EPI WATER

Evaluating Economic Policy Instruments for Sustainable Water Management in Europe

WP3 EX-POST Case studies
Water Resource Fee - Hungary

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Authors	Budapesti Corvinus Egyetem – Regionális Energiagazdasági Kutató Központ (BCE-REKK) Gábor Ungvári, Péter Kaderják, András Mezősi, András Kiss
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Executive Summary

Definition and purpose of the EPI

The „Water Resource Fee" (WRF) is an abstraction charge. When introduced, it was defined as the main regulatory instrument for water resources. The WRF's key water policy objectives address the sustainable use of the country's water resources and the supply of water for economic and public use. The fiscal objective was the provision of financial resources for the Water Fund managed by the water authorities.

The implementation of the WRF was based on a complex design that reflected the diversity of available water resources. The charge aimed to influence water demand in a market compatible way, using a method with which the water authorities - organisations with centralised governing functions – were also comfortable.

From the perspective of the research, this charge is an Economic Policy Instrument (EPI) because it is, in essence, a water charge. More importantly, it is intended to act as an EPI in order to modify water consumption decisions. The WRF offers lessons about the kind of risks and consequences a change in external conditions can bring if multiple goals are compressed into one instrument and the stakeholders do not support the legitimacy of these goals (both users and political decision-makers).

In 1993, the "Water Resource Fee" was introduced to replace a previous water charge for industrial water users and to adapt the regulation to the changes taking place in the economic structure of the country.

Comprehensive analysis of the WRF was conducted as part of the process of laying the foundation for the introduction of the Water Framework Directive (WFD) in 2009 (OVGT, 2010/a). The operation of the instrument has changed in several ways. The structure of the calculation has not changed, but the circumstances in which the water charge operates have.

Introduction

The environmental and regulatory objective of the EPI was the prevention of water resource overuse. Its environmental and regulatory objectives were the improvement of allocation efficiency and the prevention of conflicts related to consumption. The economic and fiscal objective was to maintain revenue flows to the Water Fund and, later on, to the national budget.

In this sense, the EPI is a two-tier instrument with two distinct functions. The registration of abstraction entitlements delivers the function of preventing overuse. The delivery mechanism of the allocation function is the charge on water abstraction. The charge or fee is calculated according to a complex set of modifying multipliers that depend on which specific economic actor uses the water and which water resource type is used.

The successful operation of the instrument requires the balanced enforcement of its objectives. But its role was ultimately reduced to its revenue generating function. Strong market pressures essentially overrode the EPI's potential and desired impact on environmental and allocation objectives. The earmarked use of the revenues – first for water management and later for water management and environmental protection purposes – was abolished and the Water Fund was liquidated. The fee thus became the general revenue of the national budget. It was a step of a wider and longer process that the central budget centralized revenues to overcome its chronic deficit problem. The payment calculation method remained, but the objectives were overwhelmed by fiscal goals. Based on this outcome, in our opinion the implementation and operation of the EPI was neither effective nor successful.

Legislative setting and economic background

In the context of the EPI, abstraction entitlements were issued and charges for abstraction were collected. The charge was approved by government decree.

It is not within the scope of the EPI to compensate for the external environmental impacts of water use.

The balanced operation of the charge was likewise impeded by the constant restructuring of the ministries and the water authority itself.

The early period of economic transformation in Hungary (during the 1990s) resulted in a severe decline in GDP and the deterioration of the standard of living. The economic problems placed an additional burden on public finances and, at the same time, the national budget was burdened with heavy debt payments. This situation reinforced the revenue centralization efforts of the central budget and placed additional burdens on the economy. All this together resulted in sluggish growth and an exaggerated need for foreign capital inflows, with no additional resources available for, or attention dedicated to, the restructuring of public services. Following an initial trend of debt repayment, after 2002 the situation began to change and the public debt started to grow again, resulting in growing budgetary imbalances.

The water authority (then the National Water Management Directorate General) had an interest in the implementation of the water charge in order to keep financing the sector's development vehicle, the Water Fund.

As the state retains ownership rights to all major waters, this is the basis for the right to collect charges for abstraction. The water charge was applied to all forms of water provision for commercial (industries and firms) and public use (with some exceptions) for both abstractive and non-abstractive uses.

Brief description of the results and impacts of the proposed EPI

Although there has been a general declining trend in water abstraction since the implementation of the instrument in 1993, this is not the consequence of the EPI. The effect of the water charge is negligible compared to two other drivers of change: the increasing price of water and the technological improvement of the Hungarian economy.

For this reason, we estimate that the water charge has not fundamentally altered the behaviour of water users.

Thus, the instrument has had a negligible effect on overall efficiency gains.

The burden of payments was concentrated on a few sectors: in particular the different forms of water use in the energy generation sector and water utility abstraction. Together, these two sectors pay 75% of the fees. Because half of the payment is related to energy production (hydropower plants, cooling water for thermal power plants), from a fiscal perspective the charge ended up serving as an additional tax on energy generation. This means that the cost burden of the charge was spread out across the economy instead of weighing on those that have a real impact on available resources. This situation contradicts the requirements of the "user pays principle" and is likewise disadvantageous from the perspective of social equity. Little-by-little, agricultural water users simply stopped paying the charge. The water charge also discriminates against those industrial users who depend upon the water utilities for their water needs.

The water charge (independently of its original justification) was viewed as just another tax that a strong bureaucracy had imposed on users and, in short order, was captured by the central budget. The instrument was thus transformed into what stakeholders originally thought it was.

The original design of the instrument was built upon the component features of a previously functioning instrument. This provided short-term gains during the implementation stage, but resulted in the long-term problem of stakeholder lack of acceptance. The instrument has an unfortunate design – a very detailed set of charge-modifying multipliers - that encourage targeted lobbying activities and attempts to gain preferential treatment. The quality of the administrative supervision (management of the instrument) declined after the abolition of the revenue's earmarked status.

The intended outcome of the charge was twofold. First, demand would be regulated and modified through adjusting the multipliers in the payment calculation. Second, the financial resources to cover administrative costs and the small-scale development projects of the water authority would be expanded. These intended outcomes were not realized. The actual outcomes were increased budget revenue and the improved monitoring of water abstraction. The introduction of the cost-based pricing of water supply promoted improvements in water resource allocation efficiency, not the

complicated manipulation of abstraction charges. In this sense, the general impact of the strategy was unintended.

Moreover, the reporting discipline of water users has declined.

Conclusions and lessons learned

Below are the principal reasons why the coherence of the instrument dissolved when financial pressures on the state budget grew.

- The water charge addressed an important, but very technical problem that lacks public acceptance of and support for the respective policy action.
- No clear priorities were set across the multiple stated functions of the instrument.
- The lack of clear political motivation and the subsequent objectives resulted in the implementation of an instrument for regulatory purposes, the design of which was impacted by an interest in preserving a decentralized revenue stream.

The institutional interests of the water bureaucracy however were ultimately hurt by the centralization of the revenue stream. This centralization eliminated the incentives of the water authorities and accurate resource monitoring ultimately lost its priority.

In spite of the long operation of the instrument from 1993 to the present, its strategic impact was never re-assessed. An assessment conducted in the context of developing the National Water Basin Management Plan was the first, coherent evaluation of the instrument (OVGT 2010/a). This analysis assessed the instrument's compatibility with the WFD criteria, i.e. whether it is a suitable instrument for recovering the resource cost of water use in accordance with the more complex criteria of WFD art 9. "applying the user pays principle". The answer is no..

The Plan included a proposal for bringing the WRF instrument in line with the new WFD requirements.

The proposal targeted the WRF calculation method, the use of the revenues and the allocation method for abstraction entitlements in cases where water bodies were found to be in a poor ecological status.

The proposal further defined the purpose of the charge as a revenue vehicle for covering the administrative costs related to implementing and managing the monitoring functions specified in the WFD. This change could provide a clear mandate for raising revenues. In order to enhance the public right to sustainable resource use, water users must cover the cost of administrating and monitoring their activity.

Regarding the method for calculating fees, an additional role of the fee should be to signal relative scarcity, not coerce compliance. (A resource with higher utilization requires more concerted control). In order to fulfil this goal, the modification of the end-user based water charge multipliers was proposed. The new multipliers should be differentiated based on the effect of the use on the status of the individual water body (and not on their end-use, as was previously the case). They would distinguish between abstractive and non-abstractive uses, the timing of the withdrawal and would consider the preference for (increased) storage (relative scarcity) of the available resource.

In the case of water bodies that have been found to be in a poor ecological status, in particular due to over-abstraction, the decrease of licensable quantity and the introduction of market based procedure for the allocation of the licenses were proposed.

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Proposed headings for the case studies

1 EPI Background

The Water Resource Fee is a charge on water abstraction. All types of water abstraction are targeted (including both surface and sub-surface waters). In practice, all water users pay the charge, whether they have their own wells (above 500 m3 annual withdrawal) or receive water through a utility (above the 10,000 m3/year limit) (Law 1992/85).

This EPI is a dual-purpose instrument. In 1993 it was introduced to replace a previous water charge for industrial water users and to adapt the regulation to the changes in the economic structure of the country. It was defined as the principal water resource regulatory instrument. It was intended to regulate withdrawn quantities and to guide demand between the different water resource types. In addition, the inherited function of the instrument was to keep supporting the Water Fund (Law 1992/83), an earmarked fund for financing the water authorities' operations and development projects.

For decades prior to the transition at the turn of the 1990's, steadily growing trends of water withdrawal had characterised all water resource types (surface, bank filtered, groundwater, strata and karstic). Resource monitoring and control was weak. The licensing of new, unused water resources fulfilled new additional needs. Even this administrative responsibility was overruled by decisions benefiting the mineral and energy supply needs of heavy industry (the preferred pet projects of the era). All this resulted in massive water mining and the overuse of available water resources. Attempts to enforce tighter controls before the introduction of the new instrument at the end of the 1980's were unsuccessful.

The time series of all sub-surface consumption compared to the licensed quantity in 1993 clearly illustrates this previous over exploitation.

Table 1.1 - Sub-surface water withdrawal and licensed quantity (million m3/year)

	Withdrawal			Licensed
Time period:	1951-1980*	1981-1990*	1993	1993
Country total	986	1555	1211	1328

*Average of the period

Source Vituki 1994; table 23. Page 67

The economic downturn reversed this trend by the end of the 1990's. Economic pressures effectively disadvantaged the most water inefficient industries, precisely those industries that otherwise pose political and economic constraints on the implementation of this type of regulatory strategy.

In this context the initial goal of the instrument (to control the aggregate use of water resources) was already out-dated by the time of implementation. There was no projected baseline to abate to in the classical sense. Moreover, the declining consumption trend was due to other factors, not the EPI. Problems related to the maintenance of the oversized infrastructure wound up in the forefront, not quantity issues.

The EPI is a two-tier instrument. The first tier is the licensing phase, where water abstraction requests are registered for each water body. This phase sets the maximum quantity users can withdraw and has the sole aim of protecting the renewable resource, with no attention paid to the specific social and economic policy considerations about the user sectors. These aspects are considered in the second tier.

The purpose of the second tier is the prevention of user conflicts. In this tier the water charge is calculated. The charge for a given user depends on what type of water body is affected and the purpose for which water is abstracted. The calculation includes a "base charge" and a string of multipliers that reflect preferences for the modification of water use.

The basic calculation of the Water Resource Fee (WRF) is the following:

WRF[1] **(**HUF) = V (m3) * BC (HUF/m3) * M * "G".

The "Base charge" can take on two possible values depending on whether personal water resources are used for withdrawal or the resource is supplied by the utilities. The goal is to regulate demand through "G", the modification factor. "G" is determined by a matrix calculation (see table 7.1). This matrix attempts to reflect the relative scarcity of different water resource types, the preferred use of the resource and the

[1] The elements of fee calculation: "V" – volume; "BC" – Base charge; "M" - Dummy for metering. The value is 1 if the abstraction is metered and 2 if no metering (in this case the licensed quantity is taken into account as volume); "G" modification factor

estimated income status of the users groups. This matrix results in a unique unit value for each end-user, which is then multiplied with the volumetric base fee. The calculation reflects the allocation preferences of the regulator and creates the differences in the final charge that are intended to modify demand decisions between water resource type and volume.

The principal changes in the operation of the WRF:

The decentralized budgetary status of the Water Fund was eliminated in 1999 (Law 1999/1).

The implementation of the instrument was a reflection of the known water resource use problems of the previous decades. No stakeholder consultations were conducted before implementation. Comprehensive analysis of the instrument was conducted as part of the evaluation process for the Water Framework Directive in 2009 (OVGT, 2010/a). A working-paper was published about the experience with using "value-dependent additive fees" (the above-described distinctive water charges) to regulate water abstraction (Márfai, 2001).

The National Water-Basin Management Plan's (NWBMP) preparatory analysis of the sub-surface resources revealed that several sub-surface water bodies were found to be in a "poor" ecological status due to local or general overuse of the resource. However, this had not been identified through the standard monitoring procedures introduced with the WRF. The NWBMP gave top priority to the definition of new limits on water resource use, but thus far there have been no direct consequences of this action.

The instrument's operation covers a long period of time. We do not focus our analysis on any specific sub-period because we look at what we consider to be the most important experience, i.e. how the role of the WRF has changed, and illustrate that neglected questions during implementation can erode intended outcomes during operation.

2 Characterisation of the case study area

2.1. Land use

The land use of Hungary reflects contradictory extremes. There is a very high proportion of converted land, chiefly agricultural land, with an overwhelming dominance of arable land. Current land cultivation practices are extensive when compared to average European practice. In their management practices, both agricultural areas and forested areas reflect the long lasting effects of large-scale, state owned management – i.e. highly homogenised landscape structure. Consequently, the two most widespread problems with WFD categorisation are the high nutrient load and the bad hydro-morphological status of watercourses.

The agricultural dominance of land use is slowly declining due to reforestation efforts, the disadvantageous economic conditions in the agricultural sector and the accelerating suburbanization process in the prosperous regions. The process has several negative effects on diversity and the natural capital of the countryside.

Table 2.1 - Land use by type

Item	1990		2000		2009	
Country area	9303.00	Q	9303.00	Q	9303.00	Q
Land area	8987.00	Q	8962.00	Q	9053.00	Q
Agricultural area	6474.00	Q	5854.00	Q	5783.00	Q
Arable land	5054.00	Q	4602.00	Q	4585.00	Q
Fallow land					331.00	Q
Permanent crops	234.00	Q	201.00	Q	194.00	Q
Permanent meadows and pastures	1186.00	Q	1051.00	Q	1004.00	Q
Forest area	1801.00	Q	1907.00	Q	2019.80	Fm
Other land	712.00	Fm	1201.00	Fm	1250.20	Fm
Inland water	316.00	Fm	341.00	Fm	250.00	Q

Source: FAO, 2011. Fm = Manual Estimation | Q = Official data reported by countries on FAO Questionnaires

The National Water Basin Management Plan's forecast of land use provides information only about the potential change in agricultural land up to 2015. A 3% decline is predicted compared to the status in 2009 (OVGT, 2010/b).

2.2. Description of hydrology

A second extreme is that Hungary has the highest per capita water resource on the continent, 12,000 m3/person/year (Somlyódi, 2011 page 18). However, there is a high territorial concentration of this supply. Moreover, based on the country's total runoff from precipitation, the total amount available is only 600 m3/person/year. This value better represents the territorially based average for Hungary. However, this value is also one of the lowest on the continent. Several disadvantageous locations face even worse conditions. This circumstance explains why the phenomena of water abundance and water scarcity emerge in parallel.

Table 2.2 - Water indicators

Types	km3/év
Incoming surface water (1961-1990)	112
Outgoing surface water (1961-1990)	118
Precipitation	56
Evapotranspiration	49
Sub-surface water resources	2.41

Source: Somlyódy 2011, Chapter 4.2.2

2.3. Pressures and impacts

The transformation of the Hungarian economy in the beginning of the 90's wiped out the most out-dated resource consuming heavy industries and introduced incentives for the more rational use of production inputs. The decline in water consumption and the lower level of pollutant emissions were the positive side of the economic downturn. The reconstruction of the industrial base incorporated more advanced technologies

that lowered the per capita environmental impact of economic growth. But pressures are increasing again with increasing output in all sectors of the economy. New measures will be necessary to cope with the strengthening demand.

Despite the average abundance of surface water, the consumption trend illustrates the concentrated use of the sub-surface resources across all sectors of the economy, including households. The analysis that accompanied the development of the WFD revealed several elements of scarcity.

Table 2.3 - Water consumption by water source (not included non abstractive uses)

Resource types	Million m3/year
Surface water (average 2006-2009)	480
Bank filtered	305
Sub-surface (average 2004-2007)	583

Somlyódy 2011, page 124 table 4.1

Table 2.4 - Water use by economic activity, 1989-2004 and estimated for 2015 (million m3/year)

Economic activities	**1989**	**1994**	**2000**	**2004**	**2015**
Public drinking water				374	378
Industrial				436	466
Construction and services				106	136
Other and technical				263	206
Total (public waterworks and private wells)	**1555**	**1116**	**1015**	**917**	**980**
Agriculture (total)				606	805
Irrigation				168	220
Fisheries				375	520
Surface: Energy – cooling				4 026	3 893
Surface: In-situ				14 881	13 682

Source: 1989 KSH; 1994, 2000 VKJ Registry; 2004, 2015 OVGT 2010/c

The early stages of the economic transformation resulted in a severe decline in GDP and the deterioration of living conditions and subsistence perspectives. This hindered necessary adjustments in the level of redistribution, while the national budget was burdened with heavy debt payments. This situation strengthened the revenue centralization efforts of the central budget and placed additional burdens on the economy. These circumstances resulted in sluggish growth (compared to growth potential) and an exaggerated need for foreign capital inflows, with no additional resources available for the restructuring of public services. Moreover, after 2002 the declining debt trend began to worsen.

As a consequence, effective enforcement of general environmental regulations and restrictions of local communities over development projects eroded. This decline of effective control advanced in line with the strengthening of the legislation of the same regulations due to the EU accession process. The result was an administrative operation with insufficient resources and a weak mandate to exercise formal authority for preserving broader public interests.

Table 2.5 - GDP time series

	GDP/person (pps)	GDP/person constant 2010 Euros	GDP million constant 2010 Euros
1995	7 568	7050	72 868
2000	10 555	8 222	83 979
2004	13 745	10 074	101 833
2005	14 187	10 284	103 741
2008	16 266	10 573	106 146

Source: KSH/b

Table 2.6 -Population time series

	Population 1000's	Population density persons/km2

1980	10 709	115.1
1990	10 375	111.5
2000	10 222	109.9
2010	10 014	107.6

Source: KSH/c

Table 2.7 - Main economic activities' output of GDP time series

Million EUR (2010)	2001	2004	2009
Agriculture	8532	8071	7511
Mining	378	352	401
Manufacturing	65173	67644	73691
of which			
Food, beverage, tobacco	10541	9549	7921
Forest products	750	769	705
Paper and printing	2932	2445	2207
Oil, nuclear, coal products	3290	3380	5732
Chemical industry	4474	4766	5346
Metallurgy and mineral products	7075	7624	8565
Machinery	2796	3496	4481
Electric machinery, instruments	17773	20596	19811
Vehicle and parts production	9769	10017	13697
Electricity, gas, steam, water provision	6245	7329	6721
Industry total	71796	75326	80812
Other	7734	18437	13545

Source: KSH/d; KSH/e

Table 2.8 -Share of GDP by Economic Sector

Million HUF	2001	2004	2009
Agriculture	0.10	0.08	0.07
Mining	0.00	0.00	0.00
Manufacturing	0.74	0.66	0.72
of which			
Food, beverage, tobacco	0.12	0.09	0.08
Forest products	0.01	0.01	0.01
Paper and printing	0.03	0.02	0.02
Oil, nuclear, coal products	0.04	0.03	0.06
Chemical industry	0.05	0.05	0.05
Metallurgy and mineral products	0.08	0.07	0.08
Machinery	0.03	0.03	0.04
Electric machinery, instruments	0.20	0.20	0.19
Vehicle and parts production	0.11	0.10	0.13
Electricity, gas, steam, water provision	0.07	0.07	0.07
Industry total	0.82	0.74	0.79
Other	0.09	0.18	0.13

3 Assessment Criteria

3.1 Environmental outcomes

The instrument's objectives were the prevention of overuse—the widespread practice of the previous period—and the enhancement of efficient allocation. The imposed upper limit on abstraction - the implicit baseline of the instrument - was out-dated. Table 1.1 illustrates this situation. The licensed quantity in 1993 is lower than the abstracted quantity in the 1980's. But abstraction in 1993 is even lower and this declining trend in consumption has continued (see Table 2.4). Since the start of the transition period in 1989, water demand has been adapting step-by-step to

the new economic circumstances. The more efficient use of production inputs was forced by the introduction of market-driven, cost-based pricing across the economy (for example on energy). This has also led to an increase in the price of water provision. On the other hand, there was also an underlying technological change in industry that likewise reduced input demand. These changes exercised much stronger pressures on demand than the WRF. This is the underlying reason for our view that the EPI has had no relevant effect on change in demand, so no environmental outcome can be reasonably attributed to the instrument.

The relative impact of the EPI is illustrated in table 3.1 . The figures illustrate that, on average, the water charge's share in the net revenue of the most important water user sectors is 0,01%, and only 0,1% after adjustments for taxes.

Table 3.1 – The weight of water charge payments by economic sector and each sector's share of total fees in 2004 and 2005 (in %)

	Statistical code	W.charge to net revenue		W.charge to after tax result		Fee payments' share across sectors	
Economic sector		2004	2005	2004	2005	2004	2005
Agriculture	A+B	0.09	0.1	6.08	2.53	8.65	8.41
of wich Fisheries	B	0.97	0.98	-26.7	105.7	0.72	0.63
Industry total	C+D+E	0.05	0.05	0.92	0.76	86.13	86.53
Manufacturing industry	D	0.01	0.01	0.13	0.09	10.49	9.47
Electric energy prod. Gas, steam, warm water supply	EA	0.2	0.25	5.3	6.25	52.53	54.14
Water abstraction, treatment, distribution	EB	1.56	1.66	45.35	61.19	22.03	22.19
Construction	F	0	0	0.01	0.01	0.12	0.08
Total		0.01	0.01	0.12	0.11	100	100

Source: VKI 2007, table 3.16

Another aspect supporting this argument is that demand trends do not reflect the high rate of water charge increases between 2002 and 2005. Most of the water charge increases were concentrated in this three-year period (see Table 3.2). But the declining consumption trend did not accelerate during this period (see Table 3.3). On the contrary, a turning point in consumption can be identified during the same period. Moreover, after this period had ended, demand increased in some cases. This supports our view that there is no relationship between demand and changes in the WRF.

Table 3.2 - Change in the base-rate of the water charge between 1998-2008

	2008/1998	2005/2002	2008/2006
Rate of change of the base element Nominal	3.0	2.1	1.2
Rate of change of the base element Inflation adjusted	1.7	1.8	1.0

Source: VKI 2007

Table 3.3 - Rate of quantity changes between 1998-2009()

	2009/1998	2005/2002	2009/2006
Surface water	1.14	0.93	1.16
Carstic	0.48	0.65	0.87
bank filtered	0.77	0.91	0.99
Strata	0.83	0.86	1.04
Ground water	0.83	0.80	1.06

Source: VKJ Registry; VKI 2007

The only exception to the above-defined relationship is the agriculture sector. The only segment where the EPI's impact on environmental outcomes can be observed relates to water use in fisheries. After 2004-2005, a sharp decline in consumption coincided with the quick increase of the fee. However, in economic terms this was the worst period for the sector (see table 3.1). Thus independent effects cannot be distinguished clearly. However, after the abolition of the payment obligation for agricultural surface water use, the volumes increased again.

The balance of the environmental impact of decreased water use is ambiguous for two reasons. (1) There was no shortage of surface water resources. And (2) the operation of fisheries provide fringe habitat benefits for animals (fish hunting birds and mammals, some of which are protected). This means that a decline in water consumption must be considered in conjunction with the decline in habitat provision as well. However, no analysis of this problem is available that describes how the environmental value of these habitats and the decline of fisheries

relate to each other. (The request for compensation for the fish consumption of these animals, however, is a permanent issue between fishery managers and the government).

3.2 Economic Assessment Criteria

"A)", As the instrument was extended from a previous resource fee scheme, alternative schemes were not considered at the design phase.

"B)", There was no command-and-control mechanism in place. (Only in the case of emergency situations is there a priority list for supply-closures based on end use.)

The first abstraction-licensing tier of the instrument provides limits on available quantities, but without proposing protocols to be applied if abstraction reaches the prescribed limits. The principal method for granting license requests is grandfathering.

Under the second tier of the scheme, the fee structure was intended to drive demand away from constrained resources. What we can analyse in the context of the EPI is the operation and the outcome of this second tier, the payment calculation method.

"C)", No cost effectiveness analysis underpinning the choice of instruments was conducted during the design phase.

"D)", The original purposes of the instrument were (1) the regulation of water resources and (2) the provision of financial resources for the Water Fund. As a result, the instrument generated cost increases for the economy, especially for the sectors that had previously been exempt from resource use charges. The main groups are (1) public users including households who are serviced by the utilities, (2) industries that are provisioned by the utilities, (3) other industries with their own water provision facilities, (4) agriculture and (5) energy production.

Public and household uses are targeted by the water charge via the waterworks that pass this cost element on to final users. Public and household uses have a preferential status compared to commercial entities. The average per capita charge for these purposes ranges between 0.01-0.02 €/m3, or 2% of the average household water price. Standard industrial rates range between 0.04-0.05 €/m3. (For the context of this fee see Table 3.1 .) Industrial water users provisioned by the water utilities have the least advantageous status. Above consumption of 10,000 m3/year, an additional base fee is assessed and these users face per capita charges three times higher than those for users who have their own abstraction facilities (even if they use the same water body).

This difference pushed the biggest users to develop their own wells. But due to natural water resource endowments, this response could not become widespread. (However, these practices worsened the utilization efficiency of the utilities' networks). Agricultural users ceased to pay the charge for the use of surface waters. Energy production has the lowest average rates (0.000015- 0.005 €/m3), but the volumes used are another magnitude higher than that of other uses.

These rates were designed to raise revenues. (See details in Section 3.3, Distribution and equity). The average rates for the most important use types exhibit a 4-5-fold increase over the 2000-2008 period. Energy related rates experienced a 3-fold increase. The total EPI revenue, 48 million € in 2008, represented a real term increase of 3.8 times compared to 2000 (VKJ Registry).

Table 3.4 - Average unit water charges by principal user type, 2000-2008

Purpose	2000	2008
Medical	0.0039	0.0414
Public / households	0.0021	0.0268
Drinking water economic	0.0083	0.0871
other economic	0.0088	0.0862
Fisheries	0.0002	-
Irrigation	0.0012	-
Energy production	0.0017	0.0112
"in situ" hydro power	0.000003	0.000028
Bath (for profit)	0.0077	0.1043
Surface water	0.0005	0.0029
Carstic	0.0079	0.0510
Bank filtered	0.0005	0.0292
Strata	0.0080	0.0498
Ground water	0.0021	0.0468

Source: VKJ registry, VKKI

The economic restructuring was the overwhelming driving force of decreasing demand therefore benefits of the instrument's operation can be associated with wiser water use due to the more widespread monitoring and reporting that is the precondition of the payment calculation.

The instrument also promoted change in one further respect. Over-application for abstraction licences without real water use was a problem the water authority faced before the implementation of the instrument. The shift to the more precise estimation of requests was due to the improved pricing scheme (compared to the prior industrial water charge scheme). The previous scheme imposed costs only on the *used* and not the *licensed* quantity. As a result, users applied for big safety margins, which pushed up the licensed quantities. Consumption did not reach the resource limit, but big user safety margins complicated the licensing of new requests.

In the new setup, the calculated annual user fee combined the required (licensed) quantity and the consumed one. Two new rules were applied: (1) a fee for 80% of the licensed quantity was charged regardless of actual consumption, and (2) an excess pricing element for over-consumption above 110% of the licensed quantity was introduced in the scheme as well.

These factors motivated a more precise estimation of licensing requests. As a result, less was required and the share of the unused licenses decreased. This positive effect lasted into the first phase of the operation of the instrument (from 1994 to 2000). In the second period (2002-2009), this improvement eroded significantly (see details in Policy Implementability 3.5). However, in the context of declining demand, this change had no additional beneficial effect.

Table 3.5 - Safety margins in entitlement requests (rate of used/licensed quantity)

Purpose	1994	2000	2009
Medical	0.96	0.99	0.85
Public / households	0.94	0.98	0.89
Drinking water economic	0.78	0.92	0.61
other economic	0.95	0.96	0.75
Fisheries	0.78	0.77	0.64
Irrigation	0.70	0.69	0.42
Energy production	0.92	0.90	0.87
"in situ" hydro power	0.85	0.97	1.00
Bath (for profit)	0.49	0.92	0.67

Surface water	0.89	0.94	0.96
Carstic	0.94	0.93	0.85
Bank filtered	0.99	0.99	0.93
Strata	0.84	0.95	0.80
Ground water	0.92	0.94	0.69

Source: VKJ registry, VKKI

"E)", The distribution of the cost burden is discussed in Section 3.3.

"F)", The risk, in case of abstraction, is resource overuse. To mitigate this risk it is not the EPI type that is important, but rather the careful management of the instrument. The EPI motivated and extended metered water use as a by-product of the water charge payment obligation. This contributed to better quality information on the resource status. In this sense it enhanced the prevention of resource overuse. But the WFD evaluation of the sub-surface water bodies revealed that some of the heavily used sub-surface water bodies either have a poor ecological status (from the perspective of quantity), or no further expansion of abstraction is possible without threatening good status (OVGT/d chapter 5.3). The lack of political support for strict resource management (see the section on Institutions) resulted in the limited supply of monitoring and supervision activities and resulted in the failure to reveal overuse.

"G)", The use of the instrument's revenues changed several times during its operation. (See details in section 3.6 Policy Implementability). The collected revenue does not cover the proper operation needs set out by the WFD (OVGT/d Chapter). The Plan proposed a two-fold increase for this specific purpose. Further proposals addressed the internalization of the recently un-recovered resource costs.

"H)", The water resource fee expressed the right message: that the water resources belong to the public and the user of these resources should pay for them. This enhanced the wiser use of resources. But it failed to regulate water resources as a production input.

The improvement of the allocative efficiency of resources was to be achieved using the matrix of multipliers ("g" multipliers, see Table 7.1) that reflect the relative scarcity of different water resource types and the purpose of the water use.

However, herein lays the fundamental problem of the instrument: the signals for resource allocation and the different economic and social policy preferences were mixed in these values.

It could be argued that the pre-determined differentiation between multipliers by scarcity levels can provide a cost-effective signal in spite of the fact that this arrangement does not reveal the exact differences of the marginal benefits of different uses. There is a working example for this solution. But the differences between the two setups highlight the problems the Hungarian EPI faced.

In the water pricing literature there is an analogous instrument. But that one provides an unequivocal signal for the preferences of the authority. The abstraction charges in the UK and Wales (OECD 1999, page 194) represent such a scheme that reflects the scarcity characteristics of resources by using multipliers for the payment calculation. In the 1991 Water Abstraction Act, the UK applies three factors – a source factor, a seasonal factor and a loss factor (OECD 1999, page 195, table 28.2). But this instrument was designed to cover the expenses of the bureaucracy that supervises and regulates the water withdrawal activities and the calculation method only plays a secondary role. In spite of this, the method clearly reflects the status of the resources and provides appropriate signals to users. Moreover, the method does not distinguish between water use purposes. It provides a good example of how different policy goals can be integrated.

In our case, the multiplier values are intended to express two contradictory preferences. The resource allocation principle was overridden by another one: differentiation by water use purpose. The principal role is to highlight economic- and social-policy preferences across users. There are different multipliers for public and commercial use and there are distinct multipliers for some definite (agricultural and industrial) functions. The per capita values were further adjusted according to the regulator's expectation about each sector's ability to pay. (This is the reason for the concentrated burden of the fee discussed in the context of equity). This scheme impedes the efficient allocation of resources.

"I") The structure of the instrument contains the aspect of asymmetric information. The differences in the "G" multiplicator matrix expresses the preferences of the regulator about the preferred distribution of consumption among resource types and purposes of use, but the system reveals nothing about the users valuation of the resource as a production input that has economic value for them. Without this type of information the regulator can not achieve efficient allocation of the resources, which is the main problem. But at the same time can not know how affordable the charges are for the different users types, which information the preferential charge setting is based on. The intensity of user group complains are not a good signal.

3.3 Distributional Effects and Social Equity

Table 3.1 (last column) shows the distribution of the fee burden across economic sectors. It reveals the concentrated impact of the fee on the energy sector (54%) and the water provision services (22%). The biggest contributing uses are "in-situ" water use by hydro-electric stations, cooling water use by power stations and water withdrawal by water utilities. Together they supply 76% of the fee revenue. The next group, the manufacturing industry, only has a 9% share (see table 3.1, column 4). This is the same share agriculture previously had. However, since the completion of the study (VKI, 2007), the payment obligation for agricultural users has been discontinued.

On the whole, the water charge acts as an extra tax on energy production. Households use 40% of the sold water and have a 22% share of the charge in 2009. They use a similar share of the produced electricity as well. In total, households pay approximately 40-45% of the fee revenues through their electricity and water bills (VKJ Database).

Agriculture was the most strongly affected economic sector when calculating the fee as a share of the net revenue of the sector (Table 3.1). Agriculture as a whole, and fisheries as the biggest water user in the sector, were in dire economic circumstances before and during the EU accession. Though they essentially competed in the single market, they did not receive subsidies from the European Agricultural Policy. By and large, this was a loss-making period (Table 3.1 illustrates this.). In this situation, water charge increases had a significant impact on the profitability of agricultural activities. However, this triggered successful lobbying activities and the fee for the use of surface water in agriculture was eliminated.

The underlining reasons for this success and for why the regulatory function was ultimately mismanaged are discussed in 3.4 Institutions. Lobbying activities overcame the weakened bureaucratic determination to enforce the control of resource use. In this sense, the decision to eliminate the fee for agricultural users was not an equity issue.

In chapter 3.2 (Economic Assessment), the negligible effect of the EPI was discussed. Without clear adaptive responses (behavioural changes) induced by the instrument across the water users there are no wider social effects that would be reasonable to assess. We consider the potential changes the EPI's operation could make on households, the industry and agriculture, but we have found no reasonable changes it induced on matters like: health, education, personal activities, the environment, security and social connections. As Table 3.1 already has shown the EPI's share as a cost element is minimal, its employment effect must be negligible as well.

The successful lobby activities are mentioned several times in the text. In spite of this it doesn't really represent improving expression of "political voice". Ministries often act as they were the highest level of a sector's interest group instead of acting as the regulator of that sector on behalf of the government. These lobby "successes" should be viewed as signalling the ability of gaining concessions from the government when this ability was cut back on other important problems.

3.4 Institutions

In principle Hungary is a democracy and a market economy. However, behaviour towards the state is ambiguous. Most of the time, the state represented more of a coercive power instrument manipulated by another country, than the embodiment of an institutional structure for the provision of services. The centrally planned economy that confiscated and put constraints on private property deepened the perception that the state's property was for someone else's benefit and taxes were not for the public good. Consequently the state became the omnipotent, but illegitimate agent of all problems with all the resources in hand. But from these resources – by the common sense - it was justified to use for individual purposes (stole). The centrally planned economy also left a fundamental misconception regarding the role of prices in the market: the notion that price-setting should be mindful of people's circumstances. Based on these fundamentals, the price of water, the price of water provision and the fee for the right to use water that is the property of the state are somehow blurred. (Analogous to the blurred difference between demand and need.)

Moreover, paying the state for something that seems abundant is difficult to accept.

The problem of providing the necessary amount of water for different needs is considered a technical and not an economic question. Financing was an element of the technicalities that should be obtained through the state. The result is a situation with little appreciation of the concept that pricing strategies represent the cheapest form of regulation (even if no immediate scarcity problems are present). Thus it is in the users own interest to maintain the rules of the game.

The complex water endowment situation of the country provides little help as well. Do we have too much water with floods and inland inundations or are we running out of it with increasing drought risk, declining sub-surface water levels?. The need for the thrifty water use is usually stressed. At the same time, however, the water utilities struggle with low rates of infrastructure utilization due to previous overshooting of demand forecasts and the recent decline of consumption.

Water management is an agency function. But in Hungary it used to be an "authority": a state in the state that fulfils water management functions, sets its own goals and supervises the proceedings without effective public control on decisions that have external effects on other activities. The Water Fund was the vehicle that financed the water directorates' small scale development projects and surplus activities. Originally the Water Resource Fee was the financial source of the fund. It was redesigned in 1994 to include resource regulation as well. And since the water directorates were integrated into the Ministry of Environmental Protection and Water Management, the scope of the fund was further widened to cover environmental protection.

These conditions narrowed the choice of selecting an instrument to regulate resource allocation. But it simplified the implementation of the new elements as it relied on previous practices and processes. Further, the self-interest of the administration in maintaining and extending its operations likewise contributed.

The gradual deterioration of the fee's resource regulatory function is closely connected to the restructuring of the national budget. The autonomous budgetary sub-units, of which the Water Fund was one, were abolished in 1999. This resulted in the loss of the regional authorities' incentives to keep a close eye on the fee's operation.

The other main cause for the deterioration of the resource allocation function originates in the conflicting dual purpose of the instrument (influencing resource allocation and revenue generation). In short the fiscal purpose defeated the regulatory purpose. The growing fees triggered successful lobbying activities aimed at eliminating the payment obligation for some uses. One reason behind the success of these struggles was the policymakers' weak understanding of how the regulation was intended to work through the payment scheme and why. But giving preferential excesses from general rules for kinship on the expense of long term public interests are well embedded in the deeply embedded institutions.

The design and implementation of this instrument was in line with the underlying expectations and methods that the water managing bureaucracy had intended and developed (the concept of the value proportional fee).

3.5 Policy Implementability

The aim of the EPI's introduction was to enhance the fulfilment of the resource regulator's tasks in an effective way.

The flexibility (potential for adjustment) of the instrument originates from two sources. (1) The licensing of user quotas provided a control of overall consumption, albeit without a proper adjustment mechanism in the case of scarcity. This lack of protocol diminished the effectiveness of control.

(2) The fee structure incorporated a series of multipliers (see page 2 in Background) to address quantity and quality issues, since the regulator wants to distinguish between and represent them in the fee calculation. This assumed that the adaptation of consumption behaviour would take place through the modification of the resource type / purpose multiplier matrix. This structure provided the potential to signal users about changes in the relative value of the resource after an increase in use had taken place.

The instrument was designed to be flexible, but there were no requirements concerning the timing of adjustments. The "Base" rate was increased year by year but it wasn't an automated inflation adjustment. The "G" matrix was restructured in 1999 (43/1999). The agricultural uses were differentiated, the energetics and bath purposes were introduced and the mining as a separate abstraction type was abolished. Since then the matrix structure and the modification values haven't been changed.

Public participation in its implementation was lacking. The implementation of the instrument followed the usual procedure for law preparation. Proposals have to be discussed with all ministries responsible for affected sectors and the finance ministry. This closed method had its consequences:

The general acceptance of the instrument was ambiguous (see Institutions, section 3.4). And the following points strengthened this view. The instrument was designed based on the assumption of increasing consumption. But the trends headed in the opposite direction. This forced the fee per cubic meter to fulfil its fiscal revenue purpose with constant increases. (Between 1995-2008 the base-fee increased 180% in real terms, 550% in nominal terms.) This process reduced stakeholder perceptions of the EPI as a regulating instrument, especially in contrast to its fiscal goal.

After the earmarked status of the EPI's revenue was abolished in 1999 to increase the revenues of the central budget. With this change the balance of objectives was altered. The revenue raising potential for the national budget was significantly highlighted and the regulatory role degraded. The usual way to increase total revenue was to increase the instrument's base-fee, as it was mostly paid by the energy and the water utility sectors. These were inflexible intermediaries who simply passed the extra burden on to final consumers.

Meanwhile some user types, especially the agriculture sector, were more cost sensitive and tried to gain special treatment. From a fiscal policy point of view (based on their low weight in the total payment but intensive lobbying) it was reasonable to differentiate. This resulted in the expansion of the purpose list with favourable coefficients in the fee calculation multiplier matrix. But the base rate was increased two-fold (in nominal terms) between 2002-2005, which intensified lobbying efforts.

Growing fiscal and lobby pressures from the agricultural sector weakened the regulatory (quantity control) function in two ways. First, the payment obligation for irrigation was cancelled during drought periods (an allocation nightmare in itself). But later on, all fee payment obligations for agricultural use, including irrigation, fisheries and rice production were eliminated. This was represented as state assistance to improve the poor economic standing of the sector. This implied not just a controversial signal, but worsened the effectiveness of monitoring as well, since neither the self-reporting user nor the administrative bureaucracy had any remaining incentive to assess exact volumes. Though the change has impacted only a partial segment of stakeholders, the overall message undermined the credibility of the instrument.

The other general weakening element that had an adverse effect on monitoring was the attachment of payments to the licensed volumes, even though this made bureaucratic sense. 80% of the licensed volume has to be paid independently of effective consumption. This makes both the user and the control authority less interested in going after actual consumption and diminishes incentives for reporting accuracy. (Though it was a useful tool up until the licensed quantities had to be curtailed, it proved to be counter-productive after the decline in consumption that took place between 1994 and 2000.)

The deterioration of monitoring effectiveness was revealed in the WFD preparation phase. The coherence of the self-reporting of water use declined significantly. Table 3.6 illustrates the change over time in the share of missing data in the water resource fee registry compared to the number of licences. The National Water Basin Plan formed proposals to improve the quality of administrative operation, but no further action has been taken yet.

Table 3.6 - The growth of missing data in the fee registry

		2003-2004 average	2005-2007 average
Number of licences	pc	9850	10230
Missing data on the licensed fee (in HUF)	%	3%	16%
Missing data on used quantity (in m3)	%	29%	37%
Missing data on payment (in HUF)	%	26%	40%

Source: VKI, 2009: 30

Weighted by water use, the average non-compliance of total used quantities is 4% (missing information). The maximum values are 13-14% in the case of thermal and groundwater use (VKI, 2009: 31).

These effects are the underlying cause for the increasing safety margins over the period 2000-2009 that reversed the beneficial trends of the previous period as illustrated in Table 3.5 . These figures indicate that the changes in the operation of the EPI influenced implementation significantly.

There was no public participation process in the implementation, the proposal went through the rounds of conciliations among the ministries that supervised the effected economic sectors.

The "Water Resource Fee" was introduced well before the EU accession process, so current sectoral policies cope with it as given. The WFD requirements on cost recovery highlighted the shortcomings of the current setup of the instrument. The purpose-based fee differentiations contradict these principles and these are the main targets of lobbying activities. This is why the WFD compatible restructuring of the instrument could have potential for synergies. But in its current state, where its main function is to generate revenues for the national budget, these potentials represent missed opportunities.

Table 3.7 – Synergies and barriers of sector policies

EPI: Objective	Regulate water consumption, enhance efficient allocation of the resource
Delivery mechanism	Imposing water charge that differentiates by resource and purpose types
Common Agricultural Policy (Agro-Environmental Policy)	Objective: Enhance sustainable use of renewable natural resources of agricultural production. Effect: 0 Hungarian agricultural practices (in general) are less resource intensive than of the old EU countries. In Hungary CAP means more subsidy for the agriculture than before, but it results in giving more generous financing for the old practices, than express strong incentive for adapting new, better ones. The Agri-Environment Scheme is a good example to this. Its dominant element is the “Integrated arable land” program. It gives leeway for the current practices not pressurises toward improvement. The programs result in no overall unit decrease toward more efficient resource use, in the contrary better financing will result in growing consumption.
EU Energy policy (Renewable Energy Policy)	Objctive: Support renewable energy production. Effect: + The subsidized purchase of electricity from renewable energy sources (Gov D 389/2007) gives a 200% higher unit price for small hydro generation than the average purchase price. It is among the highest rates that are differentiated by renewable resource type and production size (MEH 2011:25). It enhances the efficient use of the resource. Weak regulation on thermal water use and the connected investment subsidies can not fulfil the back pumping of cool thermal water for resource protection. (OVGT, 2010/d:254)

EU Water Framework Directive	Objective: Users have to cover the cost of their water use. Effect: + The economic assessment criteria of the WFD provided a clear need for restructure the EPI in a way that will support its initial goals more effectively. The Directive introduced new indicators to assess the status of water resources. It revealed the need for better administrative operation.

Notes: + represents a positive synergy between the objectives of the EPI and the other policy; 3 levels: + (low positive interaction),++ (medium),+++ (high positive interaction)
0 represents no discernible interaction
- represents a negative effect between the objectives of the EPI and the other policy; 3 levels: - (low negative interaction),-- (medium),--- (high negative interaction)

3.6 Transaction Costs

There is no comprehensive information available about what costs the introduction and the operation of the instrument generates.

No impact assessment studies are available about the process from the period of its introduction, nor from 1999 when the mayor changes of its status was reset. There is no data about the extra costs, the design and implementation of the instrument imposed on the bureaucracy compared to its normal operation routines.

The operation of the water charge raises costs for both the economic actors and the state administration. 10 thousand commercial actors are obliged to pay the water charge. Self-reporting of the abstracted/used quantities and the charge payment is quarterly. The information necessary for reporting overlaps with the data requirement of compulsory statistical reporting of the firms. It means it is one among the several fringe activities for a person both in the financial and technical administration.

Currently three authorities are involved in managing the instrument. The department of Water Basin Management and Water Protection of the Ministry of Rural Development is named to be responsible for the instrument from conceptual and legal point of view. The regional Environmental Protection, Nature Protection and Water Management Authorities receive the user reports of water withdrawals, supervise compliance with data supply, and receive the payments from their own regions. The regional directorates forward the collected payments to

the National Tax and Custom Office. The General Directorates of Environment Protection and Water Management maintain the database of the registry that is part of the Ministry's central database.

The responsibilities for the operation of the charge are delegated to one person in both the ministry and the general directorate, but this is one of several tasks without a predefined time allocation. Without a proper time allocation for officials, costs cannot be accurately estimated. Recent capacities on the side of the state mean that it cannot provide more than the simple administration of reporting and payments.

3.7 Uncertainty

The environmental objective of the EPI was the prevention of overuse. Its economic objective was the prevention of consumption conflicts.

The environmental objective was made quantitatively measurable in an indirect way. Licenses are the limits on annual abstractions from each resource body. But there is uncertainty about the validity of these limits because the estimations of the water balance of sub-surface water bodies is not 100% accurate. This postpones action on behalf of the water authority to take conflicting consumption reduction measures. This fits however into the water management bureaucracy's strategy of solving problems only after they have emerged. The environmental objective could have been fulfilled with adequate precision (as was done during the WFD assessment procedure), but it was not.

The economic objective – efficient allocation - was not specified clearly in a quantitatively measurable way. Neither was its fulfilment determined by any measurable criteria.
The objectives – more efficient resource use, prevention of overuse – were fulfilled as the by-product of the economic transformation, not due to the implementation of the instrument. However, no quantitative analyses of this question have been conducted. Thus this remains an expert opinion.
The distributional effects were assessed based on data drawn from the database of the 'Water Resource Fee" – on a quantitative basis. No formal conditions were attached to this information as an objective of the instrument.

The introduction of the EPI was a reasonable effort on the part of the water administration to preserve the ability to regulate water resource use in unforeseen market conditions. It applied means that the bureaucracy was capable of managing. But it became out-dated and counter-productive as restructuring failed and the instrument was captured by its fiscal function.

Pedigree matrix

Table 3.7 - Pedigree matrix for the quantified variables of the case study

	Environmental outcomes	Economic assessment criteria	Economic assessment criteria / Distributional effects
EPI to be assessed	EPI's effect on consumption trend -	Licensing optimization	Stakeholders' impact
Variable	Annual consumption	Required and used quantity	Water charge payments
Proxy	0	3	3
Empirical	4	4	4
Method	2	3	3

Values of the table refers to the uncertainty qualifiers of the Guideline

4 Conclusions

4.1 Lessons learned

General Remarks

The Water Resource Fee is a multi-purpose instrument with abstraction control, resource allocation and financial goals. But during the operation of the instrument, the balance between these functions collapsed. Currently, its operation does not reflect a coherent basis for any of its original goals. This is the underlying reason why we view the water charge system as a failure.

- During a general decline of demand the status of some heavily utilised sub-surface water bodies shifted to a poor status based on the WFD standards.
- In the end, the charge rates managed by the regulator reflect the presumed user group's ability to pay rather than the scarcity of resources or differences in resource costs across water resource types and utilization rates.
- At the starting point, the earmarked revenues covered the cost of supervision and the investments required to develop the water use services. But step-by-step, the instrument was overwhelmed by the general revenue raising interest of the central budget. Fee payment lost its connection to the service paid for.

Lessons learned by criteria:

Environmental Outcomes: though since the implementation of the instrument in 1993 there has been a general declining trend in water abstraction, this is not the result of the EPI. The water charge's effect is negligible compared to other drivers of change: the increasing price of water and the technological improvement of the Hungarian economy. Thus, we estimate that the water charge, as a cost element, has not changed the behaviour of water users.

Economic Assessment Criteria: Based on the above reasoning, the instrument has had a negligible effect on overall efficiency gains.

All water abstraction above the 500 m3 per annum is targeted. But unit charge values for the same resource are different for the public sector, including households, industry (in general) and some individually handled user types in agriculture and energy generation. This differentiation of abstraction by use with pre-set rates impedes efficient allocation.

Distribution and Equity: The burden of payments are concentrated on a few sectors: in particular on the different forms of water use in energy generation and the water utilities. Together, these two users pay 75% of charge revenues. Because half of the payment is related to energy production, from a fiscal point of view it ended up being an additional tax on energy through water that is ultimately paid by end-users through their energy bills. The history of the instrument reflects this shift in emphasis.

Institutions: Fee-setting as a form of regulation is still not commonly accepted in Hungary. Public opinion still fails to distinguish between the fee for water provision and the price. The instrument was seen as an unjust tax, as it later turned out to be. Not only the targeted stakeholders viewed it this way, but policymakers had no opposing view. The chronic deficits of the central budget and the periodic restructuring of the government's water and environmental management bodies strengthened the unilateral dominance of the instrument's fiscal aspect. Both are the long-lasting effects of the economic transition period.

Transaction Costs: There is no comprehensive information on the subject.

Policy implementability: The design of the instrument improved the structure of a previous water charge on industrial water abstraction. This facilitated implementation and political acceptance at the government level, and this way did not need to gain wider public acceptance. These short-term gains during the implementation phase resulted in the long-term problems of non-acceptance. The instrument has an unfortunate design – a very detailed set of fee-modification multipliers - that encourage targeted lobbying activities for preferential treatment.

The quality of administrative supervision declined after the abolition of the earmarked status of the revenues.

Uncertainty: Data for the analyses was drawn from the Water Resource Fee database. Uncertainty in our general statements can be attributed to the missing data in the database and the self-reporting method of data provision. But we regard the level of this uncertainty from the perspective of our analyses is low. Self-reporting in principle has a random verification that means over consumption of the individual limits has low probability and the licensed quantity declined.

Uncertainty can be identified as related to the volume control function of the EPI. The maximum limits of licensed quantities are quantified, but the simulations that generate these data have to cope with very complex geological situations. These estimations also exhibit a degree of uncertainty. Constant upgrading of these models is not assured. That is the reason why the National Water Basin Management Plan with its upgraded analyses and new aspects of defining bad ecological status of sub-surface waters resulted in identifying such water bodies.

There were no unintended effects of the instrument's operation. Unintended effects can be attached to the way the instrument was managed. The most notable of these effects was the decline in reporting discipline.

The National Water Basin Management Plan evaluated the instrument. It assessed its compatibility with the WFD criteria and proposals for its improvement were made. But up to now, no further steps to develop this part of the Plan have been taken. The proposal targeted the fee calculation method, the use of the revenues and the management of the poor status of the water bodies. It also proposed to define the fee as the revenue vehicle for covering the authority's cost of implementing and managing the control functions specified in the WFD.

Regarding the fee calculation method, the replacement of the use-defined fee-multipliers was proposed. The newly proposed multipliers would differentiate according to the use's effect on the status of the water body, namely abstractive and non-abstractive uses, the timing of the withdrawal, and a preference for storage.

In the case of water bodies that have been found to be in a poor ecological status, in particular due to over-abstraction, the decrease of the licensable quantity and the introduction of market based procedure for the allocation of the licenses were proposed. The WFD Plan didn't gave one specific solution. This procedure could be the combination of grandfathering a part of the licenses and handing over the rest via auction. This type of allocation may fit better into the institutional context of the country than a step-by-step proportional decrease of all the abstraction licenses with the possibility of exchange in a newly developed market.

4.2 Enabling / Disabling Factors

The water charge addressed an important but very technical problem that lacks public acceptance of the resulting policy actions.

No clear priority was set between the stated functions. This was the underlying reason why the coherence of the instrument dissolved.

The institutional interests of the water bureaucracy were hurt by the centralization of the revenue stream, which eliminated the authority's incentive to maintain high quality, responsive management of its operation.

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Section 3

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VKJ Registry – Database of the Water Resource Fee – managed by (VKKI) Water Management and Environmental Protection General Directorate

7 Annexes

Annex I:

Table 0.1 - The"G" multiplier matrix for water charge calculation

		Purpose of use									
Water resource type	Scarcity* / Quality category	Medical	Public	Drinking water for economic	Other economic	Fisheries and rice production	Irrigation	Animals	Energetics	In-situ	Bath for profit
Surface water	1st	×	0,6	1	1	0	0	×	0,4	0,001	1
	2nd	×	0,7	1,1	2	0	0	×	0,4	0,001	1,1
	3rd	×	0,8	1,2	2,5	0	0	×	0,4	0,001	1,2
	4th	×	0,8	1,2	3	0	0	×	0,5	0,001	1,2
Water with medical significance		1	5	5	10	×	×	×	×	×	5
Karstic	1st	1,2	1,2	3	6	×	×	4	×	×	3
	2nd	1	1	2	5	×	×	3	×	×	2
	3rd	0,5	0,5	1	4	×	×	2	×	×	1
Thermal		1	1	3	7,5	×	×	×	×	×	3
bank filtered	1st	1	1	3	4	×	0	3,5	×	×	3
	2nd	0,8	0,8	2	3	×	0	2	×	×	2
	3rd	0,5	0,5	1	1	×	0	1	×	×	1
Strata	1st	1	1	3	5	×	0	3,5	×	×	3
	2nd	0,8	0,8	2	4	×	0	2	×	×	2
	3rd	0,5	0,5	1	2	×	0	1	×	×	1

* in case of surface waters

Source: VKJ 1999 Magyar Köztársaság a 43/1999. (XII.26.) KHVM http://www.vkj.hu/kotelez/index.html