The result was that two competing visions developed inside the Power Company based on different priorities and understandings of a natural resource.[57] Hydraulic and power engineers of the PPC, such as Therianos, insisted that the diversion of Acheloos would reduce the hydraulic potential of the river from 2,060 GWH to 974 GWH.[58] In 1967, Therianos and other PPC engineers studied and planned the use of the water in the east part of Acheloos (the lower part of the river) through the establishment of a series of eight small-scale dams with flows variable from 5–24 m^3/sec and small hydroelectric installations. They stressed the importance of water management along the banks of the river.[59] In 1972, Therianos supported that solution, yet still he and the fellow members of the committee acknowledged Thessaly's needs for water. Instead of Acheloos's diversion they suggested the diversion of the small Agrafiotis tributary to the Tavropos River, the construction of a big dam of 175 m height and a tunnel of 17 km for the diversion of 6 m^3/sec to Thessaly.

The estimated flow of this design was very low in comparison to Magerias's plans for a diversion of 75 m^3/sec. Magerias presented a view of Acheloos as a natural common resource that could be a vital source not only for the development of Thessaly but also of the whole country via hydropower and water supply for the intensification of agriculture and large-scale farming. He argued that national development would be underpinned by the formation of a corridor that would link the capital, Athens, to Thessaloniki, the second largest urban centre, via Larissa, the major city of Thessaly. He believed that the plan for a high-speed railway interconnection between Athens and Thessaloniki, with links to the European railway networks as well as the upgrade of the port of Volos in south-east Thessaly would transform Thessaly into a vital agriculture and industry-based hub.[60] Magerias rejected the economic feasibility of water management based on small-scale dams and the separation of the basins and water resources of central Greece from those in Thessaly. He argued that Thessaly's increased water demand would have made any modest solution a drawback to the national plans for growth and prosperity. The postponement of the diversion would necessitate the construction of small dams of a short life cycle and increase the use of underground water by individual electric water pumps which would also increase energy demand.

Magerias's proposal, which emphasized the intensification of agricultural activity in Thessaly, was not the only alternative. Planners, engineers and economists had developed several alternate scenarios for the development and growth of the local

economy. In November 1972, the consultancy of Constantine Doxiadis was called by the junta regime to advise them on the appropriate national development policies.[61] They developed scenarios with modest agricultural sectors and the expansion of tourism and urban economic activities. Those scenarios would necessitate a different water management policy and would only prioritize the use of local water sources.[62]

In 1978 at a conference on the water potential of Thessaly a variety of approaches were suggested about water management and the role of Acheloos in regional and national 'development'. Those in attendance included engineers such as Panagiotis Kyriazis and Giorgos Hatzilakos, and economists such as Tortopidis (from Doxiadis Associates), who supported combined water management strategies with Acheloos's diversion along with dams in the rivers of Thessaly.[63] Also in attendance was the politically left civil engineer D. Konstandinidis, who supported a holistic approach with an emphasis on complexity and 'development'.[64] He questioned the importance of the intensification of agriculture and the economies of scale, prioritized quality and product value over quantity and mass production, and argued that new and more synthetic models were necessary to understand the problem. Konstandinidis maintained the view that the development of a region should be limited by its 'carrying capacity for a specific time period'. Establishing several parameters to define the 'carrying capacity' – economic feasibility of public investments, environmental capacity and socio-psychological impact – he suggested 'carrying capacity' was a tool for effective policy making and a means for persuading investors and most importantly the World Bank to invest in the problem.[65]

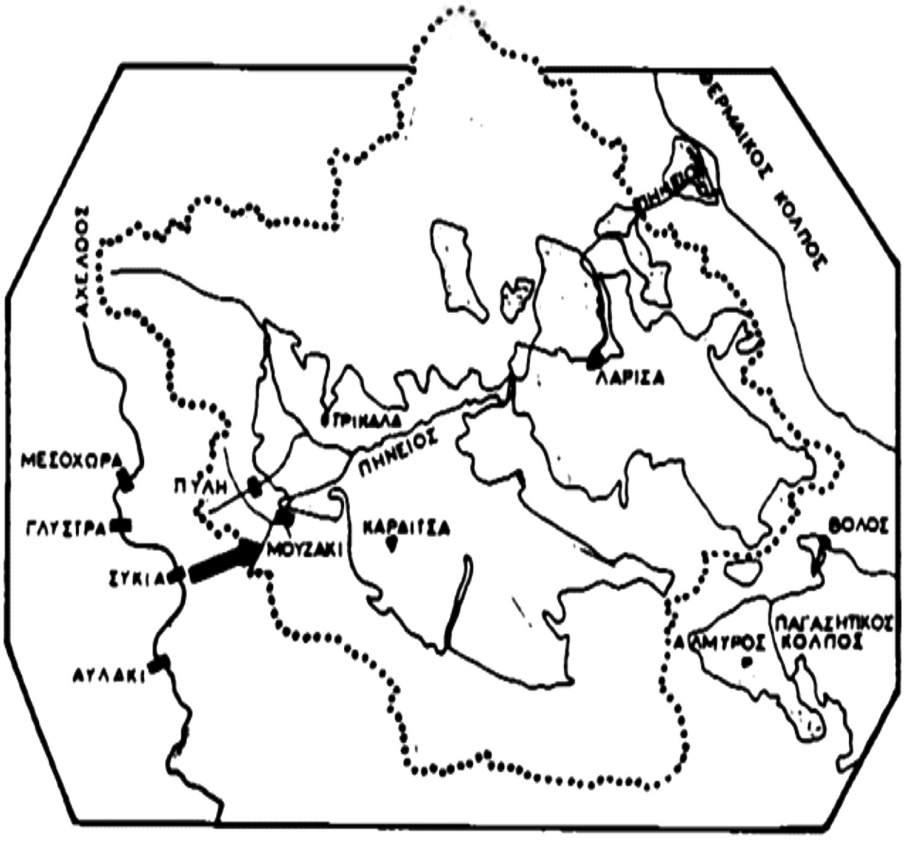
THE MULTIPLE FACES OF DIVERSION IN THE 1980s AND 1990s

During the 1980s and 1990s discussion over the water management of Acheloos acquired further momentum both within the scientific communities of civil engineers, environmentalists and water managers, as well as local communities, political authorities and legal institutions. Acheloos was considered to be key to Thessaly's irrigation problems. This view was furthered by the potential prospect of European funding following Greece's entry into the European Commission.

The conservative government of the New Democracy had, since 1979, accelerated the plans for Acheloos by ordering a new study of the project, while in 1981 the New Social Democrat (PASOK) government – with a strong populist profile – introduced the project in its agricultural policy agenda. On 13 March 1983[66] Andrew Papandreou, the socialist prime minister, in a highly political and symbolic gesture, announced the government's decision to commence the diversion during the commemoration of the Kileler Revolt.[67] The project made its way to the first five-year (1983–1987) national development programme as one of the priorities of regional and national development.[68]

The diversion project as announced by the socialists, was designed by PPC engineers in 1984 (see Map 2). It made provision for the construction of a water diversion tunnel (18.5 km) that would transfer 1.5 billion m^3 of water annually in order to irrigate more than 200,000 hectares. There was European opposition based

upon the feasibility of the project, and the economic repercussions on agricultural production, as well as the environmental impact.[69] The technical details of the proposal changed in the years between 1987 and 1994 as the design changed in a bid to secure European funding. A period of 'design fragmentation' occurred which resulted in the distinction between energy- and irrigation-related infrastructures within the project – energy infrastructures were thought more likely to secure European funding than irrigation development. By 1989 plans for irrigation had disappeared from funding applications submitted to the EU, and in 1994, the diversions were re-invented as an energy-oriented project. In the context of socialist populism with high political obligations to farmers and rural communities in Thessaly, the 'diversion' had to remain a viable project. Thus, the so-called 'short diversion' emerged with different technical specifications.



MAP 2: Plan with the location of the dams and the diversion tunnel to the Thessaly Plain in the 1980s. The diversion tunnel (the bold arrow) was designed from Sykia to Pefkofito. Dams were planned in Mesohora (Μεσοχώρα), Sykia (ΣυκιάΣυκιάΣυκιάΣυκιά) and Avlaki and hydroelectric power stations in Sykia (Συκιά) and Glistra (Γλύστρα).

Source: PPC, Consulting Board Report, v.1

In the new political context of the European Commission, the project acquired a new framing, and was scaled down from a diversion of 1.5 billion m^3 to 600 million m^3 annually. The 'short diversion' was promoted in Brussels by the Greek government as an environmentally friendly energy infrastructure. There were competing technical estimations by experts over the needs of water for agriculture on the plain of Thessaly. While the consultants Morgan-Grenfel (1988) estimated that 1 billion m^3 per annum was necessary for watering 150,000 hectares of new fields, Cooper-Lybrand (sponsored by the EU) estimated that 1 billion m^3 per annum would be necessary for watering the existing fields in Thessaly with no additional new fields.[70] The diversion was 'short' in application but practically it was technologically immense because the diameter of the diversion pipeline remained 6 m instead of the 4.2 m that the new plans would necessitate, while the heights of the dams were similar to the original planning. The diversion may have been downgraded on the funding application but in practice the technological design inscribed the technological priorities of a system for both hydroelectric power and irrigation. In reality the project would satisfy political priorities developed in the public domain as well as the strong lobby of farmers in Thessaly.

Competing visions and approaches expressed by Greek experts and driven by their different techno-scientific and political cultures emerged in the public sphere and shaped public discourses. The politics of expertise were inscribed once more in the politics of infrastructure. Themistoklis Xanthopoulos expressed reservations about the scale of the project. He questioned the national importance of the diversion, and emphasized the negative side-effects of the diversion including its high cost, and the reduction of the energy capacity of the river. He thought the plans for the use of existing drainage channels was 'clever' but that they were inappropriate from a technical and legislative point of view. He insisted that the use of drainage channels would result in excessive waste of water while at the same time argued it was a highly risky technical solution that increased the possibility of flooding in rainy periods with severe repercussions for farms and local communities.[71] Xanthopoulos was not alone in questioning existing policies and engineering practices. Leo Louloudis, Professor of Agriculture Systems and Rural Sociology at the Agriculture University of Athens, argued that the momentum of the Acheloos project was based on the environmentally harmful agricultural policies of the 1970s and 1980s.[72] At the same time George Vavizos, a biologist and member of the Expert Committee for the Environmental Study of the Project, supported a realist problem-solving strategy. He argued that any structural changes that economized water (such as changing the monoculture paradigm or the existing crop production in Thessaly) would be very slow and time consuming; that Thessaly's water problem needed immediate solutions like the diversion, and that the diversion should be viewed as a multi-purpose project. He insisted that the diversion would increase the water of the underground aquifers and thus improve the regional environment, contrary to what was argued by other engineering and scientific experts.[73] While public disputes among experts shaped the contested identity of the river diversion it was national politics and policies that set the agenda and priorities.

EXPERTS, CIVIL SOCIETY, TECHNO-POLITICS AND THE QUEST FOR SUSTAINABILITY

The debates over the Mesohora dam brought to the fore ambivalences and oppositions to the dominant development paradigm. As mentioned above, the construction of the 160 m dam of Mesohora started in 1986. In April 1984, N. Margaris, Professor of Ecology at the University of Aegean, questioned the suitability of the diversion as it would involve tunnelling through the mountain of Pindos. Margaris suggested that instead of the diversion it would be better for the local environment and the regional development to recreate Lake Carla that was drained in 1960 with harmful effects for the existing natural wells that were used in the past for irrigation purposes. But above all, he questioned the emerging development paradigm.[74] Over the next thirty years his core argument would be developed and expanded by different experts and stakeholders who opposed the diversion project and developed a variety of strategies ranging from protests to legal battles.

On 8 August 1989, local residents and political activists circulated a petition against the PPC and its practices. They argued that the company had misinformed them about the tunnel for the diversion of Acheloos' water. According to locals, by the summer of 1989 water from the upper basin of Acheloos was transferred to the Thessaly side. They demanded geological and environmental studies be made available for public consideration. They also asked for reimbursement for the expropriation of their land.[75] There was a widespread mistrust of the PPC and the implementation of state policies that did not take into account local conditions, the views of local people and alternate proposals. On 5 June 1990, the committee for the coordination of community actions argued that the series of high dams would result in a detrimental shortening of the river from 200 km to less than 60 km. The river would become an artificial lake that would destroy forests, plants and villages like Mesohora and Armatoliko, as well as monuments of local cultural heritage such as historical churches and ancient ruins. Protesters contended that people of the region could find other energy sources and exercise alternative agriculture, but that once again the state had decided to promote policies favouring a different direction.[76] Ecologists from the city of Trikala questioned the integrity of the scientific studies, particularly those that asserted that the seismicity of the region would not be made the worse by the landfalls triggered by the construction of the dams and the degradation of the land.[77] In a 1993 letter to the European Commission the local community demanded either the scaling down of the dam or the establishment of a new village in the region for the relocation of its inhabitants.[78] Reactions from ecologists and left-wing political parties were swift.[79]

The battle acquired the character of West/Central Greece versus Thessaly (see Figure 1). Local communities struggled for better terms of compensation based upon an argument that stressed ownership of the water. It is indicative to look at the arguments developed by the Technical Chamber of the Aitoloacarnania Branch in the early twenty-first century. In 2005, the Chamber argued that the diversion did not meet the necessary standards of sustainability, and lacked consensus among experts over its viability and importance. Furthermore, the local branch of the Technical Chamber argued that there was no trustworthy methodology by which to

measure the water needs of these regions. In the same announcement, the Chamber criticized water management in Thessaly for overconsumption and lack of a 'rational' strategy for tackling irrigation problems.[80] On the other hand, engineering experts and professional bodies from Thessaly presented the construction of the dam of Mesohora as an energy project that was unrelated to the diversion, hence the construction of the diversion tunnel 30 km away from the Mesohora dam.[81] The Thessaly branch of the Technical Chamber and the Geoengineering Chamber in Central Greece promoted the dam in Mesohora as infrastructure related to sustainable development, growth and progress.[82]

FIGURE 1: The battle of Acheloos. The caricature shows the local tensions and public debates over the ownership of the water of Acheloos. While people from Volos, Larissa, Trikala and Karditsa supported the diversion, the locals in West Greece, in Mesologi and Agrinio contested the project. In a rather inspirational moment one of the actors involved in the battles – most likely an expert – argued that the solution would be to move the river banks to a different place every six months!

Source: *Το Βήμα*, 15 April 1984, 38

Non-government organizations, such as Greenpeace, WWF, Greek Society of Nature Protection and the Hellenic Ornithological Society also took an active part in these public battles and opposed the project in all its presentations, including both its long and short versions.[83] They condemned the populist ideology, political lobbying and understanding of environmental issues in terms of local interests, and as the continuation of agricultural policies that did not comply with European sustainability policies. These organizations also condemned infrastructure policies that aimed to absorb European money, feed political clientelism, and gain the patronage of large corporations in the construction industry.[84] Environmental concerns were at the centre of the discourse of these NGOs. They characterized the river as a physical entity and as cultural and material heritage built by local communities. They highlighted the danger for species on the delta and along the bank of the river as well as the danger for ecologies in the Mesolongi lake which was protected by European Directives as well as international agreements such as Ramsar and Directive 92/43/EU.[85] Thus national policies and techno-politics were identified as violations of European Directives and European environmental policies. National policies were condemned for promoting unsustainable agricultural programmes that increased pesticide pollution and further intensified Greek agriculture.

Civil society used several means to combat the project, ranging from public demonstrations and conferences to legal challenges. This is still an ongoing battle with a series of cases before Greek and European courts. Until now these court cases before the Greek Council of State or the European High Court of Justice have favoured local communities and NGOs who asked for the interruption of any construction works, and for an environmental evaluation of the project that would explore the cumulative environmental effects upon the region.[86] Furthermore, they demand studies for the development exemplar of Thessaly and its relation to the diversion project.[87] The legal battles continued in the next twenty years and since the 2005 decision of the Council of State, the issue at stake was that any environmental evaluation of water management and resource exploitation could not be credible without the existence of a national plan of water management that made provision for the European Water Framework Directive (2000/60/EK).[88] It was this Directive that introduced the environmental and ecological dimensions to the management of water.[89] Concepts like 'river basin district', 'ecological status' and 'river basin management plan' as well as the criteria and standards for evaluating the environmental impact of the human activities were introduced and defined in the regulatory culture instituted with the Directive.

Yorgos Souflias, the Minister of Public Works and Environment, tried to bypass the decision of the Council of State with a law – the so-called Souflias's Law (Act 3481/2006).[90] Souflias was a leading politician of New Democracy, from the city of Larissa, the centre of the prefecture of Thessaly. NGOs and environmental activists believed that his legislative measures promoted the interests of the local farmers in Thessaly and more importantly of Larissa's plain, his motherland. The law was criticized as an act of favouritism and nepotism that was based upon narrow understandings of the development of the local economy and agriculture, and which also promoted an incomplete and misleading understanding of the environment. Souflias responded by stressing the possible improvements that the diversion would

introduce in the quantity and quality of water supply in Thessaly. He argued that 'the diversion is primarily for water supply and environmental purposes and secondly for the irrigation of the farms'.[91] Souflias's political rhetoric appropriated an argument that had already emerged among parts of the Greek engineering community. The interventionist politics of the conservative government triggered a new round of legal disputes in the Council of State that temporarily ended in 2012.[92]

In the public debates of the early twenty-first century the environmental aspects of the project coexisted and fused with arguments about its role in national and regional development. The research and consultation committee of the Technical Chamber of Greece continuously studied the project, and in 2005 announced (in a report they submitted to a national conference on the water management in the river basin of Acheloos) that they supported the regional and national importance of the project, by stressing Thessaly's dominant role in the agriculture of the country. There were members of the committee who argued that the project would boost unsustainable agriculture practices with the increased use of agrochemicals as well as would result in unequal development between the two adjacent regions, Thessaly and Aitoloakarnania, due to the latter's environmental degradation.[93] Despite the existing opposition, the majority of the committee members supported the view that the project would improve the prospects of the national economy within the European and global economies.[94]

Declining Greek agriculture needed an additional boost, which could not be achieved without the use of water that would expand the cultivated land and would increase the numbers of new farmers, and the avoidance of the exploitation of the rural populations by a small group of landowners.[95] It focused on the issue of cost and stressed that the diversion of water to the Thessaly Plain would reduce the cost of production since it would minimize irrigation by the use of private drillings and wells, a technological solution that proved to be energy intensive. The committee was clear in focusing on the role of infrastructure in forging social acceptance, and the legitimization of structural changes in agricultural policies of the region, that would introduce new plant varieties and new crop production.[96] The committee, following the Studies of Environmental Assessment of the project, argued that the water sources provided by Acheloos for the economic, social and cultural activities of communities in Aitoloakarnania were sufficient and that human interventions secured the 'ecological status' or 'ecological potential' as defined by the European Directive 2000/60. On the other hand, the water sources in the basin of Thessaly required to support the economic and social life of the region needed drastic improvement, while the ecological deterioration of the water of Pineios, the major river of the basin, was deemed to be one more reason for the legitimization of the diversion of water from the upper part of Acheloos.

Experts such as John Mylopoulos, professor of hydraulics and environmental technology, who supported the diversion, promoted the so-called 'third way' by arguing that existing infrastructure and preparatory works already conducted should be respected and so be understood as materialities that obliged planners and policymakers to develop a realist approach. He insisted that the 'soft' diversion of 60 million m^3 of water should be conceived as an environmental project that would be integrated within the broad development and agricultural policies that made

provision for drastic changes in farming, and the establishment of sustainable agricultural patterns. For Mylopoulos, the diversion was framed as necessary for any shift towards sustainable agriculture.[97]

The conflict over the water of Acheloos has divided local communities, national politics and communities of knowledge, and has marked the politics of development in Greece and the understanding and framing of modernity in the country.

CONCLUSION

Acheloos' 'resource space' has been continuously disputed in the Greek public sphere, making headlines in the national and regional news. The case of Acheloos has played an emblematic role in Greece's national water management politics. In post-Second World War Greece, rivers defined vital sources of hydraulic potential for the energy policy and development of the country. The way engineers viewed natural common resources, and defined and configured state policy priorities was informed by their institutional and social legitimization, the emergence of a professional ideal and the technocratic ideology that placed engineers at the centre of public affairs.[98]

The configuration of Acheloos as 'resource space' was a struggle about defining the ways and means of national and regional development, which involved a boundary between prefectures and sovereign state power. Acheloos was conceptualized as both a national natural common resource and a regional source; therefore, the case for water management in the basin of Acheloos was alternately presented as either a national or local problem. Engineers' prioritized the hydraulic potential of the river and its contribution in the national electricity system and thus national growth. Without a coherent nationwide water management policy, it was left to engineers to set the agenda of the PPC in relation to the use and exploitation of the energy potential of the river. Given the absence of centrally organized state policies, expert engineers and economists framed problems, legitimized optimal solutions and configured state policies through their visionary schemes, individual initiatives and by participating in the politics of technological infrastructures.

In this article, we have argued that the story of Acheloos is more than mere local history. The policies and technological design of infrastructure depended on different ideologies and conceptualizations of the development and modernization of both Greece and Thessaly. Repertoires about the 'development' and 'growth' of the country co-evolved with the boundaries of the river's 'resource space'. Two main periods are identified in the story: first the post-war period to the end of the 1970s when large-scale infrastructure was part of state policy for the modernization and development of the national economy. In this period in particular, the conceptualization of the river Acheloos as a natural common resource was bound up in the ideology of development and by economies of scale, and was linked to the energy priorities of the PPC. This was a policy developed by local and foreign power station and hydraulics engineers. This was a policy pathway developed in national contexts like France, Spain, India and China. The rhetoric about national or regional 'development' shaped the hydraulic politics of a hierarchical state and legitimized large-scale projects and technocratic visions and identities that promoted limitless exploitation

of natural resources and human hubris.[99] The second period refers to the early 1980s and more particularly the 1990s, when civil society and their allied experts were central in developing infrastructure politics. Engineering, energy and hydraulic experts as well as experiential experts like NGOs and ecological movements, political activists and local inhabitants demarcated the boundaries of Acheloos as a 'resource space', and brought into the fore new meanings of 'development' and 'growth'. The public conflict is an ongoing dispute in which the river, the river basin, the plain and the environment have changed and acquired new, dynamic meanings.

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49. Magerias initially presented his ideas and suggestions in a study for the Planning Unit of PPC in June 1972. He reiterated his ideas in December of the same year in the Technical Chamber of Greece.
50. For Soviet grandiose engineering projects and the Soviet technocratic ideology see Kendall E. Bailes, 'The Politics of Technology: Stalin and Technocratic Thinking among Soviet Engineers', *The American Historical Review*, 1974, 79 (2), 445–469; Frank Westerman, *Engineers of the Soul: The Grandiose Propaganda of Stalin's Russia* (Overlook Press, 2011); Andrew L. Jenks, 'A Metro on the Mount: The Underground as a Church of Soviet Civilization', *Technology and Culture*, 2000, 41 (4), 697–724.
51. Έκθεσις επι της σκοπιμότητας εκτροπής ποταμών δυτικής Ελλάδος προς Θεσσαλίαν, Τόμος 1, 3.
52. Έκθεσις επι της σκοπιμότητας εκτροπής ποταμών δυτικής Ελλάδος προς Θεσσαλίαν, Τόμος 1, 3
53. Σ. Μαγειρίας, 'Αναπτυξης της Θεσσαλίας εις πρώτο ενεργειακό, αγροτοκτηνοτροφικόν και ποταμοπλοικόν κέντρον της χώρας', Επιθεώρησις (Συλλόγου Διπλωματούχων Ηλεκτρολόγων και Μηχανολόγων Μηχανικών), Φεβρουάριος 1973, 1.
54. Έκθεσις Επι της σκοπιμότητας εκτροπής ποταμών δυτικής Ελλάδος προς Θεσσαλίαν, Τόμος 1, 1
55. 'Σύστασις Ομάδος Αξιολογήσεως Προμελετών ΥΗΕ', in Σ. Μαγειρίας, ΑΠΟΨΕΙΣ επί εκθέσεως Ομάδος κ. Θέριανου, Athens, May 1974.
56. 'Σύστασις Ομάδος Αξιολογήσεως Προμελετών ΥΗΕ', 32.
57. There was a conflict between Magerias and Therianos with allegations by the former of the latter's attempt to bury his suggestions and to distort his proposals. Σ. Μαγειρίας, ' Η εκτροπή των υδάτων του Αχελώου (από λίμνη Συκιάς) προς την Θεσσαλική Πεδιάδα', Πρακτικά Συνεδρίου Υδάτινου Δυναμικού Θεσσαλίας, τόμος 2ος, (Athens, 1979), 349–412, esp. 354–357.
58. Έκθεσις επι της σκοπιμότητας εκτροπής ποταμών δυτικής Ελλάδος προς Θεσσαλίαν, Τόμος 1, 10–14; Μαγειρίας, 'Η εκτροπή των υδάτων του Αχελώου (από λίμνη Συκιάς) προς την Θεσσαλική Πεδιάδα', 356–357.
59. Μαγειρίας, 'ΑΠΟΨΕΙΣ επί εκθέσεως Ομάδος κ. Θέριανου', 45

60. Μαγειρίας, ' Η εκτροπή των υδάτων του Αχελώου (από λίμνη Συκιάς) προς την Θεσσαλική Πεδιάδα', 349, 350, 353.
61. Constantine Doxiadis was an architect and planner who had played an important role in the post-Second World War reconstruction of Greece from several governmental and state positions. A. A. Κύρτσης (επιμ.), *Κ. Δοξιάδης: Κείμενα, Σχέδια, Οικισμοί* (Athens, 2006).
62. Υδατικοί Πόροι, Τόμος V, *Εθνικό Χωροταξικό Σχέδιο και Πρόγραμμα της Ελλάδος* (Αθήνα, 1980), 148–149.
63. Π. Κυριζής, 'Αξιοποιούμενα ύδατα Θεσσαλίας: Υπάρχουσες μελέτες και έργα', *Πρακτικά Συνεδρίου Υδάτινου Δυναμικού Θεσσαλίας, τόμος* 2ος, (Athens, 1979), 68–74; Γ. Χατζηλάκος, 'Υπολογισμός των αναγκών σε νερό για άρδευση στον Θεσσαλικό κάμπο', *Πρακτικά Συνεδρίου Υδάτινου Δυναμικού Θεσσαλίας, τόμος 2ος*, (Athens, 1979), 136–155; Α. Τορτοπίδης, 'Προοπτικές και δυνατότητες αναπτύξεως του θεσσαλικού χώρου', *Πρακτικά Συνεδρίου Υδάτινου Δυναμικού Θεσσαλίας, τόμος* 2ος, (Athens, 1979), 36–45.
64. Δημ. Κωνσταντινίδης, 'Μακροπρόθεσμα προγράμματα περιφερειακής αναπτύξεως με βάση την αναπτυξιακή χωρητικότητα σε ορισμένα χρονικά όρια' *Πρακτικά Συνεδρίου Υδάτινου Δυναμικού Θεσσαλίας, τόμος 2ος*, (Athens, 1979), 252–285
65. Κωνσταντινίδης, 'Μακροπρόθεσμα προγράμματα περιφερειακής αναπτύξεως με βάση την αναπτυξιακή χωρητικότητα σε ορισμένα χρονικά όρια', 281
66. Ελευθερία, 16 March 1983, 1
67. A revolt of the landless rural workers against wealthy land owners of large scale farms in the early twentieth century.
68. Υπουργείο Οικονομικών, *Πρόγραμμα Οικονομικής και Κοινωνικής Ανάπτυξης, 1983–1987* (Αθήνα, 1985), 495, 497–499.
69. Ηλίας Ευθυμιόπουλος, Δήμος Τσαντίλης και Κίμων Χατζημπύρος (επιμ.), *Η Δίκη του Αχελώου* (Αθήνα, 1999), 21–23.
70. Ευθυμιόπουλος, Τσαντίλης και Χατζημπύρος (επιμ.), *Η Δίκη του Αχελώου*, 24–25.
71. Ευθυμιόπουλος, Τσαντίλης και Χατζημπύρος (επιμ.), *Η Δίκη του Αχελώου*, 70–78, esp. 70–71, 73
72. Ευθυμιόπουλος, Τσαντίλης και Χατζημπύρος (επιμ.), *Η Δίκη του Αχελώου*, 127–132.
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74. Ν. Μάργαρης, 'Αχελώος και Θεσσαλία', *Βήμα*, Απρίλιος 1984.
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