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## **IZAZOVI ZAŠTITE OKOLIŠA U KOMUNALNOM GOSPODARENJU OBALNIH PODRUČJA**

### ***ENVIRONMENTAL CHALLENGES FOR COASTAL UTILITIES MANAGEMENT***

#### **SAŽETAK**

*Kao dio istraživanja vezano uz model zaštite okoliša utemeljen na komunalnom gospodarenju primjeren tranzicijskoj i obalnoj zemlji kao što je Hrvatska, autorica je provela anketu među hrvatskim komunalnim tvrtkama koje se bave vodoopskrbom i/ili odvodnjom i/ili gospodarenjem otpadom. Rezultati ankete komunalnih tvrtki u Republici Hrvatskoj ukazuju da se prilikom investiranja, u dovoljnoj mjeri, ne uzimaju u obzir troškovi održavanja te da ulaganja u komunalnu infrastrukturu nisu uvijek optimalna i u funkciji zaštite okoliša. Nadalje, autorica smatra da za oživotvorenje zaštite okoliša nisu uvijek neophodna velika ulaganja, te da uz bolju organizaciju postoje manje skupa i učinkovitija rješenja. U radu se navodi da je pojam decentraliziranih sustava otpadnih voda nedovoljno poznat, kao i to da su Hrvatske vode svojevrsna nepoznanica za komunalne tvrtke, da prevladava načelo "onečišćivač plaća", i da je obrada otpada u blizini mjesta njegovog nastanka ekološki i troškovno prihvatljivo rješenje, te da je neprimjereno da privatni kapital upravlja javnom službom. Rezultate ankete treba uzeti u obzir u okviru usklađivanja komunalnog sektora prilikom pristupanja Hrvatske Europskoj uniji.*

**Ključne riječi:** zaštita okoliša, obalno područje, komunalno gospodarstvo, voda, otpad, komunalna infrastruktura

#### **ABSTRACT**

*As part of the research concerning environmental protection model based on waste and water utility management, appropriate for a transition country such as Croatia, the author has surveyed Croatian utilities operating in water supply and/or sewerage and/or waste management. The results of the survey of municipal utilities in the Republic of Croatia indicate that the costs of maintenance are not sufficiently taken into account when investing, that investments in utility infrastructure are not always the most optimum ones and in function of environmental protection, that major investments are not always indispensable for implementing environmental protection, and that less expensive and more efficient solutions do exist in better organizational setup, that the concept of decentralized sewerage is not sufficiently known, that Croatian Waters are not an entity that utility service companies are quite familiar with, that "polluter pays" principle is not prevailing, that waste treatment close to the site of its production is an ecologically and cost-wise acceptable solution, and that it is inappropriate for private capital to run public service. The author is of the opinion that results of the survey should be taken into account within the context of aligning the municipal utilities sector on the occasion of Croatian accession to the European Union.*

**Key words:** environment, coastal areas, utilities management, water, waste, utilities infrastructure

## 1. UVOD

Jedan od najvećih izazova današnjice je zaštita okoliša putem komunalnog gospodarenja vodoopskrbom, odvodnjom, pročišćavanjem otpadnih voda i zbrinjavanje komunalnog otpada. Pri tome su pojedinačna rješenja teško usporediva s obzirom da svaki lokalitet ima svoja specifična obilježja koja treba poštovati, tako da nije primjenjiv jedinstveni recept za zajednice u dostizanju održivosti, već samo postoje opća zajednička obilježja.

Republika Hrvatska se u pogledu vodnih resursa svrstava među bogatije zemlje Europe, iako su podzemne vode teritorijalno neravnomjerno raspoređene, pa se lokalno pojavljuju problemi nestašice vode, posebno u ljetnim mjesecima na obalnom području, vidi također [1]. Činjenica da se pročišćava vrlo mali udio otpadnih voda [2, 3] predstavlja posebnu opasnost za kraško tlo obalnog područja, a time i podzemne vode, površinske vode i obalno more izgrađenih i turističkih područja. Zbrinjavanje krutog otpada značajno zaostaje za standardima Europske unije (u organizacijskom i financijskom smislu), vidi [4], što samo po sebi predstavlja značajan ekološki problem u Republici Hrvatskoj.

Problem dalje otežava činjenica da se prilikom provedbe ekoloških projekata precjenjuje odnosno iskustvo drugih zemalja, njihova zakonodavna rješenja i strategije, dok se posebnosti hrvatskih problema, osobito na obalnom teritoriju podcjenjuju, vidi također [5].

## 2. ANKETA O UPRAVLJANJU KOMUNALNIM RESURSIMA

Za potrebe istraživanja modela zaštite okoliša utemeljenom na komunalnom gospodarenju otpadom i vodom, primjerenim za zemlju u tranziciji kao što je Hrvatska, autorica je anketirala hrvatske komunalne tvrtke koje se bave vodoopskrbom i/ili odvodnjom i/ili zbrinjavanjem komunalnog otpada. Opće obilježje sektora komunalnog gospodarenja u Republici Hrvatskoj je da ono uglavnom spada u nadležnost općina, odnosno gradova.

Provedena je anonimna anketa među hrvatskim komunalnim tvrtkama u svim županijama Republike Hrvatske. Respondenti su poglavito iz redova tehničkog osoblja srednje rukovodne

## 1. INTRODUCTION

One of the major challenges today is protecting the environment through municipal utilities management of water supply, sewerage, wastewater treatment and solid waste management. In this particular sector individual solutions are hardly comparable as each locality has different characteristics that are to be respected, so that a unique recipe is not applicable for communities in reaching sustainability, but only the general common features.

The Republic of Croatia is in terms of water resources one of the richer European countries although the non-uniform territorial distribution of its groundwaters results in local water shortages, especially in the summer season, see also [1]. The fact that very small portion of wastewaters is treated [2, 3] poses particular threat on karst soil in coastal region, and thus on groundwaters, surface waters, and coastal sea of urbanized and tourist areas. Solid waste management significantly lags behind the standards of the European Union (in organizational and financial terms), see [4], and itself represents significant environmental problem in the Republic of Croatia.

The problem is further aggravated by the fact that when environmental projects are implemented, relevant experience of other countries, their legislative arrangements and strategies are being overvalued, while specific features of the Croatian problems in a particular territory are undervalued, see also [5].

## 2. SURVEY ON THE MUNICIPAL UTILITIES GOVERNANCE

As part of the research concerning environmental protection model based on waste and water utility management, appropriate for a transition country such as Croatia, the author has surveyed Croatian utilities operating in water supply and/or sewerage and/or waste management. General feature of the municipal utilities sector in the Republic of Croatia is that for the major part it falls within the competence of municipalities/cities.

An anonymous survey was undertaken throughout utilities in all the counties of the Republic of Croatia. Respondents for the most part came from the ranks of mid-level technical personnel in companies, more precisely those

razine, točnije osobe koje dobro poznaju problematiku rada vlastitih tvrtki i radne procese, sagledavaju cjelinu poslovanja tvrtke, zainteresirani su za njenu produktivnost, a ujedno su i sami korisnici komunalnih usluga tih tvrtki<sup>1</sup>.

Upitnik je odaslan na 117 adresa. Odgovore je poslalo 68 ispitanika, što znači da je odziv bio 59%.

### 3. REZULTATI ANKETE O UPRAVLJANJU KOMUNALNIM RESURSIMA

Anketirane tvrtke su poglavito one višenamjenske gdje je u većini slučajeva jedna od djelatnosti vodoopskrba i/ili odvodnja. Glavnina anketiranih tvrtki rade na području više od jedne općine, od kojih samo jedna nije u vlasništvu općine, odnosno grada, što odražava stvarni status komunalnog sektora u Republici Hrvatskoj.

Odluke o komunalnom sustavu kod gotovo svih ispitanih tvrtki donosi političko tijelo. U jednoj četvrtini slučajeva ispitanici nisu upoznati s podacima o godišnjim prihodima i rashodima komunalnog sustava na njihovom području. U najmanjem broju slučajeva je prosječan mandat uprave tvrtke dulji od 4 godine. Podjednak je broj tvrtki s prosječnim mandatom uprava do 2 godine ili između 2 i 4 godine.

Zanimljivo je da su Hrvatske vode<sup>2</sup> u koje se slijevaju velika financijska sredstva iz različitih naknada i koje postaju glavni subjekt administriranja inozemnih zajmova u vodnu infrastrukturu, pa čak i komunalnu [8], svojevrsna nepoznanica za komunalne tvrtke, koje čak u ime i za račun Hrvatskih voda naplaćuju različite naknade od korisnika. Nadležnost županije<sup>3</sup> u komunalnom sektoru nije poznata ili je samo djelomično poznata većini ispitanika. Nadležnost grada, odnosno općine u komunalnom sektoru je ispitanicima daleko više poznata nego nadležnost županije.

<sup>1</sup> Autorica smatra da lokalno stanovništvo poznaje i zainteresirano je za gospodarenje lokalnim prirodnim resursima i da odnosno znanje o unapređenju okoliša koje postoji samo lokalno, ne treba zanemariti (vidi također [6]).

<sup>2</sup> Hrvatske vode su pravna osoba za upravljanje vodama u Republici Hrvatskoj [7].

<sup>3</sup> Županija je jedinica područne (regionalne) samouprave čije područje predstavlja prirodnu, povijesnu, prometnu, gospodarsku, društvenu i samoupravnu cjelinu, a ustrojava se radi obavljanja poslova od područnoga (regionalnog) interesa [9].

persons who are familiar with operational issues and work processes in their companies, who are able to conceive the integrity of operations of their own companies, who are interested in corporate efficiency, and are themselves very often the users of utility services provided by their own companies<sup>1</sup>.

The questionnaire was sent to 117 addresses. There were 68 respondents or 59 % who returned completed questionnaire forms.

### 3. RESULTS OF THE SURVEY ON COMMUNAL RESOURCES MANAGEMENT

The surveyed companies are for the major part multiutility companies where one of the activities in the majority of cases is water supply and/or sewerage. The majority of companies surveyed operate on the territory of more than one municipality. All but one company are owned by the city/municipality, reflecting actual state of utilities sector in the Republic of Croatia.

Decisions concerning the municipal utility system are in almost all the companies surveyed taken by a political body. In one fourth of the cases the respondents are not familiar with annual revenue and expenditure data of the municipal utility system on the territory within their competence. In the least number of cases average term of office of management of the company is longer than 4 years. Quite even is the share of companies with average management term of office up to 2 years or between 2 and 4 years.

It is interesting that the company Croatian Waters,<sup>2</sup> where large financial resources originating from various statutory fees are accumulated and which is becoming the leading entity for administering foreign loans for water infrastructure, including for utilities [8], is little known to the utilities that on the other hand on behalf and for the account of Croatian Waters collect various fees from the users. The competence of the county<sup>3</sup> in utilities sector is not obvious or is only

<sup>1</sup> The author is of the opinion that local people are familiar with and interested in local natural resources management and that relevant knowhow on enhancing the environment that exists only locally should not be neglected (see also [6]).

<sup>2</sup> Croatian Waters is a legal person for water management in the Republic of Croatia [7].

<sup>3</sup> County is a unit of regional self-government the territory of which represents natural, historical, transport, economic, social and self-government unit, and is constituted for the sake of undertaking the tasks of regional interest [9].

Glavninu investicijskih sredstava osigurava općina, odnosno grad, a slijede naknade za komunalne usluge, država, banke i međunarodne institucije. Ispitanici, nadalje, smatraju da glavninu troškova investiranja u komunalnu infrastrukturu trebaju snositi općine, manji broj smatra da to treba činiti sama država ili u kombinaciji s općinom, odnosno općina u kombinaciji s komunalnom tvrtkom. Mali broj ispitanika smatra da sama komunalna tvrtka ili potrošači trebaju snositi troškove ulaganja u komunalni sustav.

Naime, autorici je poznato da su građani i komunalne tvrtke u suštini vrlo malo ili nikako uključeni u donošenje odluka u vezi veličine ulaganja i tehničkih rješenja. S druge strane građani snose troškove kroz poreze i druga davanja. Isto tako u sadašnjem ustroju komunalne tvrtke su pružale i još uvijek pružaju uslugu održavanja sustava, ali nisu odgovorni subjekti za investiranje u komunalnu infrastrukturu. Da bi se uopće moglo dosljedno oživotvoriti načelo "onečišćivač plaća", bilo bi potrebno definirati predmet takvog plaćanja.

Komunalne tvrtke u većini slučajeva nisu na vrijeme, odnosno sporadično su upoznate s planovima i radovima na komunalnoj infrastrukturi koju kasnije moraju preuzeti na održavanje.

Gotovo jedna trećina ispitanika smatra da investicije u komunalnu infrastrukturu nisu uvijek u funkciji zaštite okoliša, što se može smatrati zabrinjavajućim. Jedna četvrtina ispitanika navodi da se prilikom investiranja nudi samo jedna opcija, umjesto da se raspravlja o više opcija kako bi se izabrala optimalna (ovaj problem je prisutan i drugdje, vidi [10]). Čak 60% ispitanika navodi da su u posljednjih 5 godina investicije bile samo djelomično ili nikako podvrgnute postupku procjene utjecaja na okoliš. Više od jedne trećine ispitanika smatra da studije utjecaja na okoliš nisu objektivne.

Znakovito je da velika većina ispitanika smatra kako za oživotvorenje zaštite okoliša nisu uvijek neophodna velika ulaganja, te da uz bolju organizaciju postoje manje skupa i učinkovitija rješenja. Spomenuto je suprotno praksi u Republici Hrvatskoj gdje se redovito pribjegava skupim rješenjima u ime oživotvorenja zaštite okoliša, vidi također [11]. Gotovo polovica ispitanika drži da se prilikom odabira tehnologije za nove investicijske projekte ne uzimaju u obzir troškove održavanja, vidi i [12].

partially obvious to the majority of respondents. The competence of the city or municipality in utilities sector is far better known to the respondents than the competence of the county.

The bulk of funds for investments are provided by the municipality/city, followed by utility charges, the state, banks, and international institutions. The respondents furthermore find that the bulk of costs for investments in utility infrastructure should be borne by the municipalities, somewhat less by the state itself or in combination with the municipality, and finally by the municipality in combination with the utility service company. Very few respondents are of the opinion that the utilities service company itself or the customers should bear the costs of investing in the municipal utility system.

Namely, it is known to the author that citizens and the utility service companies are in fact either very little or not involved in decision making concerning the size of investments and technological solutions. The citizens on the other hand bear the costs through taxes and other levies. Similarly, in current setup, the utility service companies have been and still are providing the service of system maintenance, but are not responsible entities for investments in utility infrastructure. In order for the «polluter pays» principle to be implemented in a consistent manner, it would be necessary to define how and who defines the object of such a payment.

Utility service companies in the majority of cases are either not informed timely or are informed sporadically about the plans and works on utility infrastructure that they are bound to take delivery of for providing maintenance later on.

Almost one third of the respondents hold that investments in utility infrastructure are not always in function of environmental protection, and that is a reason for concern. One fourth of the respondents state that when investing there is only one option available, instead of discussing several options in order to select the most favourable one (such problem is also present elsewhere, see [10]). As much as 60% of respondents stated that in the last 5 years the investment projects have either partly or not underwent prior environmental impact assessment procedure. More than one-third of the respondents hold that studies on environmental impact assessment are not objective.

Tabela 1. prikazuje rezultate dijela ankete koji se odnosi na pitanja gospodarenja vodama i otpadom.

Po mišljenju ispitanika, načelo “onečišćivač plaća” ne prevladava u dostatnoj mjeri. Većina ispitanika nije upoznata s konceptom decentraliziranog sustava odvodnje (opisano u [13, 14, 15, 16]). To je inače tema o kojoj se u Hrvatskoj vrlo malo govori jer se sredstva usmjeravaju na velike centralizirane sustave. Neizgradnja priključaka za odvodnju kolektora fekalnih voda istovremeno s izgradnjom kolektora ima za posljedicu da se fekalne vode i dalje nekontrolirano izljevaju u tlo i u podzemne vode, što znači da takva investicija ne vodi, barem ne u dogledno vrijeme, ka poboljšanju stanja u okolišu. Programi štednje vode se uglavnom ne provode. Većina ispitanika potvrđuje da se korisnici priključuju na kanale oborinske odvodnje.

It is indicative that the majority of respondents are of the opinion that major investments are not indispensable for implementing environmental protection, and that with better organization there are less costly and more efficient solutions available. That is contrary to current practice in the Republic of Croatia, where expensive solutions are regularly pursued in the name of implementing the environmental protection, see also [11]. Almost one half of the respondents hold that when selecting technology for new investment projects, the maintenance costs are not being considered, see also [12].

Table 1 presents responses of the survey related to water- and waste-specific management issues.

In the opinion of the respondents, the “polluter pays” principle does not prevail to a sufficient extent. The majority of respondents is not

**Tablica 1.** Pitanja gospodarenja vodama i otpadom.  
*Table 1* Water- and waste-specific management issues

Pitanje / Question	Odgovor / Response	broj / count	%
Je li u vašem gradu/općini dosljedno prihvaćeno načelo “onečišćivač plaća”? <i>Is the “polluter pays” principle adopted in a coherent manner in your city/municipality?</i>	da / yes	15	25
	ne / no	46	75
Izvode li se priključci za odvodnju istovremeno s izgradnjom glavnih kolektora? <i>Are sewerage connections made simultaneously with laying of sewers?</i>	da / yes	22	37
	ne / no	38	63
Jesu li vam poznate prednosti i nedostaci decentraliziranog sustava odvodnje? <i>Are you familiar with advantages and drawbacks of the decentralized wastewater systems?</i>	da / yes	21	35
	ne / no	39	65
Provode li se na vašem području sustavno programi štednje vode tijekom cijele godine? <i>Are water saving programmes implemented throughout the year in your territory?</i>	da / yes	12	20
	ne / no	49	80
Jesu li pojedini korisnici na vašem području priključili fekalnu odvodnju na kanale oborinske odvodnje? <i>Have some users of your services connected their house sewers to stormwater sewers?</i>	da / yes	38	63
	ne / no	22	37
Koji je postotak organiziranog odvoza otpada u vašoj županiji? <i>What is the percentage of organised solid waste collection in your county?</i>		81%	
Reciklira li se na području vaše županije otpad? <i>Is waste recycled in the territory of your county?</i>	da / yes	5	8
	djelomično / partly	38	62
	ne / no	18	30
Znate li prednosti i nedostatke mehaničko-biološke obrade otpada? <i>Are you familiar with the pros and cons of mechanical and biological treatment of waste?</i>	da / yes	45	75
	ne / no	15	25
Smatrate li da će centralni županijski deponij biti dobro rješenje? <i>Will in our opinion centralized county landfills be an appropriate solution?</i>	da / yes	40	67
	ne / no	20	33
Smatrate li da je obrada otpada blizu mjesta nastanka ekološki i troškovno prihvatljivo rješenje? <i>Do you think that treating the waste close to the site of its production is acceptable solution in terms of ecology and cost-wise?</i>	da / yes	42	71
	ne / no	17	29

Podatak o udjelu organiziranog prikupljanja otpada iskazan putem ankete odgovara podacima službenih nacionalnih statistika [2]. Otpad se uglavnom uopće ne reciklira.

Većini ispitanika su poznate prednosti i nedostaci mehaničko-biološke obrade otpada (MBO). Većina smatra da će centralizirani županijski deponij [17, 18] biti dobro rješenje, iako značajan udio ispitanika drži suprotno. Većina smatra da je obrada otpada blizu mjesta nastanka (za prednosti vidi [19]) ekološki i troškovno prihvatljivo rješenje.

U tabeli 2. daje se pregled stavova ispitanika o nekim pitanjima upravljanja u komunalnim tvrtkama.

Većina ispitanika smatra da bi veliki potrošači trebali plaćati višu cijenu komunalne usluge opskrbe vodom, odvodnje i zbrinjavanja otpada, što odražava njihovu ekološku orijentaciju. Velika većina ispitanika drži neprimjerenim da privatni kapital upravlja javnom uslugom. Nema, niti jednog ispitanika koji smatra da bi multinacionalne kompanije trebale preuzeti hrvatski komunalni sektor. Velika većina ispitanika smatra da potencijali domaćeg tehničkog i poduzetničkog znanja nisu ili su samo djelomično iskorišteni u komunalnom sektoru.

Naime, zbrinjavanje komunalnog otpada je donedavno bila jedna od pomoćnih djelatnosti koja se poistovjećivala s odvozom smeća. Vodoopskrbi se davao značaj, a odvodnja ili kanalizacija je kao i zbrinjavanje otpada bila samo nužna "prljava" djelatnost. Razvojem ekološke svijesti, standarda i odgovornosti, te turističke industrije, zahtjevi postaju sve stroži (vidi [20]), zbog visine financijskih sredstava potrebnih za ulaganje u sektor prisutni su i interesi izvan samih komunalnih društava kojima više odgovoraju poslušni izvršitelji na terenu.

Blizu polovice ispitanika smatra da kvalifikacijska struktura rukovodstva njihove komunalne tvrtke nije zadovoljavajuća. Samo u polovici anektiranih komunalnih tvrtki se potiče obrazovanje uz rad. Oko tri četvrtine ispitanika smatra da komunalnim sustavom treba upravljati javnopravni subjekt, gotovo jedna četvrtina smatra da to trebaju činiti zaposlenici, a ostatak smatra da javnopravni subjekti i zaposlenici trebaju zajednički upravljati komunalnim sustavom.

familiar with the decentralized wastewater treatment concept (described in [13, 14, 15, 16]). In fact that issue is accorded very little attention in Croatia as funds are directed to large centralized systems. The consequence of the reported failing to install sewerage connections simultaneously with laying of the sewers is that sanitary wastewater continues to be discharged uncontrolled into the soil and groundwaters as well as in surface water, meaning that such an investment does not lead to improving the state of the environment, at least not in the foreseeable future. Water saving programmes are generally not being implemented. The majority of respondents confirm that the users do connect to stormwater sewers.

The data on share of the organized solid waste collection obtained through survey corresponds to official national statistics data [2]. Waste is generally not recycled.

The majority of respondents are familiar with pros and cons of the mechanical and biological treatment of municipal waste (MBO). Most respondents hold that centralized county landfill [17, 18] will be a good solution, although the share of respondents having contrary opinion is not insignificant. The majority holds that treating the waste close to the site of its production (for advantages see [19]) is environmentally and a cost-wise acceptable solution.

Table 2 reviews the reflections of respondents on governance issues.

The majority of respondents hold that big consumers should be charged a higher price for utilities service of waters supply, sewerage and waste management, proving the environmental awareness of the respondents. The majority of respondents find inappropriate for private capital to govern public service. No respondent holds that multinationals should take over the Croatian utilities sector. The overwhelming majority of respondents hold that capacities of domestic technical and entrepreneurial knowhow are not or are only partly utilised in the utilities sector.

Namely, waste management has until recently been considered an auxiliary activity identified with waste collection. Water supply was accorded due significance, while sewerage was along with waste management just the indispensable "dirty" activity. As environmental awareness, standards, responsibilities, and tourist sector developed, the demands have become ever more stringent, see [20]. On the other

**Tablica 2.** Stavovi ispitanika o pitanjima upravljanja  
**Table 2** Reflections on governance issues

Pitanje / <i>Question</i>	Odgovor / <i>Response</i>	broj / <i>count</i>	%
Koju cijenu komunalne usluge opskrbe vodom, odvodnje i zbrinjavanja otpada bi trebali plaćati veliki potrošači? <i>Which price of utility service for water supply, sewerage and waste management should be charged to major consumers of such services in comparison with those consuming less?</i>	Veću / <i>Higher</i>	60	88.24
	Jednaku / <i>Equal</i>	7	10.29
	Manju / <i>Less</i>	1	1.47
Smatrate li primjerenim da privatni kapital upravlja javnom uslugom? <i>Do you find appropriate that private capital governs public service?</i>	da / <i>yes</i>	4	6
	ne / <i>no</i>	63	94
Smatrate li da bi multinacionalne kompanije trebale preuzeti hrvatski sektor opskrbe vodom, odvodnju i pročišćavanje otpadnih voda i zbrinjavanje komunalnog otpada? <i>Do you think that multinationals should take over Croatian sector of water supply, sewerage and wastewater treatment and waste management?</i>	da / <i>yes</i>	0	0
	ne / <i>no</i>	68	100
Smatrate li da su potencijalni domaćeg tehničkog i poduzetničkog znanja iskorišteni u sektoru opskrbe vodom, odvodnje i pročišćavanja otpadnih voda i zbrinjavanja komunalnog otpada? <i>Do you think that capacities of domestic technical and entrepreneurial knowhow are fully utilised in the sector of water supply, sewerage, waste water treatment and solid waste management</i>	da / <i>yes</i>	6	9
	djelomično / <i>partly</i>	44	66
	ne / <i>no</i>	17	25
Smatrate li kvalifikacijsku strukturu rukovodstva vaše komunalne tvrtke zadovoljavajućom? <i>Do you find the qualifications structure of the management of your utilities service company satisfactory?</i>	da / <i>yes</i>	38	57
	ne / <i>no</i>	29	43
Potiče li vaša tvrtka obuku i obrazovanje uz rad? <i>Does your company stimulate permanent in-service education and training?</i>	da / <i>yes</i>	35	52
	ne / <i>no</i>	32	48
Tko po vašem mišljenju treba upravljati komunalnim sustavom? <i>Who should in your opinion run the municipal utility system?</i>	javnopravni subjekt / <i>public legal entity</i>	48	72
	privatnik / <i>private entity</i>	0	0
	anonimni dioničari / <i>anonymous shareholders</i>	0	0
	zaposlenici / <i>employees</i>	14	21
	javnopravni subjekti i zaposlenici / <i>public legal entity + employees</i>	5	7

#### 4. OCJENE ISPITANIKA O UČINKOVITOSTI UPRAVLJANJA KOMUNALNIM RESURSIMA

Ispitanici ocjenjuju učinkovitost komunalnog sustava u njihovom gradu ili općini ocjenom dobar. Prosječna ocjena od 3,46 za učinkovitost novih ulaganja u infrastrukturu ukazuje da treba ozbiljno preispitati politiku i provedbu investiranja. Hrvatske vode su dobile izrazito nisku ocjenu glede svoje učinkovitosti, imajući u vidu broj ljudi koje zapošljavaju.

Razina zaštite okoliša se skromno povećava, po mišljenju ispitanika. Razina komunalne usluge se povećava nešto malo više nego li razina zaštite okoliša. Ispitanici su očito svjesni da

hand, owing to sizable amounts of financial resources required for investing in the sector, the interests beyond the very utility service companies prevail that prefer obedient agents on site.

Nearly half of the respondents deem the qualification structure of the management of their utility service companies not satisfactory. Only half of the surveyed utilities service companies stimulate in-service training. About three fourths of the respondents hold that municipal utility system should be run by a public legal entity while about one fourth is of the opinion that those should be the employees, while others think that public service entities and employees should jointly run the municipal utility system.

**Tablica 3.** Ocjena učinkovitosti komunalnog sustava  
*Table 3* Evaluation of efficiency of the municipal utility system

Pitanje / Question	Ukupno odgovora / total respondents	prosječna ocjena / average grade
Smatrate li da je učinkovitost komunalnog sustava u vašem gradu ili općini zadovoljavajuća? (ocjena od 1 do 5) <i>Do you find the efficiency of municipal utility system in your city or municipality satisfactory? (grade from 1 to 5)</i>	67	3.49
Smatrate li da je investiranje učinkovito? (ocjena od 1 do 5) <i>Do you consider the investments made are efficient? (grade 1 to 5)</i>	67	3.46
Smatrate li Hrvatske vode učinkovitom organizacijom s obzirom na broj od 800 ljudi koje zapošljava? (ocjena od 1 do 5) <i>Do you consider Croatian Waters an efficient organisation given its 800 employees (grade 1 to 5)?</i>	64	2.76
Koliko se po vašem mišljenju razina zaštite okoliša povećava? (ocjena od 1 do 5) <i>How much is in your opinion the level of environmental protection being enhanced (grade 1 to 5)</i>	66	3.06
U kojoj mjeri se po vašem mišljenju razina komunalne usluge povećava? (ocjena od 1 do 5) <i>To which extent is the level of utility services rising in your opinion? (grade 1 to 5)</i>	66	3.26
Ocijenite razinu informiranosti donositelja odluka i javnosti kod investiranja u komunalni sustav (ocjena od 1 do 5) <i>Grade the level of awareness of decision makers and public in general on the occasion of investing in municipal utility system (grade 1 to 5)</i>	68	2.90
Ocijenite transparentnost odluka o investiranju u komunalni sustav (ocjena od 1 do 5) <i>Evaluate the transparency of decisions concerning investments in the municipal utility system (grade 1 to 5)</i>	67	2.91
Ocijenite isplativost investiranja za zajednicu u cjelini na način kako se sada provodi (ocjena od 1 do 5) <i>Evaluate the efficiency of investments for the community as a whole, as undertaken presently (grade 1 to 5)</i>	67	3.06
Ocijenite stručnost aktera u zaštiti okoliša (ocjena od 1 do 5) <i>Evaluate professional competence of actors in environmental protection (grade 1 to 5)</i>	66	3.03



između zaštite okoliša i pružanja komunalne usluge u ovdašnjim uvjetima nema znaka jednakosti. Razina informiranosti donositelja odluka i javnosti kod investiranja u komunalni sustav je niska, prema ocjeni ispitanika.

Transparentnost odluka o investiranju u komunalni sustav je na jednako niskoj razini kao i razina informiranosti o investiranju. Isplativost investiranja za zajednicu na način kako se sada provodi je skromna. Stručnost aktera u zaštiti okoliša nije na zavidnoj razini.

## 5. RASPRAVA O EKOLOŠKOM VREDNOVANJU KOMUNALNIH RESURSA

Komunalna djelatnost je izrazito značajna grana kojoj se godinama nije pridavala dužna pažnja, i koju treba ustrojiti tako da bude održiva. Autorica drži da lokalne vlasti i njihove komunalne tvrtke trebaju kroz partnerstva s drugim gradovima i općinama koristiti njihove primjene najbolje prakse i biti primjer za održivo unapređenje stanja okoliša uz ne nužno velika ulaganja. Komunalnu infrastrukturu treba osmisliti tako da se otpad smatra i koristi kao resurs. Alternativne tehnologije pročišćavanja otpadnih voda i zelenu infrastrukturu koja ispunjava spomenuti zahtjev treba uvoditi na širem planu s obzirom da ista uzima u obzir etapnost izgradnje. Postupni pristup omogućava usklađenje kapaciteta s potražnjom, izbjegavaju se troškovi predimenzioniranja sustava, a kapitalni izdaci se odgađaju.

Smanjenje troškova i uspješnost u održavanju komunalne infrastrukture postiže se kroz unapređenje kadrovske strukture komunalnih tvrtki zapošljavanjem većeg broja visokoobrazovanih ljudi. Time bi se usluga najviše razine, a to je ona kreiranja i kontrole obavljala u kući, a ona niže razine bi se mogla pribavljati izvana. Stručne službe u komunalnim tvrtkama gradova i općina bi tako služile kao glavni tehnički savjetodavac, pokretač i kreator projekata komunalne infrastrukture. Prilikom donošenja odluka o novim ulaganjima treba se rukovoditi stvarnom analizom troškova.

Većini ispitanika je poznato godišnje izvješće o prihodima i rashodima komunalnog sustava na njihovom području, ali je značajan udio i onih kojima spomenuto izvješće nije poznato, što upućuje na nedostatno informiranje.

## 4. RESPONDENTS' EVALUATIONS OF THE EFFICIENCY OF COMMUNAL RESOURCES MANAGEMENT

Table 3 presents the evaluation of respondents with regard to efficiency of the municipal utility system.

The respondents grade the efficiency of municipal utility system in their city or municipality as «good». The average grade of 3.46 for the efficiency of new investments indicates that the investment policy and its implementation should be seriously reviewed. The company Croatian Waters is graded very low with regard to its efficiency and considering the size of its human resource.

The level of environmental protection is being enhanced to a modest extent, in the opinion of the respondents. The level of the utility service is rising slightly more than the environmental protection level. The respondents are evidently aware that in present circumstances there is no equivalence between environmental protection and utility services provision. The level of awareness of the decision makers and public in general, with regard to investing in the municipal utility system, is low, as evaluated by the respondents.

The transparency of the decisions on investments in the municipal utility system is at the level that is about as low as that of the awareness concerning investments. The cost efficiency of investments for the community, as currently implemented, is modest. Professional competence of actors in environmental protection is not at an enviable level.

## 5. AUTHOR'S DISCUSSION ON ENVIRONMENTAL BENCHMARKING OF COMMUNAL RESOURCES

Municipal utilities sector is a very important activity which has for a long time not been accorded due attention and therefore it should be structured so as to perform sustainably. The author is of the opinion that local authorities and their utilities service companies should through partnerships with other cities and municipalities use their examples of best practice and be a reference for how to substantially improve the state of environment with not necessarily huge

Prosječan mandat uprave tvrtke poklapa se s političkim mandatom čelnika jedinice lokalne samouprave ili je čak kraći, što upućuje na nemogućnost planiranja za duže razdoblje, a što je s obzirom na kapitalno intenzivno poslovanje komunalnih tvrtki neizbježno.

Komunalne tvrtke u većini slučajeva nisu na vrijeme, odnosno sporadično su upoznate s planovima i radovima na komunalnoj infrastrukturi koju kasnije moraju preuzeti na održavanje, što znači da nisu uključene u proces kojega utvrđuje netko treći. Gotovo polovica ispitanika smatra da se prilikom odabira tehnologije za nove investicije ne uzimaju u obzir troškovi održavanja. Nadalje, gotovo jedna trećina ispitanika smatra da investicije u komunalnu infrastrukturu nisu uvijek u funkciji zaštite okoliša, što se može smatrati zabrinjavajućim, jer ukazuje da povod za investiranje može biti neki drugi. Isplativost investiranja za zajednicu na način kako se sada provodi je skromna.

## 6. ZAKLJUČAK

U okviru usklađenja propisa koji se tiču komunalnog gospodarstva, a u povodu pristupanja Hrvatske Europskoj uniji, bitno je osmisliti za Hrvatsku optimalan i najisplativiji model komunalnog gospodarenja. Obveze koje Republika Hrvatska preuzima svojim pristupanjem Europskoj uniji treba troškovno analizirati, poticati primjenu manje skupih i za okoliš prihvatljivih tehnologija, te sačiniti prethodni i dugoročni troškovni pregled primjene konkretnih mjera za pojedinu sredinu s ciljem učinkovite zaštite okoliša.

Potrebno je povećati transparentnost i učinkovitost korištenja sredstava putem državnih agencija i osmisliti mehanizme neovisnog i učinkovitog nadzora potrošnje sredstava, posebno za obalno područje. Međunarodne institucije trebaju preispitati odabir partnera za komunalne projekte. Nadalje, potrebno je sačiniti sveukupnu analizu ekonomske koristi za zajednicu.

Razvijanje svijesti o okolišu mora postati integralni dio školskog sustava i sustava edukacije stanovništva s posebnim naglaskom na obalno područje.

Utjecaj korupcije u komunalnim projektima treba smanjiti razvijanjem civilnog društva, podizanjem profesionalnih standarda, te potica-

investments. The municipal utilities infrastructure should be designed so as to treat and use waste as a resource. Alternative wastewater treatment technologies and green infrastructure which comply with the said requirement should be more widely introduced as they also take into account phased construction. A gradual approach renders possible aligning the capacity with demand, the costs of overdimensioning the system are avoided, and capital expenditures are delayed.

The reduction of costs and efficiency in the maintenance of municipal utilities infrastructure can be achieved through building the capacity of human resources of utility companies by recruiting more people with high qualifications degree. Thereby, the service of creation and control would be performed in-house, while that less complex could be outsourced. The staff in municipal utility companies would thus serve as a principal technical adviser, driving force and creator of municipal utility infrastructure projects. The analysis of the actual costs should be a guideline when making decisions on new investments.

Most respondents are familiar with annual revenue and expenditure data of the municipal utility system in the territory of their competence, but a share of those who are not familiar with the mentioned data is quite significant, indicating insufficient information accessibility. The average term of the office for the management of the company coincides with the duration of the political term of the office of the heads of local self-government or is even shorter, suggesting the unfeasibility of having longer-term plans in place, such plans being inevitable bearing in mind capital intensive operations of utility service companies.

Utility service companies in the majority of cases do not learn timely or have only sporadic knowledge of the plans and works on utility infrastructure that they must later on take the delivery of for maintenance, meaning that they are not involved in the process defined by the third party. Almost half of the respondents hold that maintenance costs are not considered on the occasion of selecting technology for new investments. Furthermore, almost one third of the respondents hold that investments in utility infrastructure are not always in function of environmental protection, and such circumstance may be considered disturbing, indicating that the motive for investment might be diverse.

njem tijela zaštite zajednice. Potrebno je objavljivati upute o korištenju državnih i međunarodnih novčanih tokova za okolišne projekte, te pojednostaviti postupke bez ublažavanja kriterija. Sredstva na lokalnoj razini osiguravati izravno iz lokalnih prihoda, a ne time da se prihodi od građana i poduzeća prvo transferiraju centralnoj vladi, nakon čega ista dijeli političke "milosti" na regionalnu ili lokalnu razinu. Konačno, od velike je važnosti razvijati lokalno znanje, a ne kopirati tuđa rješenja za neobalno područje u smislu tehnološkog i upravljačkog znanja u komunalnom sektoru.

The cost effectiveness of investments, in a way it is currently undertaken, is modest.

## 6. CONCLUSION

Within the context of aligning the legislation concerning municipal utilities sector on the occasion of Croatian accession to the European Union, it is essential to conceive the optimal and efficient municipal utilities management model and defend it in an argued manner in the negotiation procedure. The commitments that the Republic of Croatia assumes should be analysed cost-wise, the application of less costly and environmentally-friendly technologies should be promoted and long-term costing overview for implementing concrete measures for a particular community with the view to protect the environment efficiently should be elaborated.

It is necessary to enhance the transparency and efficiency of the use of funds via government agencies and conceive mechanisms of independent and effective control of spending. Furthermore, international institutions should re-examine the selection of partners for municipal utilities projects. The overall analysis of economic benefit for the community should be produced.

Developing environmental awareness should become an integral part of the system of schooling and educating the public with particular emphasis on the coastal area.

The impact of corruption in utilities project should be diminished by developing civil society, raising professional standards and stimulating the bodies in charge of protecting the community. It is necessary to publish the instructions regarding the use of state and international funds for environmental projects and simplify the procedures without softening the criteria. The funds at local level should be provided directly from local revenues, and not in a way that revenues from citizens and companies are first transferred to central government, which then distributes political "beneficence" to regional or local level. Last but not least, it is of ultimate significance to develop local knowledge, and not simply copy-paste the methods used by others, often designated for non-coastal areas, with regard to technological and management know-how in the utilities sector.

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