EU4Environment in Eastern Partner Countries:
Water Resources and Environmental Data (ENI/2021/425-550)

REFORMING THE WATER TAX IN THE REPUBLIC OF MOLDOVA

Funded by
the European Union

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Water and Data in Eastern Partner Countries

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ABOUT EU4ENVIRONMENT – WATER RESOURCES AND ENVIRONMENTAL DATA

This Programme aims at improving people's wellbeing in EU's Eastern Partner Countries and enabling their green transformation in line with the European Green Deal and the Sustainable Development Goals (SDGs). The programme's activities are clustered around two specific objectives: 1) support a more sustainable use of water resources and 2) improve the use of sound environmental data and their availability for policy-makers and citizens. It ensures continuity of the Shared Environmental Information System Phase II and the EU Water Initiative Plus for Eastern Partnership programmes.

The programme is implemented by five Partner organisations: Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OiEau) (France), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE). The programme is principally funded by the European Union and co-funded by the Austrian Development Cooperation and the French Artois-Picardie Water Agency based on a budget of EUR 12,75 million (EUR 12 million EU contribution). The implementation period is 2021-2024.

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Executive Summary

The water tax[1] is the key economic instrument (**EI**) for water management in the Republic of Moldova (hereafter Moldova) and is intended to both generate revenue as well as create incentives for efficient water use, prevent over-abstraction, and avoid the eventual depletion of water supply sources. However, its current form leaves significant space for improvement. A survey of water sector stakeholders in Moldova completed in 2023 as part of this study confirmed what other assessments have found:

- The water tax does not contribute to Moldova's water policy objectives, such as greater levels of equity and water security in Moldova, as its revenue is not earmarked;
- the water tax does not provide incentives for improving water use efficiency, or for reducing water abstraction, not least during periods of droughts;
- the tax rates are set too low and do not reflect the true economic value of water, contributing to overuse – and low collection rates;
- compliance enforcement is weak, and loopholes are regularly exploited – i.e. water users abstract water without having a special water use permit, or when permits exist, abstract much more water than the quota established in the special water use permit;
- **Difficulties in administering** due to challenges in accurately measuring the tax base.

To make the water tax a substantially more effective instrument supporting the Moldovan water policy objectives aligned with the EU acquis **three scenarios** with different levels of ambition were developed.

Scenario 1 envisages just minimal improvements in the water tax through a reallocation of water tax revenues from Local Public Authority Level II (LPA II) to LPA I and to the national public budgets. LPA I and State tax authorities have more administrative capacities and thus power for enforcement of the water tax, increasing tax revenues and closing loopholes. This measure is **already planned** for 1 January 2024.

Scenario 2 is a more substantial reform following water policy objectives such as quality and affordable water for all users, as well as the "polluter pays" and "beneficiary pays" principles. Most importantly this scenario urges (i) to revisit the tax base and tax rates for specific water uses, (ii) to better measure the tax base and improve reporting, and (iii) to better enforce special water use permits. Some of the actions recommended for Scenario 2 include:

- **Adjusting tax bases** (hydropower: MLD per 1kWh; beverage manufacturers per hectolitre).
- Better **differentiating tax rates for surface water** (SW) **and groundwater** (GW) abstraction.
- Enforcing obligatory **metering of water use** also for SW abstraction.
- **Discouraging GW abstraction** for crop production, commercial fish farming or industrial needs.
- **Improving reporting** on water tax amounts due and paid.
- **Enforcing administrative and monetary sanctions** for water abstraction above the limits in the water user's established permit.

[1] Sometimes also referred to as *water use fee* or *water use rent payment*.

Scenario 3 is the most sophisticated reform and on top of the measures from Scenario 1 and 2 includes amongst other things a recommendation to **jointly tax administer the irrigation water and irrigated land tax** and **ear-marking water tax revenues for water policy objectives**. This report also proposes a possible roadmap for the implementation of the scenario identified as the preferred one by stakeholders.

Expected fiscal, economic, environmental and social impacts of the measures envisaged under Scenario 3 include the following:

- **Increased (presumably, at least, doubled) water tax revenues** due to a fuller appropriation of the water rent, and **more fair taxation**.
- **More efficient water use**: Public funds used more effectively for water sector priorities, fairer environment for competition, and reduced chances of conflicting incentives and interests.
- More water available for **maintaining environmental flows, supporting biodiversity, resilience against drought and for allocation to other productive uses** – both in Moldova and downstream.
- Faster **progress in developing water systems** and improving the quality of water services **benefitting the population**. Under the proposed measures affordability thresholds are not broken.

Based on this, the following ***main reform avenues*** have been proposed:

- **Clearly formulate policy objectives (aligned with *EU acquis)* that the tax should support;**
- **Ensuring coherence** between the water tax and the design and performance of other relevant **administrative** (such as the requirement to have special water use permits and accurate water metering & reporting) **and economic instruments** (such as the taxation of irrigated land)**;**
- **Revisiting tax bases** established for different water uses, as well as **exemptions;**
- **Considering options for better differentiating tax rates and for establishing higher tax rates for some water uses** where water adds much value;
- **Improving collection mechanism of the water tax** - ideally jointly with collecting revenues generated by complementary EIs and revenues from taxes levied on other natural resources;
- **Improving reporting on water tax amounts due and paid** by water users;
- **Reallocating water tax revenues** from LPA level II budgets to LPA level I budgets, and eventually a proportion to the State Budget;
- **Considering options for ear-marking water tax revenues** (e.g. via an ear-marked budgetary find) for water policy objectives and priorities (including metering programmes).

Most of the measures could be implemented already in the short term and in parallel, while some dedicated studies are recommended to be conducted prior to launching the remaining measures. The revised water tax would better support Moldova's water policy objectives, including:

- **equity** (ensuring access to quality & affordable water for all users, while avoiding depletion of the resource by uncontrolled exploitation, and apply more fully the user-pays principle);
- **rational use of water resources** recognising the true economic value of water; and
- **a move towards full cost recovery of water services** (including resource and environmental costs, and water management costs) - in line with the principles of the EU Water Framework Directive.

1. Key issues with the design and application of Moldova's water tax

As part of this report a questionnaire on the deficiencies of the present design and application of the water tax for stakeholders in Moldova was developed and conducted. The analysis of the responses combined with additional sources of information[2] revealed the following deficiencies, as well as possible complementary administrative instruments:

- Most respondents noted that the water tax should drive stronger support to water policy objectives including greater levels of equity and water security in Moldova.
- Respondents agreed that presently the water tax does not provide incentives for improving water use efficiency, or for reducing water abstraction, not least during periods of droughts.
- All respondents agreed on the need to revise tax rates to better reflect the true economic value of water. Many agreed that the present tax rates and the total amount of water tax collected are low.
- Low collection rates are partly due to the fact that presently many water users abstract water without having a special water use permit, or largely disrespecting its terms (e.g. abstract much more water than the quota established in the special water use permit), while from the Chamber of Auditors 2020 report one can conclude that the Environmental Inspectorate was not successful in identifying and sanctioning such behaviour (*de facto*, becoming a significant regulatory loophole).
- Several respondents marked various inconsistencies of the present water tax either with similar economic instruments applied in neighbouring Romania and Ukraine (though without specifying what inconsistencies were meant), or with other fees, charges and taxes applied in Moldova, or with the performance of complementary administrative instruments (foremost, compliance assurance of the fulfilment of terms of permits for special water use, including the need for accurate water metering and accurate reporting on water use).

Overall, the analysis of responses to the Questionnaire helped reveal a general stakeholder consensus on the need to reform the water tax in Moldova, identify key drivers and outline main objectives and possible reform avenues (for further analysis and discussion with stakeholders).

The former being **stronger support to Moldova's water policy objectives**, including **equity** (ensuring access to quality & affordable water for all users, while avoiding depletion of the resource by uncontrolled exploitation, as well as in terms of charging all water user groups to apply more fully the user-pays principle); **rational and economically efficient use of water resources** recognising the true economic value of water; and a more **full cost recovery of water services** (including resource and environmental costs, and water management costs) – in line with the principles of the EU Water Framework Directive.

[2] Such as the 2020 report of the Accounting Chamber of Moldova titled "*Report on consistency between natural resource taxes due and collected*"

In addition, the design and performance of the water tax in Moldova was assessed using an OECD-EU methodology (see 4. Annexes). The assessment revealed the following:

- The instrument is **not effective** in achieving objectives such as significantly improving water use efficiency, water conservation and prevention of water resources from damage or over-abstraction (not least during droughts), nor does it help generate significant revenues to fund projects and activities towards the water policy objectives.
- Water use permits/authorisations are **poorly enforced** and there are **inconsistencies with applying the water tax**: many economic agents obliged to get such permits de facto do not have such permits (even where they pay the water tax); while the water tax is not entirely consistent with taxation of the irrigated land.
- There are **difficulties in administering** the water tax due to several factors, including the difficulty to accurately measure the tax base (e.g. in case of the lack of water meters, or surrogate meter readings or intentional misleading reporting on the amount of water used resulting in poor reporting, all facilitating poor enforcement).
- The water tax **does not generate significant revenues**, more over the amounts due are poorly collected, while collected revenues are typically used for a wide range of local priorities, not always connected to water.
- **Cost-efficiency is low** – as a result of the above observations.
- **It is unresponsive to broader economic changes,** as the **tax rates are not regularly adjusted**, neither to the recent (significant) inflation nor to the evolving economic value of water for specific water uses.
- **Impact on income distribution and equity:** are all user groups and water users charged in a fair and balanced way? The fact that Industries and other economic agents located in the capital city pay in total the amount of water tax at the same or lower level than agents operating in some small rural districts of Moldova may indicate that certain economic agents may be privately appropriating the water rent, thus getting extra income compared to those who pay in full and at fair rates. This may indicate that equity is a significant issue.
- **Possibility of opting out of water tax has negative impact on competition**.
- **Politically and socially accepted** – as water supply for drinking purposes to the population, as well as water uses for other social needs (e.g. for firefighting) are exempt from the tax, it is socially acceptable and so far, has not generated any political resistance.
- **Other considerations**: the water tax is not fully consistent with taxes levied on other natural resources (e.g. irrigated land) nor with tariffs for electricity generated by hydropower stations (HES); moreover, selection of the tax base for some water uses (e.g. by HES) can be questioned.

2. Scenarios of the water tax reform

Based on the findings in Section 1, the following main reform avenues are proposed:

- **Clearly formulate and prioritise water policy objectives (aligned with the *EU acquis)* the water tax should support.**
- **Ensuring coherence** between the water tax and the design and performance of other relevant **administrative** (such as the requirement to have special water use permits and accurate water metering & reporting) **and economic instruments** (such as the taxation of irrigated land)**.**
- **Revisiting tax bases** established for different water uses, as well as **tax preferences and exemptions.**
- **Considering options for better differentiating tax rates and for establishing higher tax rates for some water uses** where water adds much value, based upon current environmental and economic trends and priorities.
- **Improving collection mechanism of the water tax** - ideally jointly with collecting revenues generated by complementary EIs and revenues from taxes levied on other natural resources.
- **Improving reporting on water tax amounts due and paid**, by water users.
- **Reallocating water tax revenues** from LPA level II budgets to LPA level I budgets, and eventually a proportion to the State Budget.
- **Considering options for ear-marking water tax revenues** (e.g. via an ear-marked budgetary find) for water policy objectives and priorities (including supporting regulation, water use permitting system, monitoring, implementation of metering programmes).

It is believed that implementing these measures will make the water tax a substantially more effective instrument of the water policy in Moldova, better contributing to the national water policy objectives, and to its water-related international obligations. Most of the measures could be implemented already in the short term and in parallel, while some dedicated studies are recommended to be conducted prior to launching the remaining measures to secure the evidence base and to properly design, consult and implement them.

Below three scenarios with different levels of ambition, constructed based on the set of measures presented above, are discussed.

2.1. Scenario 1: urgent minimal ("cosmetic") improvements

This scenario envisages just minimal ("cosmetic") improvements in the implementation of the present water tax. E.g. changes limited just to:

- The reallocation of water tax revenues between the levels of the budgetary system (from LPA level II budgets to LPA level I budgets, and a proportion to the State Budget) - this positive measure is already planned for 1 January 2024. It corresponds well with other international experiences, where appropriated water rent (and other natural resource rent) is shared between the national (state) and local public budgets).
    - but without earmarking the water tax revenues, and
    - with no changes in the tax base or rates.
- This scenario envisages improved collection efficiency largely as a result of limited improvements to water metering and reporting, and stronger enforcement.

The latter will be largely due to the reallocation of tax revenues from LPA level II budgets to LPA level I budgets, and a proportion to the State Budget, as LPA level I and the State tax authorities have more administrative capacity and power for enforcement. Assuming the tax collection efficiency[3] at a quite realistic 95% and collection of say 80+% of the fines levied on the violators of water laws and regulations, one can expect that the tax revenues collected (accounted for **on cash basis**) will increase by at least **MDL 3.5 million**[4] per annum, in 2020 prices.

In addition, this scenario may envisage that all water users who are legally obliged to use water only on the basis of the **special water use permit** will: finally get it (in 2018-19, out of over 2,600 water users reporting on water abstraction to the National Tax Authority only some 420 (15%) had such permits[5]); and fully respect its conditions (with administrative and monetary sanctions for water abstraction over and above the limits established in their permit, and for other violations).

Such measures will help: (i) to close the existing loopholes for not paying in full for water resources owned by the nation, and (ii) generate as minimum **MDL 5 million**[6] **per annum** of additional public revenues.

However, as under this scenario tax rates will remain low (with no adjustment for inflation accumulated over the past years), it will not help to significantly improve incentives for efficient water use, missing the opportunity to drive implementation of key water policy objectives identified as part of this study.

[3] measured as the ratio of tax amounts due to the amounts collected, i.e. the ratio of tax revenues on accrual basis to tax revenues on cash basis.

[4] equivalent to some EUR 180,000, using the exchange rate as of 12 December 2024: EUR 1 = MDL 19.29

[5] See section 4.1.1 in the Accounting Chamber of Moldova 2020 report titled „*Report on consistency between natural resource taxes due and collected*", available at: https://www.ccrm.md/rma_files

[6] equivalent to some EUR 260,000, using the exchange rate as of 12 December 2024: EUR 1 = MDL 19.29

2.2. Scenario 2: a more substantial reform

On top of the planned reallocation of water tax revenues from LPA level II budgets to LPA level I budgets, and a proportion to the State Budget, this scenario assumes that as a very first step, the GoM will clearly formulate and prioritise water policy objectives (aligned with the *EU acquis)* that the water tax should support.

Ideally, the water tax reform should support the following water policy objectives[7]:

- Ensuring access to quality and affordable water for all users, while avoiding depletion of the resource by uncontrolled exploitation.
- Applying the „polluter pays" and „beneficiary pays" principles.
- Recognition of the true economic value of water resources.
- Rational/economic and efficient use of water resources.
- Application of pollution and degradation prevention measures, elimination or adequate monetary compensation of any substantial damage to water resources and bodies contributing to a fuller cost recovery of water services (including resource and environmental costs, and water management costs).

Furthermore, this scenario envisages: (i) revisiting tax base and rates for some water uses, as well as tax preferences and exemptions; (ii) better measuring the tax base & improving reporting; and (iii) better enforcement of special water use permits/authorisation, further improving collection mechanism.

Specifically, item (i) may include the following measures:

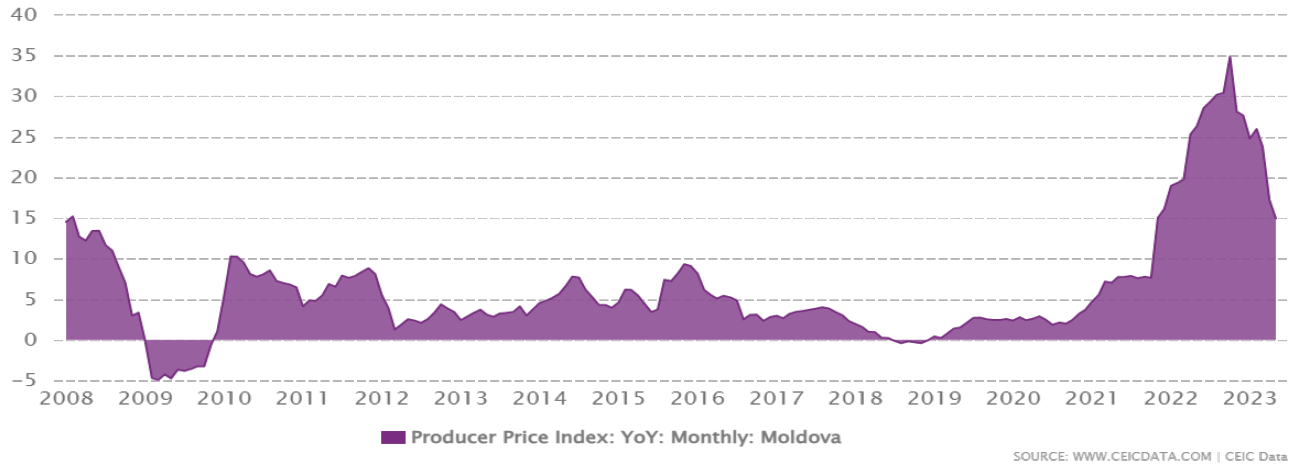
- For **hydropower**: to use as the amount of electricity generated as the tax base and establish the tax rate in Moldovan lei per 1 kWh. It is recommended to establish also a threshold (for example 15-20%) for the share of the water tax due in the full unit costs of hydro electricity generation (see Box 1).
- For the **food industry**, to tax mineral water, soft drink and beer producers based on the volume of drinks produced, establishing the tax rate in lei per 1 hectolitre (hl) – a similar tax base could be applied to other water-intensive food producers (e.g. juice from juice concentrate, salty or marinated tomatoes and cucumbers in glass or plastic containers etc.).
- **Revisiting tax preferences and exemptions** (to identify and eliminate cost ineffective or counter-productive ones).
- Consider options for **better differentiating tax rates** for both SW and GW abstraction and uses (it is recommended that identification of such options would require a dedicated study).
- As a minimal immediate measure, **annually adjust tax rates to reflect the inflation**[8] using **producer price index (PPI)** to measure the inflation. (Figure 1 presents data on PPI growth in

[7] see https://www.legis.md/cautare/getResults?doc_id=132532&lang=ru

[8] the Accounting Chamber of Moldova 2020 report titled „*Report on consistency between natural resource taxes due and collected*" stated that as of Dec 2020, there had not been any adjustment of the water tax rates since 2008.

Moldova in 2008-23). This single measure may almost double water tax revenues due to the public budget.

Figure 1. Moldova's Producer Price Index Growth from Jan 2008 to May 2023, year-on-year



Source: https://www.ceicdata.com/en/indicator/moldova/producer-price-index-growth

Box 2.1. Share of the water tax due in the costs of electricity generated by Hydro-electric stations in Moldova

Table 1 below presents the cost structure of electricity generation by the Costesti hydro-energy module. Analysis of the data presented in Table 1 suggests that in 2020-21 the water tax paid by the capital-intensive utility amounted to a high share (36-38%) of total production costs, while capital and current repairs were negligible cost items. Such a cost structure does not look sustainable in the long run, as fixed assets deteriorate and require regular repairs and timely replacement at the end of their operational life. It seems appropriate to ensure ear-marked use of depreciation allowances (for fixed assets capital repairs and replacement) and to keep the water tax levied on HES at the level of 15-20 % of the total production costs. An option for consideration would be to use the amount of electricity generated as the tax base, with the water tax rate at MDL 0.1 per kWh.

Table 1. The cost structure of electricity generated by Costesti hydro-energy module in 2020-22

			Years			
Costs for electricity production	2020		2021		2022	
	in 000 MDL	**in%% of total costs**	**in 000 MDL**	**in%% of total costs**	**in 000 MDL**	**in%% of total costs**
Wages and salaries	2306,9	*19,38*	2813,1	*16,51*	3707,2	*14,07*
Social Contributions	493,9	*4,15*	640,4	*3,76*	889,7	*3,38*
Food for personnel	217,8	*1,83*	220,2	*1,29*	266,9	*1,01*
Depreciation of fixed assets	1126,9	*9,46*	1903,9	*11,17*	2426,2	*9,21*
Repaire of fixed assets	233,5	*1,96*	0	*0,00*	4297,6	*16,31*
Current repaire					3311,8	*12,57*
Tax on water passed through tourbines	4257,9	*35,76*	6533,3	*38,34*	4961	*18,82*
Material	115,9	*0,97*	120,4	*0,71*	299,5	*1,14*
Equipment and personnel insurance	119,6	*1,00*	181,4	*1,06*	283,9	*1,08*
Services	203,2	*1,71*	317,8	*1,87*	397,5	*1,51*
Small value assets write-off & others	60,9	*0,51*	120,9	*0,71*	152,9	*0,58*
General and administrative expenditures						
Wages and salaries	1741,5	*14,63*	2492	*14,62*	2923,6	*11,09*
Social Contributions	385,2	*3,24*	583,5	*3,42*	701,7	*2,66*
Food for personnel	89,1	*0,75*	95,6	*0,56*	122	*0,46*
Depreciation of fixed assets	88,1	*0,74*	141,6	*0,83*	194,6	*0,74*
Material	66	*0,55*	143,4	*0,84*	233,5	*0,89*
Small value assets write-off	20,1	*0,17*	110,2	*0,65*	108,1	*0,41*
Equipment and personnel insurance	17,4	*0,15*	22,7	*0,13*	37,6	*0,14*
Services	277,9	*2,33*	492,9	*2,89*	934,9	*3,55*
Taxes	51,4	*0,43*	51,9	*0,30*	59,9	*0,23*
Other	33	*0,28*	55,6	*0,33*	45,1	*0,17*
Total	**11906,2**	**100,00**	**17040**	**100,00**	**26355**	**100,00**

Source: original calculations based on cost data from:
https://nhec.md/wp-content/uploads/2023/06/Situatii-financiare-2022.pdf

Item (ii) envisages **obligatory metering of water use** where relevant, not only of GW abstraction. Abstracting GW for crop production or commercial fish farming, or for industrial needs **often results in fast depletion of GW reserves and is thus discouraged.**[9] As a priority, in many countries GW is typically used for drinking water supply purposes, in food, milk and drinks production, and in some cases also for firefighting.

Also, item (ii) includes **improving reporting on water tax amounts due and paid**, by water users. Respective reporting formats should be improved and reporting requirements extended also to all water-intensive enterprises, as minimum, large and of medium size.

Finally, Item (iii) envisages that all water users who are legally obliged to use water only on the basis of the special water use permit will have it and fully respect its conditions (with administrative and monetary sanctions for water abstraction over and above the limits established in their permit, and for other violations). As already stated above (see Scenario 1), such measures will help (i) to close the existing loopholes for free-riding, and (ii) generate as minimum MDL 5 mln per annum of additional public revenues.

Concerning the identification and assessment of opportunities for improving (i) metering (including obligatory metering where relevant) and (ii) reporting, a small, dedicated study would be required. (Collecting stakeholder opinions through a specifically designed questionnaire sent out on behalf of the NPD Coordination Council could help to scope such a study).

2.3. Scenario 3: a fully-fledged reform of the water tax and related administrative instruments

This scenario envisages the implementation of all measures listed above assuming that stakeholders would generally support them.

The authors believe that **this would be a preferred scenario, while the said measures will present building blocks of a methodology for water tax reform.**

On top of measures envisaged under Scenario 2, this scenario would additionally include an

- **In-depth review of the tax bases** established for different water uses.

On top of the revisions envisaged under Scenario 2, it is sensible to consider jointly taxing the irrigation water and irrigated land tax, with land tax rates differentiated for irrigated and non-irrigated land,[10] and for irrigated land additionally differentiated by the factor of existing/non-existing collector drainage system (CDS).

Rationale for increasing tax rate for irrigated land: high difference in irrigated vs non-irrigated land productivity, due to not only higher yields of traditional crops (see Box 2), but also the opportunity to

[9] This now happens e.g. in the Ararat valley in Armenia due to over-abstraction of GW for commercial fish farming.

[10] Experience from Central Asia has shown that in Fergana valley, the monetary value of crop harvested from 1 ha of irrigated land is typically 3-5 times higher than the value of crop harvested from 1 ha of non-irrigated land.

produce another crop with higher value added (e.g. vegetables, or strawberries and other berries). Operational collector drainage systems increase yields by some 20% more (OECD, 2018).

However, as such higher land productivity is not only due to the quality of soil and favourable location of respective land spot (so called differentiated land rent II) but largely due to irrigation, a proportion of the higher land tax revenues collected from owners of such land could and should be used to finance the development and maintenance of the state-owned (main irrigation canals or pipelines and pumping stations) and intra-farm irrigation systems.

Note that this reform option can be consistent with the two-part irrigation water tariff structure, where a fixed monthly fee paid by owners of irrigated land aims to fully cover the fixed costs of the state-owned and intra-farm irrigation systems – this fee could be included in the land tax rate; while the variable (volumetric) part aims to cover the variable costs of irrigation.

There are challenges that can arise from such a land tax reform: (i) properly apportioning land tax revenues (a proportion would go to the state budget, another – to the local public budgets(s), while the third part be earmarked to finance the development and maintenance of irrigation systems (state-owned and intra-farm irrigation systems): and (ii) eventual lack of political will to ear-mark the latter proportion of land tax revenues.

- **Considering options for (i) further improve differentiating tax rates and (ii) establishing higher tax rates for some water uses** were water adds much value.

Implementing this recommendation would require a dedicated study on the availability and value of water for different uses, not least for irrigated agriculture. Identifying and quantifying such benefits for each specific (major) water use will help justify a better differentiation of tax rates levied on both SW and GW abstraction.

Two cases are discussed in this report: taxing water uses for hydropower (Box 1), and water for irrigation. Regarding the latter, international experience suggests that one can expect that a dedicated country-specific study in Moldova will with a high likelihood demonstrate the following benefits (see Box 2):

- Increased yield.
- Reduced variability in yield.
- Increased CO_2 sequestration and reduced N_2O emissions (both are GHG).
- More efficient fertiliser use.

Box 2.2. Multiple benefits from irrigation in Agriculture

Irrigation generates multiple benefits for Agriculture, some of which have been quantified. For instance, the Irrigation and Drainage Strategy of Ukraine to 2030 insists that proper irrigation and drainage help increase crop yields per ha by 2-3 times, irrespectively of weather conditions ("Застосування зрошення та дренажу дає змогу незалежно від погодних умов підвищити врожайність сільськогосподарських культур у два-три рази порівняно з богарними умовами."). Michael F. Dowgert (2010) refers to studies showing that on top of that irrigation: (i) reduces variability in yield; (ii) increases CO_2 sequestration, reduces N_2O emissions (both are GHG); and stressed (iii) more efficient fertilizer use associated with irrigation.

However, yield figures cited in the aforesaid Strategy looked like average global figures, as available local data suggests that the increase in yield highly depends on the site (soil quality and hydro-morphology),

and year as the availability of irrigation water, temperature and precipitation profile over the vegetation period are different each year. Data from Nebraska, USA, supports this hypothesis (see Table 2). The period from 1965 to 2009 was marked by a massive increase in irrigation in Nebraska. For instance, in 1966 there were 3 million irrigated acres while in 2002 there were 8 million acres. As a result, in the year 2007 Nebraska had over 80% irrigated corn (maize) acres (Source: Michael F. Dowgert, 2010).

Table 2. Yield of some Major Crops in Nebraska, USA (in US bushels* per acre)

Year	Corn (maize) for grain		Wheat		Soybeans	
	Irrigated land	Non-irrigated	Irrigated land	Non-irrigated	Irrigated land	Non-irrigated
1992	144	117	49	29	45	41
1993	111	90	56	28	41	34
1994	153	113	55	34	53	45
1995	130	73	62	40	42	29
1996	156	115	53	35	50	43
1997	151	99	48	36	51	37
1998	161	119	68	45	51	41
1999	159	111	66	47	51	38
2000	154	84	63	34	50	30
2001	173	110	59	35	53	39
2002	166	62	63	30	51	29
2003	186	82	67	44	54	31
2004	186	134	66	33	54	40
2005	185	108	60	37	59	43
2006	185	101	67	32	59	42
2007	181	125	58	40	55	47

Notes: * - 1 US bushel = 35.24 litres; 1 acre = 0.404686 hectare

One can see that for corn (maize) the increase in crop yield, as a result of irrigation, varied from just 23% in the year 1993 to over 250% in the year 2002.

A similar study, quantifying also benefits from (i) reduced variability in yield; (ii) increased CO_2 sequestration and reduced N_2O emissions; and (iii) more efficient fertiliser use, is strongly recommended for Moldova. It could be implemented with eventual support from relevant development partners.

Sources:
Michael F. Dowgert (2010) and КАБІНЕТ МІНІСТРІВ УКРАЇНИ (2019)

Further improving the water tax collection mechanism

Ideally, the reform should be delivered jointly with enhanced collection of revenues generated by complementary EIs (not least water related pollution charges and fines; fines for over-abstracting water and monetary compensation of damage to water resources and bodies (where in-kind damage elimination is not feasible), as well as damage to hydro-technical systems (e.g. dams and dykes)) and revenues from taxes levied on other natural resources.

Ensuring much better coherence between the water tax and the design and performance of other relevant **administrative** (water use permits, the requirement to have accurate water metering) **and economic instruments** (not least: monetary compensation of damage to water resources and bodies; pollution fees and charges, and fines; and the tax levied on irrigated land), as well as with the EIs applied in Romania and (or) Ukraine (see Box 2.3).

Box 2.3. Some features of the water rent paid by water users in Ukraine

Article 255 of the Tax Code of Ukraine establishes rental payments for special uses of SW and GW resources (where a number of water uses are exempt).

As GW is qualified as a sub-soil resource belonging to the whole nation, for GW abstraction eligible water users pay two rents: the water rent; and the rent for extraction of subsoil resources (the latter rent is regulated by the Code on Sub-soil Resources).

The rent rates are differentiated by river basin, type of use and some other factors. E.g. in 2020, the rate (in hryvna (UAH) per 100 m^3 of SW) was at: UAH 16.05 in the Prut basin; and UAH 21.37 in the Dnister basin – the basin with more intensive water use than Prut.

For unmetered water abstraction water users pay double the rate, for over-abstraction of water (over the quota set in the special water use permit issued by the State Water Agency and its territorial bodies) as well as for water abstraction without the permit respective at - five times the non-penalty rate. This is to – both are penalty rates to incentivise metering and compliance.

Article 255.5.6 established special, much higher rates for water used in drinks production: at UAH 34-40 per m^3.

Source: own elaboration for this note based on Article 255 of the Tax Code of Ukraine and https://www.golovbukh.ua/article/ru/8284-rentnaya-plata-za-spetsispolzovanie-vody-2020

The list of such economic instruments includes: fines for over-abstraction of water; water pollution charges for point source and non-point source (diffuse) pollution, and fines; monetary compensation of damage to water resources and bodies. Also, linkages between the water tax and electricity tariffs (water tax as cost item, on the one hand – see Box 1, and the electricity costs of pumping water, on the other hand). It will be useful to assess also eventual trans-boundary impacts of the water tax on water quantity and quality, in dialogue with Romania and Ukraine.

- **Considering options for ear-marking water tax revenues for water policy objectives and priorities**

Reaching national water policy objectives typically **requires decades**, even in developed countries. In order to achieve these objectives it is of utmost importance to ensure sufficient, stable and predictable financing of the water sector, irrespective of the changes in government related to the political cycle.

Such ear-marking could be done via an ear-marked budgetary fund and used for supporting both: (i) capital investment in cost-effective measures, and (ii) "soft measures" such as improving regulation and monitoring, implementing metering programmes.

In France, for instance, water sector funding has been based not only on the *"polluter pays*" and "*beneficiary pays*" principles, but also on the *"water pays for water*" principle, where revenues collected from charging water abstraction fees and pollution charges, as well as taxes levied on pesticides and other agri-chemicals that significantly contribute to diffuse water pollution, are ear-marked for water management (see Arnaud Caurtecuisse (2019)). It helped to ensure the long-term sustainability of financing, required for achieving such ambitious policy targets such as the universal access to piped water and sanitation in urban settlements and near universal access in rural areas. It took over 40 years to reach these goals.

In France, the aforesaid revenues complemented by allocations from the national budget are managed at the basin level. In Moldova, a much smaller country, basin councils may not have sufficient capacity yet to ensure the most cost-effective use of resources and therefore it would make sense to manage the ear-marked money at the central (national) level until basin councils gain experience and capacity to manage funds at a local level.

2.4. Expected performance and benefits of the proposed reform options

This section summarises the expected benefits (qualitative assessment) of the proposed reform options, in terms of fiscal, environmental and socio-economic impacts.

Table 3. Expected Fiscal, Economic, Environmental and Social impacts of the measures envisaged under Scenarios 1-3

	Scenario and measures	Fiscal impact	Economic, Environmental and Social impact	Comments
1.	**Scenario 1**			
1.1	somewhat improved collection efficiency due to slightly improved metering and reporting, and stronger enforcement	Increased water tax revenues (+ **MDL 8-10 million** per annum, in nominal terms*****)	not significant Affordability is not a constraint	
1.2	reallocation of water tax revenues between the levels of the budgetary system	not significant	(likely) more public funds used more cost-effectively for water sector priorities	

2.	**Scenario 2** *(measures in addition to those envisaged under Scenario 1)*			
2.1	revisiting tax base and rates, tax preferences and exemptions	Further increased water tax revenues in both nominal and real terms (i.e. protected from devaluation by the inflation). Somewhat higher administrative costs on the side of water users, Environmental inspectorate and tax authorities	Improved incentives for water use efficiency Fairer taxation Improved data base for decision making. Proposed measures do not envisage breaking the affordability thresholds	
2.2	better measuring the tax base and improving reporting			
2.3	better enforcement of special water use permits/authorisation, further improving collection mechanism			
3.	**Scenario 3** *(measures in addition to those envisaged under Scenario 2)*			
3.1	Clearly formulate and prioritise water policy objectives well	More cost-effective use of public funds for water sector priorities	Clearer guidance for economic agents typically means more cost-effective use of their resources	
3.2	**In-depth review of the tax bases** established for different water uses, continue to better differentiate tax rates and establish higher tax rates for water uses were water adds a lot of value	Substantially higher water tax revenues in both nominal and real terms	Stronger incentive for improving water use efficiency Positive impact on the amounts of water available for other uses – both in Moldova and downstream	Appropriating more fully the water rent to the benefit of the whole nation. Affordability thresholds should be respected when revising tax rates
3.3	Further improving the water tax collection mechanism		Fairer environment for competition	Ideally, jointly with improving collection of taxes levies on land & other natural resources
3.4	Ensuring **coherence** between the water tax and the design and performance of other relevant administrative and economic instruments	More cost-effective use of public funds	Lower chances for conflicting incentives and interests	

3.5	**Ear-marking water tax revenues** for water policy objectives and priorities	More funds for, and more stable and predictable financing of, water policy objectives and priorities	Faster progress in developing water systems to the benefit of the whole nation A proportion of the ear-marked fund could and should be used to soften eventual affordability constraints on the side of vulnerable water user groups (foremost, vulnerable households and small farmers)	(e.g. via an ear-marked budgetary find)

Note: * - a conservative estimate. ***Source****: authors' original elaboration for this note*

3. Developing a roadmap to reform Moldova's water tax

The actions in this section aims to support the scenario identified as the preferred one by stakeholders.

Stage 1:

- **Implement the plan to reallocate water tax revenues** from LPA level II budgets to LPA level I budgets, and a proportion to the State Budget.
- **Better enforce** the requirement that all water users who are legally obliged to use water only on the basis of the **special water use permit** will finally apply for it and get it, and respect their terms and conditions.
- **Launch some dedicated studies** required for stage 2 of the reform (see below).
- **Implement bans on some GW uses** (e.g. for commercial fish farming and irrigation of water-intensive crop produced at large scale (that is, except for own needs by households)).

Milestone 1: Water tax revenues reallocated from LPA level II budgets to LPA level I budgets, and a proportion to the State Budget. Most of existing loopholes for illegal use of, or free riding on, water resources owned by the nation are closed. As a result, water tax revenues collected (accounted for on cash basis) increased by minimum **MDL 8-10 million** per annum.

Tentative deadline 1: end Year 1 – mid Year 2

Stage 2:

- Clearly formulate and prioritise water policy objectives (aligned with the *EU acquis)* the water tax should support.
- **Revisiting tax base for some water uses** (e.g. for the food & drinks industry, and HES) **and rates** (for both SW and GW abstraction and uses), tax preferences and exemptions.
- **Annually adjusting all tax rates to reflect the past inflation** (using the producer price index – PPI to measure the inflation).
- **Improving measuring of the tax base & reporting on water uses and water tax due;**
- **Better enforcement of special water use permits/authorisation**.
- **Further improving collection mechanism**.
- **Implementation of dedicated studies from the list below** (required for this stage and a fully-fledged reform on Stage 3).

To identify and assess opportunities for improving (i) metering (incl. obligatory metering where relevant) and (ii) reporting on water uses and water tax due, it is recommended to **conduct the following dedicated studies**:

- On the reasons why industries and other economic agents located in the capital city pay in total the amount of water tax at the same or lower level than agents operating in some small rural districts of Moldova.
- On the value of water for different uses, not least for irrigated agriculture (see next item). Identifying and quantifying such benefits for each specific (major) water use will help justify a better differentiation of tax rates levied on both SW and GW abstraction, within affordability thresholds.
- Quantifying benefits from irrigation including: (i) higher yields (ii) reduced variability in yield; (iii) increased CO_2 sequestration and reduced N_2O emissions; and (iv) more efficient fertiliser use.

- On banning some GW uses (e.g. in the areas with fast GW depletion).
- On benefits and costs of introducing the two-part tariff structure for irrigation water, where the fixed part would be integrated into the land tax rates levied on irrigated land, assuming that a proportion of the land tax revenues will be allocated for land amelioration, incl. developing and maintaining irrigation and collector-drainage systems.
- On benefits and costs of ear-marking for water sector priorities water tax revenues, fines for over-abstraction, monetary compensation for damage to water resources; excise tax levied on agro-chemicals; and water related pollution charges and fines.

Milestone 2: Tax rates adjustment rule is approved, tax bases revised and better measured, and collection efficiency improved (resulting as minimum in doubling water tax revenues). Most of the dedicated studies completed strengthening the information base for Stage 3 of the reform.

Tentative deadline 2: mid-end Year 3

Stage 3:

- Implementation of all remaining reform measures.

Milestone 3: The reform is completed, creating much stronger incentives for water conservation, more effective use and protection as well as generating more significant water tax revenues used foremost for water sector priorities ("water pays for water")

Tentative deadline 3: end Year 4

Pre-requisites for, and likely barriers to, the reform and the Implementation challenge

Note that implementing most of the proposed measures are mainly driven by political will and could start promptly. While conducting respective dedicated studies in support to the reform would help fine-tune and most effectively implement the preferred scenario.

Pre-requisites for reform include:

- Consensus among key stakeholders on the need for reform and political will to implement it.
- Public awareness and mobilisation of broad political support for the reform.
- Support from development partners in implementing some costly measures outlined the road map, including conducting a number of dedicated studies.

Likely obstacles for a reform include (i) conflicting interests of stakeholders or the lack of political will and (ii) weak compliance assurance and implementation of complementary instruments (e.g. issuing and enforcement of special water use permits), and support measures such as metering and reporting – the lack of water metering (sufficiently accurate or at all) and of reliable data on water abstraction/extraction by respective water users is, and will likely remain, a key barrier to reform until it is addressed through implementing respective measures envisaged in the Road Map.

Implementation challenge

Controlling (at affordable level) the costs of meter installation and then of meter reading, reporting and analysis, and financing the costs will likely be a challenge.

It will also be a challenge to introduce a ban on some GW uses (such as for large scale irrigation, or commercial fish farming) – after decades of poorly controlled GW use, this measure may face political resistance. To address the challenge, a public awareness campaign might be conducted to inform water

users and the general public about: the risk of depletion of GW resources, or diminishing the level of water table resulting in much higher electricity costs to lift GW; and notable cases where this risk has already materialised (both in Moldova and abroad, e.g. in India).

Another challenge (both technical and political) would be to revise tax bases and introduce better differentiated tax rates – a broad communication of the results of the study on true economic value of water would help to address the challenge.

One more challenge might be to timely and effectively implement recommended dedicated studies, e.g. due to the lack of resources (qualified specialists, and financing) – development partners (DPs) may help address this issue.

Recommended next steps:

- Arrange consultations with stakeholders on main findings and preliminary considerations of this note, with the objective to generally agree (or build consensus) on the proposed: (i) options for, and scenarios of, reforming the water tax; and (ii) draft Road Map on implementing them and pre-requisites for the reform.
- Finalise the road map, generally supported by stakeholder consultation, help mobilise broader political support for implementing the reform following the road map and start implementing the road map.
- Upon agreement on main elements of the revised water tax (tax base and rates, exemptions, penalties for over-abstraction or abstraction without special water use permit, or proper metering etc.), to elaborate a more detailed methodology (algorithm) for calculating the amounts of water tax due, for different water uses.
- Draft legal regulatory act(s), or amendments to existing acts, to implement the revised water tax.

4. Annexes

Assessing the structure (design) and performance of the water tax in Moldova using OECD-EU methodology

The OECD-EU methodology for assessing economic instruments (see EC (2009) and Annex A1 to OECD (2013b)) successfully applied in a number of studies on EIs for WRM in EECCA (e.g. see (OECD, 2013a and 2013b)), for each EI in question envisages assessing the following:

- Its environmental effectiveness: to what extent/how well the instrument helps achieve water policy objectives, by creating respective incentives and sending right market signals, or by generating revenues used to fund projects and activities towards the objectives;
- Consistency with the existing institutional framework;
- Ease of administration;
- Revenue generation;
- Cost-efficiency;
- Dynamic efficiency;
- Impact on competition;
- Impact on income distribution and equity;
- Political and social acceptability;
- Other (instrument or country specific) considerations.

The water tax in Moldova was assessed against this methodology, results are presented below in Table A1.1.

Table A1.1: Assessment of the water tax in Moldova

Environmental effectiveness	The water tax is not particularly effective in achieving some key objectives such as drastically improving water use efficiency, water conservation and prevention of water resources from damage or over-abstraction (not least during droughts), nor does it help to generate significant revenues to fund projects and activities towards the water policy objectives.
Consistency with the existing institutional framework	Poor enforcement of special water use permits/authorisation is inconsistent with applying the water tax: many economic agents obliged to get these permits de facto do not have them (even when they pay the water tax); while the water tax is not entirely consistent with taxation of the irrigated land.
Ease of administration	It is not easy to administer the water tax due to several factors, incl. the difficulty to accurately measure the tax base (e.g. in case of the lack of water meters, or surrogate meter readings or intentional misleading reporting on the amount of water used resulting in poor reporting, all facilitating poor enforcement)

Revenue generation	The water tax does not generate significant revenues, moreover the amounts due are poorly collected, while collected revenues are used for any local priorities, not always connected to water.
Cost-efficiency	As a result of the above observations, the cost-efficiency of the instrument is low.
Responsiveness	It is low as the tax rate are not regularly adjusted, neither to the recent (significant) inflation nor to the evolving value of water for specific water uses.
Impact on competition	The possibility for some not to pay the water tax (totally or partially, e.g. due to inaccurate metering or poor reporting) distort the rules of fair competition
Impact on income distribution and equity	The fact that industries and other economic agents located in the capital city pay the amount of water tax at the same or lower level than agents operating in some small rural districts of Moldova may indicate that certain economic agents may be privately appropriating the water rent, thus getting extra income compared to those who pay in full and at fair rates.
Political and social acceptability	As water supply for drinking purposes to the population, as well as water uses for other social needs (e.g. for firefighting) are currently exempt from the tax, it is socially acceptable and so far, has not generated any political resistance.
Other (instrument or country specific) considerations	The water tax is not fully consistent with taxes levied on other natural resources (e.g. irrigated land) nor with tariffs for electricity generated by hydropower stations (HES); moreover, selection of the tax base for some water uses (e.g. by HES) can be questioned.

Source: own elaboration for this report.

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