

# THE ACHELOOS DIVERSION SCHEME

THE MOST SCANDALOUS MISMANAGEMENT OF EUROPEAN COMMUNITY'S FUNDS WITH MAJOR ENVIRONMENTAL EFFECTS



Above: Landscape near the sources of Acheloos  
Right: A view of Messochora dam construction works in 1989

## END OF A RIVER-GOD

Hercules seems to be back with all his witless vigour. The eternal struggle of the Crocks against the mighty river Acheloos has resumed in full rage. Alas, for the father of Nymphs this could be the last battle: the diversion of part of the river's flow by blasting a tunnel through the Pindos range to bring water to the thirsty hot plain of Thessaly has entered the implementation stage. Heavy damage has been inflicted on the once pristine mountain valley of the Acheloos by the on-going works. If not stopped in time, the forscen diversion of part of the river's flow to Thessaly will have unforeseeable consequences on the ecology, the economy and the social life of the whole region. Especially threatened is the important bird habitat and the fish-breeding sites in the wetland and lagoon complex of the Acheloos Delta. Yet, pulling the Acheloos down to his knees was both technically and financially a Herculean task which Greece's economy would never be able to bear on its own. It was the European Community's financial participation that made it possible for the Greek government to launch into this environmental and economic hubris known as the "Acheloos Diversion Scheme".

## Where the Nymphs used to dwell.

The Acheloos, the longest river in Greece (roughly 240 km) has its sources in the shade of a small beech wood high up in the alpine pastures of Lakmos, near the town of Metsovo. Lakmos is part of the Pindos range, which forms the backbone of continental Greece and its principal watershed dividing the country into an eastern and a western hydrological system. The Acheloos, on the western side of the watershed, flows at first through mountainous country covered with thick forests of conifers and beech-trees, and then, alternately, through oak forests and Mediterranean macchia. The presence of trout, dippers, otters, roe-doer and other mammals is an indicator of the good state of the natural environment of the Upper Acheloos.

## A mountain idyll

Small picturesque villages, shaded by big plane trees and surrounded by terraced fields, overlook the narrow river bed. Abandoned monasteries and ruins of old stone bridges are reminiscent of the times when the Acheloos valley used to be the path taken by the mule-caravans of merchants travelling to neighbouring Balkan countries and even beyond to Central Europe. In modern times, the importance of the valley as a

communication route declined and the whole area fell into oblivion. People left, villages were half abandoned and nature could thrive almost undisturbed by human influence.

## An environmental disaster

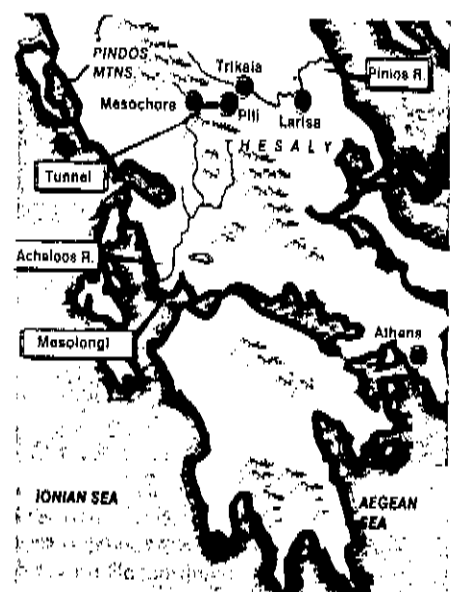
The huge earth dam of Messochora (150m high), still under construction, abruptly cuts the course of the Acheloos, forcing the river to flow through a narrow outlet at the base of the dam. From this point onwards, and as far as the construction site of the Sykia dam downstream, where the entrance of the Acheloos diversion tunnel is situated, the valley has been literally disfigured. Dams, ancillary works, the new Arta - Trikala road and a network of access roads, all monstrosities of sub-standard quality, have caused irreparable damage to the valley's landscape. Extensive erosion and landslides have left barren great stretches of ground and are provoking the formation of enormous talus fans descending the steep slopes down to the river's edge. Gravel for the road building is extracted from the river bed while great quantities of uncollected used oil from the trucks and the heavy earth-moving machinery are spilled on the ground right by the river. These are the most obvious impacts on the environment of what is called the "first phase" of the Acheloos Diversion Scheme. In the future, once the artificial lakes have been

filled, the villages of Messochora and Armatoliko will be partly submerged, together with their agricultural land. This will probably be the last blow to this sparsely populated mountainous area. Further depopulation is expected to lead to the ultimate decline of the terraced cultivations, thereby increasing erosion. Cultural monuments like the characteristic old bridges over the river or the byzantine monastery of St. George at Myrophylio are also going to be submerged by the reservoir waters.

## The threatened Delta.

The estuary of the Acheloos, flowing into the Ionian Sea, is one

of the rare fairly intact river-mouths in the Mediterranean. Reedbeds, saltmarshes, rich in halophilous vegetation, and, scattered amidst this alluvial flatland, rocky hills with lofty limestone cliffs, form a variety of



Right: Map situating the river Acheloos in Western Greece.  
Below: The effects of road construction works



natural habitats. This uniquely beautiful landscape is part of the larger delta formation extending eastwards to the estuary of the river Evinos and northwards as far as the lakes Trichonis and Lyssimachia. The whole Delta area with its brackish shallow lagoons, saltmarshes, wetlands and sand-dunes formed by the action of both the Acheloos and the Evinos river, is a very important bird and fish-breeding area. Continuous sediment deposition and fresh-water inflow are essential for maintaining this biotope in quasi-stable equilibrium against the erosive power of the sea and the intrusion of saline water. Conserving birds' habitat and the fish-breeding capacity of the lagoons depends on this equilibrium. But both sediment transport and fresh-water inflow are being dangerously reduced by the dam on the river Tavropos, the main tributary of the Acheloos, and by the three existing dams of Kremasta, Kastraki and Stratos on the Lower Acheloos and by the use of water for irrigation either directly or pumped from the low-depth aquifer. Erosion of the sandbanks protecting the lagoons and lowering of the water table permitted sea-water intrusion which is leading to progressive wetland and lagoon salination. Any further reduction of fresh water inflow would only accelerate these phenomena which alter, degrade or destroy birds' habitat and reduce the fish-breeding capacity and fish population of the lagoons.

Diverting almost one quarter to one third of the flow of the Acheloos to Thessaly, as foreseen by the scheme, might well mean the end of the wetlands and the lagoons as important biotopes. The impeded / planned diversion of the river Evinos, whose purpose is to solve the water supply problem of Athens, will further decrease sediment and fresh-water inflow to the Delta. This combined effect could well multiply the environmental stress on the Delta, especially as both rivers are probably hydrologically interconnected.

### Protection status

A significant part of the area of the Acheloos-Evinos Delta and the Messolongi-Aetoliko lagoons (13.900 ha out of a total of 63.000 ha) enjoy a conservation status as an EC special protected area and as an internationally important bird area (Ramsar Convention Site). It is protected under EC Birds Directive 79/409 on wild birds, and by the Bonn and Bern Conventions on wildlife. A further 8.000 ha are protected as a wild fauna reserve under Greek law. The Greek government has not defined the limits of the protected area as provided by the Birds Directive and the European Commission has initiated an infringement procedure against Greece (article 169 of the Treaty).

### The Delta's world of birds

The Delta's lagoons, saltmarshes,

*One of the last undisturbed parts of Acheloos*

Dalmatian Pelican, the White Egret and the Cormorant. It also offers nesting and feeding ground for a great variety of wetland birds like the Little Bittern, the White Stork, the Black-winged Stilt, the Avocet, the Stone Curlew and the Pratincole. It is also a feeding ground for the Bearded Vulture, the Imperial Eagle, the Spotted Eagle and the Peregrine, while other raptors like the Griffon Vulture, the Short-toed Eagle, the Lesser Spotted Eagle or the Eagle Owl nest on the limestone cliffs of the hills.

### A biotope under stress

Reduction of fresh water inflow, untreated sewage discharges from the town of Aetoliko and the leached fertilizers and pesticides from the surrounding intensive cultivations lead to periodic blooms of eutrophication accompanied by massive fish death, especially in the Aetoliko and the Klissova lagoons. Drainage and land reclamation works undertaken from 1938 onwards have destroyed great areas of habitat and extended agriculture in the Delta. Moreover, 2.500 ha of coastal wetlands were transformed into useless salty polders in an abortive attempt to create agricultural land. Road building and on-going illegal house construction are destroying the flora and the bird habitats of the sand-dunes and are increasing erosion and sea water intrusion. The channelling of the waters of the Acheloos downstream of the Stratos dam leaves the wide river bed almost dry in the summer months. This former river bed is now a single gravel quarry and dumping site for waste of all kinds. Establishment of new fish-breeding farms and saltworks within the protected area and the illegal construction of fishermen's huts and access roads degrade the aesthetics of the landscape and add further strain to the environment. One of these fish-breeding farms (ICHTHYKA) received European Community funding. The European Commission has initiated an infringement procedure against Greece for violating the Birds Directive.

### EIAs: Assessing the impacts or alibi?

No global Environmental Impact Assessment (EIA) has been produced for the whole scheme or even for the hydroelectric part currently implemented, taken as a whole. The assessments presented merely identify the corrective measures for the environment taking for granted the implementation of the proposed individual projects and without considering alternative solutions. Hence, they do not in fact qualify as EIAs in the sense of the European Community directive (EEC/337/85). In particular, the EIA for the Delta area, an extended compilation of relevant and less relevant data on the state of the natural environment, concludes by suggesting corrective measures which are self-evident and pertinent for ameliorating conditions in the Delta, but utterly unrelated to the planned Acheloos Diversion. The really important factors affecting the Delta were not examined. Neither the minimal fresh-water inflow which is necessary to assure the conservation of the biotope nor the behaviour of the possibly unique Acheloos-Evinos hydrological system after the diversion of both rivers, was covered by the EIA. It must be emphasised that none of



the corrective measure proposed, which include preventing the on-going house construction, illegal riparian vegetation and hunting in the Delta, has been carried out, despite an agreement between the European and the Greek governments which imposed the application of the corrective measures under the conditions of the disbursement of the EC funds. The above-mentioned illegal activities are thriving in the Delta, tolerated by the



The northern side of the Messochora dam and what has remained of the river.



Acheloos reaching the artificial lake of Kremasta. The steep river bank is today a garbage dump.





## BOTTOMLESS PIT

*The Acheloos diversion is both environmentally and economically an ill-conceived scheme. Serious doubts exist as to the scheme's feasibility as well as about its overall financing. By pressing ahead, against all odds, for the execution of the diversion scheme — even though piecemeal — the Greek government appears to be pursuing a covert but nevertheless highly lucrative objective: to plug the holes of an ailing Greek economy by tapping a source of steady EC funding — a modern equivalent of the mythical Anthean horn of plenty which Hercules won for the mortals through his victory over the ancient river-god.*

### Tracking back an ageing folly

Irrigating the plain of Thessaly with the waters of the Acheloos is an idea which was first formulated as early as 1925. The "sleeping giant", as the Thessalian plain was referred to due to its then unexploited agricultural potential, would be awakened by the fresh inflow of the waters of the Acheloos. Hydroelectric power generated on the way would be the motive force behind the modernization and industrialization of this promising region. The idea fitted in with the "self-sufficiency" ideology of the time but presented a serious deficiency: its exorbitant cost. About half a century later, European Community funding is turning into reality a scheme which — by modern standards — is economically and environmentally obsolete.

### The goals of the Acheloos Diversion

Originally planned as a multi-purpose scheme, the diversion of the Acheloos was mainly aimed at:

- bringing water to the plain of Thessaly to extend the irrigated

land to a total of 390,000 ha (the whole of the Thessalian plain up to the contour line of 200m) as compared to the 200,000 ha presently irrigated;

- contributing to the water supply of the urban areas of Larissa, Trikala, Volos and others;
- replenishing the overexploited aquifer of the Thessalian plain;
- increasing the flow of the highly polluted Pinios river; and
- restoring the natural environment by the replenishment of lake Karla, previously Greece's most important waterfowl habitat but destroyed by drainage in the early sixties in an unsuccessful attempt to create fertile agricultural land.

Power production was considered to be only a beneficial side effect, which could have been better achieved by harnessing the Acheloos on its natural course.

### A 4500 million ECU scheme

Feasibility studies were carried out mainly by the Swiss firm Electrowat (1968) and the Canadian firm SNC (1971) both of which concluded that the scheme was not economically viable. In 1972 a proposal for the diversion of the Acheloos was submitted by engineer S. Magirias, and was finally incorporated in its essence in the Five Year Development Plan established by the Greek government in 1983. A global feasibility study carried out by Morgan Grenfell & Co and presented in 1988 concluded that the scheme would only be viable under conditions of stable (high) agricultural prices and low inflation rates. The entire scheme was opened for lump sum bids in the same year but of the six qualifying bidders only one, the Tayeuro Consortium (Woodrow Taylor from Britain and Philip Holzmann from Germany) submitted an offer estimating total planning and construction costs at 4500 million ECU.

Meanwhile, the conditions set by the feasibility study are extremely unrealistic: inflation rates in Greece have been in double figures every year since the feasibility study and, after the reform of the Common

# AN EXTRAVAGANT WHITE ELEPHANT

Agricultural Policy, prices of agricultural products dropped substantially. These tendencies render the entire Acheloos Diversion Scheme economically unfeasible.

### Regional misdevelopment

Current water supply shortages in the plain of Thessaly, Greece's main cereal, sugar-beet and cotton producing area, are due to the arbitrary and wasteful use of the existing resource: water is pumped by farmers in competition with one another from more than 2000 deep wells and the water table of the aquifer has been dangerously lowered (deeper than 200m). Overpumping, discharge of industrial effluents and fertilizers, and pesticides leached from agricultural land, have turned the river Pinios into an open sewer, depriving Thessaly of its most important water resource. Tunneling water from the Acheloos to Thessaly is not a permanent solution to the region's problem as it does not promote a more rational usage of water. On the contrary, it encourages it to be wasted and it deprives the less developed region of Western Greece of a valuable local resource, and hence to its future chances to develop, for the benefit of a much wealthier region. The same argument also holds true

hydroelectric power generation. Despite the Commission's reluctance to support such a vast irrigation scheme (threatening to further augment the EC's already huge surpluses of agricultural products, the Greek government managed to obtain EC funding for what they really wanted, i.e. the most crucial part of the scheme which is the 18,5 km tunnel under the Pindos range to divert the river's waters to Thessaly.

The tactical approach by which this was achieved was to blur the real goal of the Acheloos Diversion Scheme and to present the construction of the diversion tunnel as part of a series of supposedly "free standing investments" in hydroelectric power generation, beneficial for Greece's regional development and therefore eligible for EC funding. On the contrary, irrigation, which was originally the reason for the Acheloos diversion to Thessaly, would not have qualified as the European Community is interested in diminishing the agricultural surpluses. However, despite the uncertainties over the scheme's real goals, there is one rather conspicuous parameter which remains unchanged: it is the quantity of roughly 1.5 billion m<sup>3</sup> year of water to be diverted to Thessaly, i.e. almost one third of the total river flow measured at the estuaries and about two thirds measured at the diversion point. This suffices, by

Sykia and Pefkophyto (18,5 km long);

- six hydroelectric plants, at Sykia (2x30 MW), Messochora (140 MW), Pefkophyto (160 MW), Mouzaki (270 MW) and Mavromati (30 MW) with the necessary ancillary tunnels and works such as access roads etc.;

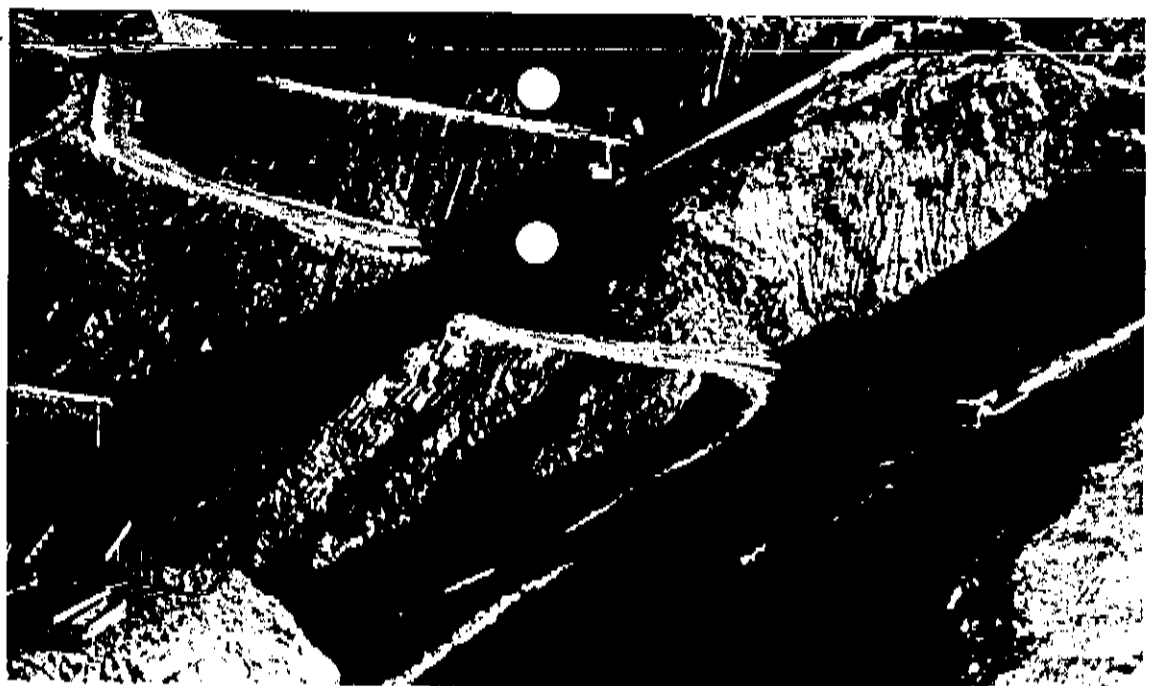
- land reclamation and irrigation works in the plain of Thessaly (150,000 ha).

### The "first phase" and the sober aftermath

The "first phase" of the Acheloos diversion comprises the construction of dams and ancillary works at Messochora and Sykia, and also the first 9.5 km of the diversion tunnel. The budget is estimated at 175 million ECU, 60% being financed by the Integrated Mediterranean Programme for Central and Eastern Greece and the European Investment Bank (i.e. 105 million ECU).

An additional 80 million ECU has been allocated by the Structural Funds for the construction of power generation plants at Sykia and Pefkophyto and for the construction of the remaining 9 km of the diversion tunnel (estimated total costs: 320 million ECU). (The Messochora power plant will be entirely financed by the Public Power Corporation).

Disbursement of the above funds is conditional on the approval by



Detail of Messochora dam.

concerning both the degradation of the natural environment of the upper Acheloos valley by high dams and extensive reservoirs in order to help maintaining the country's extremely wasteful model of electricity consumption. It is equally applicable to the diversion of water from the neighbouring Evinos river in order to mitigate water shortage in the overpopulated capital city of Athens.

### Shifting justification

The Acheloos Diversion Scheme was included in the "Greek Memorandum" presented to the European Commission for funding in 1983, as an enormous investment scheme primarily for irrigation and, secondarily, for

local standards, to irrigate the 150,000 ha of agricultural land. This decisive parameter for deciding on the size of the diversion tunnel, the dams and the hydroelectric power plants, was calculated taking account only of the requirements of future irrigation, not those of hydroelectric power generation which is now the alleged goal of the Acheloos diversion.

### The Diversion put in new clothes

- Seen as an energy scheme which would also be useful for irrigation purposes the Acheloos Diversion comprises, in its present (informal) version, the construction of
- two dams in the Upper Acheloos basin, one at Sykia and another one at Messochora;
  - three dams on the eastern side of the watershed, at Pyli, Mouzaki and Mavromati;
  - the diversion tunnel between

the Commission of the relevant operational programmes, which have not yet been submitted by the Greek government.

However, the contract presently being negotiated between the Greek government and the Tayeuro Consortium concerning only the above mentioned power generation projects and the diversion tunnel, is still expected to be presented to the Greek Parliament for approval.

For the part after the "first phase", i.e. the dams and the hydroelectric plant at Mouzaki, the dam at Pyli and the connecting tunnel between Pyli and Mouzaki, the dam and the hydroelectric power plant at Mavromati and the land reclamation and irrigation works in the plain of Thessaly (150,000 ha) the costs have not been estimated precisely but exceed 1,000 million ECU.

No EC financing is foreseen for this final "irrigation" phase and as

far as the European Commission's services are concerned, there is no irrigation component in the Acheloos Diversion Scheme. Yet, the Greek government, political parties and the media continue to praise the scheme's value for irrigation of the Thessalian plain and emphasise the benefit it will bring to agricultural production.

## An energy flop

Is the Acheloos diversion economically viable as a purely hydroelectric power generation investment as it is presented to be?

The question cannot readily be answered since there is no feasibility study for this part of the overall scheme. The opinion of the competent Greek authority on the matter, the Public Power Corporation, is negative if the Acheloos diversion is considered within the context of the overall installed and planned hydroelectric power generation capacity of the river. Diverting part of the Acheloos flow would reduce the power generation capacity of the three existing hydroelectric plants downstream of the diversion point (one of them also, EC funded). Consequently, the Public Power Corporation has demanded compensation of roughly 20 million ECU from the Greek government for the overall expected capacity deficit as the loss would be greater than the respective gain from plants to be built on the diverted flow.

## Hypocrisy at work?

The European Community's Mediterranean Programmes were supposed to be "integrated", and the reformed Structural Funds are supposed to integrate environmental considerations in their support measures. "Sustainable development and preventive and precautionary action" is a declared goal of the Environmental Policy of the European Union after Maastricht.

In this light, the Acheloos Diversion Scheme does not exactly seem to translate the environmental and development policy principles of the European Community in practice. Diverting rivers or the serial construction of high dams which transform them into a sequence of artificial lakes is not what, by contemporary standards, is understood as "sustainable and sound use of natural resources". Nor is the piecemeal approach adopted by the Greek government and the presentation of a major irrigation scheme as a series of ordinary independent hydroelectric projects an example of either integrated planning or of partnership with the European Community. The Structural Funds support for these disparate projects also highlights lack of consistency and cooperation among the European Commission's services, eg. between those responsible for regional development who endorse the hydroelectric component of the Acheloos Diversion Scheme and those responsible for agriculture who deny knowing that the ultimate goal of this exercise is the extension of irrigation in the plain of Thessaly, which runs contrary to the reformed Common Agricultural Policy. Besides, curing Thessaly's water shortage resulting from wasteful irrigation practices,

replenishing the erroneously drained lake Karla and flushing-down the industrial, urban and agricultural pollution of the river Pinios using the waters of the Acheloos is not really "preventive and precautionary action" or problem solving at source. However, as the Special Report of the Court of Auditors of the European Community for 1992 shows, the Acheloos Diversion is not an isolated example of mismanagement of the Structural Funds with important negative environmental consequences. Allocating funds on the basis of vaguely described Regional Development Plans before the actual operational programmes to be funded are even known, results in the supported countries being unable and unwilling to exert any control, if this could be interpreted nationally as obstructing the inflow of the promised Community funds.

## A LAST MAYDAY CALL

The implementation of the "first phase" of the Acheloos Diversion Scheme has irreparably damaged the natural environment of the Upper Acheloos valley, a great part of which will soon be submerged by waters from the reservoirs, causing additional environmental and social degradation to the area. The Acheloos Delta, formally protected as a Ramsar Convention Site, is being rapidly destroyed by human activities and development, both legal and illegal (intensification of agriculture, illegal house construction, legal and illegal hunting, road building etc.).

The imminent diversion of almost one third of the Acheloos flow threatens, in conjunction with the diversion of the river Evinos, to desiccate the remaining wetlands and change the water balance of the whole Delta area. Those alterations will affect both the bird habitat and the non-breeding capacity of the lagoons. Sea water intrusion due to the reduction of fresh-water inflow and increasing pumping is likely to cause heavy damage to the agriculture, the fish-farms, the saltworks and the general economy of the entire region.

Presently, there is still confusion as to the ultimate goal of the Acheloos Diversion Scheme. Yet, tunneling the waters of the Acheloos to Thessaly seems economically unfeasible either as an irrigation-cum-energy scheme as originally conceived or as solely an energy investment as currently presented. From a regional development point of view, the Acheloos Diversion is also unacceptable as it consists in depriving a less developed region of a vital resource such as water, for the benefit of a much wealthier region, notorious for its wasteful usage of water. We therefore issue an appeal to the Greek government to put an immediate end to the activities destroying the natural environment of the Delta and to abandon the diversion of the Acheloos to Thessaly. We also urge the European Community to stop any current and future payments in connection with the Acheloos Diversion Scheme, even those concerning "free standing" hydroelectric projects, and to link financial support to the condition of seriously respecting the protection of the natural environment

according to the principles of the European Community's own environmental policy and legislation. The European Community should further negotiate with the Greek government ways to repair damage already inflicted and to manage appropriately the natural resources of the Delta. As for the plain of Thessaly, curing the problem at its source implies the application of rational management of river and groundwater used for irrigation, as well as waste-water treatment, which would render the diversion of the Acheloos unnecessary.

We finally appeal to all international environmental organizations to support us in our efforts to save what can still be saved of the natural environment of the river Acheloos and its Delta, by intensifying their lobbying of the Greek government and the institutions of the European Community.



Looking for the lost river - bed.



Above: Where the otter still lives: The river Acheloos near the mountain village of Haliki. Below: Waiting for the bus and for ever lasting development in Monzaki village.



This factsheet was edited by the Society for Ecology and Development and the magazine Nea Ecologia, Mavromichali 39, 10 680 Athens, Greece. Tel. 3619 837, Fax. 3602 621