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Irrigation Reform in Ukraine (2022–2025)

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LEGAL AND INSTITUTIONAL FRAMEWORK AFTER THE 2022 LAW

In February 2022, Ukraine enacted the Law **"On Organizations of Water Users and Stimulation of Hydrotechnical Land Reclamation"** (No. 2079-IX) to overhaul how irrigation and drainage (collectively *land reclamation*) are managed. This law established a new legal framework allowing farmers to form **Water User Organizations (WUOs)** – non-profit associations of water users – and empowered these WUOs to take over ownership and operation of irrigation infrastructure from the state or municipalities. The intent was to decentralize and modernize the Soviet-era reclamation system, encouraging farmers to **manage and develop local irrigation networks themselves.** Upon its entry into force in May 2022, the law enabled WUOs to acquire state-owned or communal canals, pipelines, and pumping stations free of charge, with responsibility for their maintenance and modernization. This marked a shift from state-run irrigation management to a user-led model, laying the groundwork for broader irrigation reform.

To implement the 2022 law, Ukraine initiated several **institutional and legal measures.** A dedicated government body – the **State Agency of Ukraine for the Development of Land Reclamation, Fisheries and Food Programs** – was designated to oversee irrigation (transferring functions from the old State Water Resources Agency). However, this reorganization faced delays: as of late 2024, many reclamation assets that were supposed to move under the new agency's purview remained with the old agency, **blocking the transfer of systems to WUOs.** In parallel, the government prepared follow-up legislation to complement the WUO law. Notably, **Draft Law No. 7577** (the "law on Operators of Land Reclamation Systems") was developed to create state-owned irrigation **operators** and enable co-management of large-scale infrastructure. This law, drafted with expert input from the Ministry of Agrarian Policy and Food, Ukrainian Agri Council (UAC), and USAID, passed first reading in June 2023 uacouncil.org. It aims to replace the Soviet-era budget management of main canals with **state non-profit enterprises (operators)** that can attract investment and operate on a self-sustaining basis uacouncil.orguacouncil.org. Critically, the draft provides for **transparent tariff-setting** – introducing two-part water tariffs (a fixed fee for system maintenance and a variable fee for water usage) – to ensure fairness ("the one who consumes more water pays more") and financial viability uacouncil.orguacouncil.org. It also mandates supervisory boards for these operators that include WUO representatives and independent experts, giving farmers a voice in managing trunk infrastructure uacouncil.orguacouncil.org. Together with anticipated amendments to the Tax Code (Draft Law No. 5203) to grant WUOs non-profit status (exempting them from income tax) uacouncil.org, these measures form a comprehensive institutional framework for irrigation reform.

Several **bylaws and programs** have been adopted to jump-start implementation. In August 2022, the government issued Resolution № 974 setting performance standards for pumping stations transferred to WUOs, ensuring that when WUOs assume ownership of pumps, the equipment meets certain efficiency criteria. In June 2024, the Cabinet of Ministers approved Resolution №. 628 to provide direct **state support for irrigation investments.** Under this program, farmers using reclaimed (irrigated) land can receive 50% compensation for the costs of reconstructing or building on-farm irrigation systems, and WUOs can be reimbursed 50% of the cost of rehabilitating pumping stations. The subsidy is capped at ₴26,500 (Ukrainian hryvnia) per hectare of irrigated land, and is disbursed for projects completed within a defined period (e.g. the 2023–2024 agricultural year) upon application through the State Agrarian Register. This co-financing mechanism is intended to incentivize private investment by reducing farmers' capital burden, thereby accelerating restoration of dilapidated infrastructure uacouncil.org. Even amid wartime budget constraints, the state has continued to allocate funds for maintaining main reclamation systems (about ₴5 billion annually) uacouncil.org and to prioritize irrigation as a strategic sector.

By early 2025, Ukraine signaled its long-term commitment to irrigation reform through high-level planning. In March 2025, the government adopted a **Long-Term Development Plan for the Irrigation Complex until 2050** (Cabinet Resolution 280-r). This plan, developed by the Ministry of Agrarian Policy and the State Agency of Land Reclamation with EU support, calls for completing the irrigation management institutional reform, stimulating large-scale investments in restoring and modernizing irrigation networks, building new irrigation systems, and improving water storage capacity. It explicitly envisions an "effective irrigation sector" managed with **active participation of WUOs**, enabling efficient and sustainable farming under climate change. The plan aligns with Ukraine's Irrigation and Drainage Strategy to 2030 and the Water Strategy to 2050 agroberichtenbuitenland.nl, and reaffirms that expanding irrigated agriculture is crucial for national food security. In summary, from 2022 to 2025 Ukraine put in place a robust legal and institutional framework – the WUO law, supporting bylaws, draft operator legislation, subsidy programs, and strategic plans – to transform its irrigation system from a centralized, under-invested model to a decentralized, farmer-centric one.

WATER USER ORGANIZATIONS: ROLES, GOVERNANCE, AND FINANCING

At the heart of the reform are the **Water User Organizations (WUOs)** created under the 2022 law. A WUO is a non-profit legal entity formed by agricultural water users (primarily farmers) to collectively manage irrigation (or drainage) infrastructure uacouncil.org. The law gives WUOs a clear role and authority: they can **take ownership of reclamation infrastructure** – such as secondary canals, on-farm distribution networks, and pumping stations – that was previously state, communal, or ownerless property. Once these assets are transferred, the WUO assumes responsibility for operating, maintaining, and upgrading them to provide irrigation water (or drainage services) to its members. In effect, WUOs enable farmers to directly control the water delivery to their fields, instead of depending on distant government agencies. This user-led management is expected to improve efficiency (by reducing water losses and ensuring timely water supply) and encourage investment, since farmers will have a secure stake in the infrastructure and its returns linkedin.com.

Each WUO is governed by its member water users. While the specific governance structure is defined in the WUO's charter (per the law's requirements), generally **farmers come together in a general assembly to elect a management board** and make decisions on budgets, maintenance plans, and water distribution rules. The WUO operates on a non-profit basis: it collects fees or service charges from members to cover the costs of pumping, canal upkeep, and repairs, but any surplus must be reinvested in the system. The 2022 reform envisages close coordination between WUOs and the state for multi-level governance. For major state-owned irrigation infrastructure (main canals, headworks), the forthcoming operator enterprises will include WUO representatives in their supervisory boards uacouncil.org, integrating farmers' voices into higher-level water management. This two-tier model – state operators for primary infrastructure and WUOs for local networks – aims to balance government oversight with farmer empowerment. It also introduces transparency and accountability, as users can oversee operations and prevent misuse of funds. For instance, WUOs will participate in setting irrigation service tariffs, ensuring that pricing is fair and reflects actual usage and maintenance needs uacouncil.org.

Financing of WUOs comes from multiple sources. Primarily, member farmers finance their WUO through membership fees or volumetric water charges, which cover day-to-day operation (electricity for pumps, canal cleaning, staff salaries) and minor upgrades. To support larger capital improvements, the reform provides substantial state assistance: as noted, WUOs can get 50% cost reimbursement for rehabilitating pumping stations and other works under government programs uacouncil.org. Local governments may also contribute or transfer assets without charge. Importantly,

international donors have stepped in to fund WUOs in their nascent stage. The USAID Agriculture Growing Rural Opportunities (AGRO) activity, which helped design the WUO law, launched **sub-grant programs** providing co-financing to newly created WUOs for modernization projects. By 2023, USAID AGRO had committed $2 million to such grants, with plans to expand support as more WUOs form. Additionally, USAID has supplied material aid to some WUOs – including durable pipelines, modern sprinklers, and energy-efficient pumps – to jump-start infrastructure upgrades. Looking ahead, WUOs are expected to become creditworthy entities that can attract private investment (e.g. bank loans or public-private partnerships) once they have stable revenue from member fees and clear rights to infrastructure uacouncil.org. The WUO law and proposed tax amendments ensure WUOs are treated as non-profits (tax-exempt) uacouncil.org, so that farmer contributions and any external funds go entirely into improving irrigation services rather than paying income tax.

Formation of WUOs began soon after the law was passed. Supported by outreach from the Ministry of Agrarian Policy and UAC, farmers in several regions initiated pilot WUOs even amid the challenges of 2022. By early 2023, **approximately 18 WUOs had been officially registered across various oblasts**, with dozens more in preparation. The pace accelerated through 2023–2024 as awareness grew. As of late 2024, **around 52 WUOs have been established, uniting about 150 farmers** in 13 oblasts of Ukraine uacouncil.org. Southern and central regions with high irrigation needs – such as Odesa, Kherson (where possible), Mykolaiv, and Cherkasy – have led in WUO creation uacouncil.org. Each WUO typically serves a defined irrigation system or cluster of farms. For example, the first WUO in Odesa oblast (“Water of Life”) was formed by nine farmers to manage the Suvorov irrigation system, a scheme that had been operating at only ~24% of its capacity due to disrepair linkedin.comlinkedin.com. By banding together in a WUO, these farmers could formally take over that system and mobilize resources to fix pipelines and pumps (something they were legally unable to do before). Similar grassroots initiatives have occurred in other areas, often guided by a **WUO establishment manual** and trainings developed by UAC and USAID to answer legal and practical questions (on registration, statutes, tariff setting, etc.) uacouncil.org.

To further support WUOs, a national umbrella organization – the **Association of Water User Organizations of Ukraine**– was launched in November 2024. This Association, supported by USAID’s Harvest program, brings together existing WUOs and advocates for their interests. Its mandate includes representing WUOs in lawmaking and government forums, providing legal assistance, building capacity, and helping new WUOs get started uacouncil.org. The creation of the Association reflects the growing momentum of the WUO movement and the need for a unified voice. As First Deputy Agriculture Minister Taras Vysotskyi noted at the Association’s launch, **WUOs play a pivotal role in land reclamation reform,** and showcasing successful WUO cases (such as upgraded pumping stations using advanced technologies) can inspire more

farmers to organize. The Association has also identified bottlenecks to address – for instance, the **slow transfer of ownership of infrastructure to WUOs.** By late 2024, despite many WUOs being formed, only **two WUOs had actually received legal title to reclamation assets** (pumping stations or canal segments) from the state. Pushing the government to expedite these transfers and honor WUOs' legal rights is a top priority of the Association uacouncil.org. In summary, WUOs have emerged as the cornerstone of Ukraine's irrigation reform: they are empowered to own and manage local irrigation systems, governed by the farmers they serve, financed through a mix of member fees, state support, and donor aid, and increasingly organized to advocate for the reform's full implementation.

STAKEHOLDER SENTIMENTS AND PUBLIC DISCOURSE

Farmer Reception: The irrigation reform has been met with a mix of hope, urgency, and frustration among stakeholders, especially farmers. In general, **most agricultural producers welcome the idea of WUOs and local control** of irrigation, seeing it as a "chance to restore irrigation" and improve water supply reliability. The need for reform is widely recognized in southern Ukraine's farming communities, where recurrent droughts and decades of neglect have made irrigation a critical concern uacouncil.org. The fact that over 50 WUOs have already been voluntarily formed by 2024 indicates a substantial buy-in from farmers who are eager to unite and solve water problems collectively. Many farmers have actively sought information through webinars, Q&A sessions, and manuals provided by UAC and USAID, signaling broad **grassroots interest** in making the new WUO model work uacouncil.org. For instance, when the reform was rolled out, over 100 producers gathered at public forums in 2023 to discuss its progress and ask practical questions about WUO setup, indicating a high level of engagement in the farming community uacouncil.org. Success stories are already feeding positive sentiment: farmers like Andriy Butenko in Odesa oblast report that the WUO law "opened up new prospects" – it allowed his group to finally fix an antiquated system where previously *"we paid for water but damaged pipes let it flow onto the roads"*, and to replace wasteful old pumps that consumed *"three times more electricity than modern ones"* linkedin.com. These early adopters showcase how WUOs can save water and costs, which encourages other farmers to get on board.

Public and Political Discourse: Outside of the farm owners themselves, the reform has drawn support from agricultural associations and donors, while exposing some bureaucratic resistance. The Ukrainian Agri Council (a major farmers' organization) has been a vocal champion, regularly highlighting irrigation reform in its news and lobbying efforts. UAC experts, along with USAID, were co-drafters of the 2022 WUO law and

have since used media to keep the spotlight on the reform's importance. They frequently frame it as essential not only for farmers but for national food security, especially in light of war disruptions and climate change. International partners (USAID, World Bank, EU) echo these points in public statements, emphasizing that revitalizing Ukraine's vast idle irrigation potential is key to maintaining crop production and resilience agroberichtenbuitenland.nl. Notably, after the destruction of the Kakhovka Dam in 2023 – which devastated irrigation in Kherson and Zaporizhzhia – there was a strong narrative in the media and among officials about the **urgent need to rebuild and expand irrigation systems**. The First Deputy Minister of Agriculture warned that without rapid irrigation development, up to **half of Ukraine's farmland could become unfarmable by 2050** due to increasing aridity uacouncil.org. Such messages have generally strengthened public and political will to push the reform forward.

However, the discourse has not been without **concerns and criticisms**, particularly regarding the slow pace of implementation. By late 2023, many farmers expressed frustration that the reform had stalled in bureaucracy. Despite the law's promises, producers attempting to register WUOs or acquire infrastructure encountered foot-dragging by local officials and agencies. Farmers **"actively involved in the reform"**reported difficulties in getting irrigation systems transferred to WUOs – with certain government bodies (the Ministry of Environment and the State Water Agency) effectively **blocking or delaying approvals**. This has led to suspicions that entrenched interests or corruption are at play. UAC representatives publicly warned that **"the greatest corruption risks arise where the water management system is not reformed"**, i.e. where officials can still control water assets. They argue that fully empowering WUOs (even without requiring local sign-offs for transfers) would remove local rent-seeking opportunities; hence the resistance to change might be driven by those benefiting from the status quo. Farmer spokespeople like Serhii Rybalko of UAC took to the stage in 2024 urging farmers to *"pay attention to this and demand action from the government"*. Indeed, a sense of urgency and impatience permeates stakeholder comments: **"We have already lost two years during which we could have updated the systems"**, one farmer lamented in late 2024, noting that both war **and** bureaucratic inertia had hampered progress uacouncil.org. By that time, many were calling on the Cabinet of Ministers to expedite the necessary regulations and asset handovers – essentially to *unblock* the reform.

Small Farmers' Perspectives: A specific concern in the discourse has been whether **small-scale producers** will benefit or be sidelined. Ukraine's agriculture is dualistic, with large agro-holdings and smaller family farms – so any irrigation governance change raises the question of equity. The WUO model theoretically allows all water users, big or small, to participate with equal legal standing. In practice, forming a WUO requires initiative and some resources, which larger farms may have more of. Some observers have noted the risk that **smaller farmers might struggle to organize or**

finance their share of rehabilitation costs, potentially leaving them out of new WUOs formed by clusters of bigger farms. To mitigate this, the law and donor programs have emphasized inclusivity: for example, WUOs typically operate on democratic principles (each member gets a vote), and the government's 50% cost-compensation program is especially valuable for smallholders who could not afford new pumps or drip lines on their own uacouncil.org. Still, in public consultations, **concerns were raised by small producers** about being heard in the process. Some feared that if local authorities or powerful agribusinesses dominated a WUO, water distribution might favor large users at the expense of small plots. This has made transparency in tariff-setting and water allocation a key talking point. The introduction of **unified tariffs with no cross-subsidization** (so one farmer's payments cannot be used to unfairly subsidize another's water use) was explicitly meant to ensure fairness among all sizes of farms tridge.comtridge.com. Likewise, the inclusion of water user representatives in operator supervisory boards is designed to reflect a range of stakeholders, not just the largest players uacouncil.org. As the reform progresses, farm associations are closely watching to ensure that **small and medium farmers can form and lead WUOs** in their communities. Notably, examples like the **"Lesyni Dzherela" WUO in Zhytomyr oblast** – founded by a family farm to rehabilitate a local drainage-irrigation system – have been highlighted in media to show that even modest-sized farms can successfully drive reclamation projects under the new law linkedin.com. Overall, while most stakeholders agree on the reform's necessity, the public discourse is focused on **how** and **how quickly** these changes are realized, with farmers (large and small) actively pushing for full implementation and voicing concerns over any delays or inequities.

IMPACT ON SMALL AND MEDIUM-SIZED AGRICULTURAL PRODUCERS

If fully realized, the irrigation reforms from 2022 onward stand to have a **transformative impact on Ukraine's small and medium-sized agricultural producers**. These farmers – who often operate on slimmer margins and are more vulnerable to weather extremes than large enterprises – could greatly benefit from improved irrigation access. Currently, irrigation is akin to an insurance policy for farmers in the more arid south: recent studies show that in southern Ukraine, **irrigated crop yields are up to 50% higher than rainfed yields** under the same conditions. For a small or mid-size farm, this yield boost can mean the difference between profit and loss in a dry year. With climate change projections indicating that by mid-century about 75% of Ukraine's croplands will face water shortages hydrosolutions.ch, having irrigation infrastructure could become vital for the survival of small farms. The reforms aim to make such infrastructure more readily available and reliable by putting local users in charge and mobilizing investments to rehabilitate systems that have long been defunct. In essence, small and medium producers stand to gain **higher and more stable crop productivity**

– through both yield increases and the ability to diversify into higher-value crops (like vegetables or fruits) that are only viable with irrigation. Enhanced water management will also mitigate risks of crop failure during droughts or, conversely, of waterlogging in poorly drained fields (as illustrated by the Zhytomyr WUO case, where a farm eliminated flooding and could start summer irrigation, raising yields 25% in restored areas) linkedin.com.

Crucially, the WUO framework provides a **collective solution** that particularly helps smallholders. Individually, a small farmer might never afford to repair a large pump station or dredge a silted canal, but by pooling resources in a WUO and accessing government subsidies, these improvements become feasible. The government's co-financing (50% grants for new equipment and canals) explicitly targets those using reclaimed land, which includes many medium-scale farms who inherited aging on-farm systems. With the subsidy cap per hectare, it ensures even a farmer irrigating a smaller plot can get a proportional benefit uacouncil.org. Donor-funded grants and technical assistance are likewise often directed at nascent WUOs that include small farms – effectively lowering the entry barrier for them to participate. For example, in Odesa's "Water of Life" WUO, a group of family farms combined forces to replace broken pipelines and install modern pumps, something none could have done alone; as a result, they planned to **triple their irrigated area within a year** of forming the WUO, dramatically improving their output and income stability linkedin.com. Similarly, in Zhytomyr, a single mid-sized farm led a WUO to reclaim nearly 300 ha of land that were previously waterlogged or drought-prone linkedin.com. These cases underscore how the reform empowers proactive small/medium farmers to solve local problems collectively and reap tangible benefits.

That said, the **impact on smaller producers will depend on addressing certain challenges**. One concern is the upfront cost and technical know-how required to modernize irrigation – even 50% cost-sharing still leaves the other half to the farmer. For cash-strapped smallholders, this can be a hurdle, and not all have equal access to credit. This is why the role of WUOs is so critical: they create a structure where small farmers can join an existing system rather than build one from scratch, and through economies of scale the cost per farmer comes down. Another factor is ensuring **equitable water distribution**. Under state management in the past, smaller farms sometimes complained of water being delivered preferentially to larger state farms or those who paid bribes, etc. The new system, with transparent tariffs and user management, is intended to prevent that tridge.com. Each WUO member typically has rights to water proportional to their land or agreed shares, which should safeguard small plot owners from being cut out. The law's requirement that WUOs be non-profit and (once 5203 is enacted) tax-exempt means they won't face heavy taxes that could otherwise be passed on to members as higher fees uacouncil.org – an important detail for keeping water affordable for small farmers. Additionally, by involving small

producers in governance (e.g. serving on WUO boards or on the new operators' supervisory boards), the reform seeks to give them a voice in decision-making commensurate with larger producers uacouncil.org.

In the broader picture, revitalizing irrigation could significantly level the playing field for small and medium farms. Large agribusinesses in Ukraine often have more capital to invest in private irrigation (some even drilled wells or built their own reservoirs), whereas small farms without such means have been at a disadvantage. Now, with collective WUOs and state support, a village of smallholders can, for example, refurbish a disused Soviet irrigation scheme and start getting water, dramatically increasing their yields of corn, soy, vegetables, etc. This not only boosts their incomes but also enhances **climate resilience** – a key benefit as seasons become more erratic. An irrigated small farm can plan crop rotations and mitigate drought losses, whereas those relying on rain alone face higher uncertainty. Indirectly, this reform can also **stimulate rural employment and investment**: as water becomes available, small farmers might expand cultivated area, invest in new crops (like orchards or berry plantations), or build greenhouses, knowing they have irrigation. Each of these moves improves rural livelihoods and community stability, which is especially vital during the ongoing war and expected post-war recovery. In summary, although challenges remain in ensuring every small and medium producer can take advantage of the reform, the potential impact is largely positive – promising better yields, more stability, and new opportunities for Ukraine's smaller farmers, provided the reforms are fully carried through.

INVESTMENT AND FINANCING FOR IRRIGATION SYSTEM RESTORATION

Reviving Ukraine's vast irrigation systems – much of which was built in the 1960s–80s and is now **85% worn out** uacouncil.org – requires massive investment that far exceeds current public funding. Recognizing this, the reform has been geared toward attracting **multiple sources of financing**: public (state budget), private (farmers and agribusiness), and international donors/IFIs. The 2022 WUO law itself was designed as an investment catalyst by giving the private sector (farmers) a secure stake in infrastructure. **Farmers are now incentivized to invest their own capital** in repairs and upgrades because they can own the assets and directly benefit from efficiency gains. Dmytro Kokhan, head of the new WUO Association, noted that the law "created incentives and tools for private investment in land reclamation" by granting farmers the right to take over state and communal reclamation networks uacouncil.org. This legal ownership is crucial for convincing farmers to spend money on, say, replacing a canal lining or installing drip lines – they can be confident the infrastructure won't be arbitrarily taken away after they invest. Indeed, farmer-led WUOs have already begun modest investments (clearing canals, buying new pumps) and have plans for much larger ones

if the environment remains favorable linkedin.com.

Nonetheless, the scale of needs is enormous. By 2023, due to war and neglect, only 120,000 ha of land were actually being irrigated (water-supplied) in Ukraine, down from ~2.2 million ha a couple of years prior uacouncil.org. With climate change looming, the goal is not just to recover that 2.2 million ha but to extend irrigation to new areas to safeguard food production. Experts estimate that **billions of hryvnias in investment** will be needed to restore and expand the infrastructure. The government has clearly signaled that **state resources alone are not enough** and private investment is essential uacouncil.org. To facilitate this, the draft law on reclamation operators (No. 7577) creates a framework for more financially autonomous operators that can enter partnerships and finance arrangements. These operators, being state-owned enterprises with revenue streams, could potentially borrow money or engage in public-private partnerships to rehabilitate main canals or pumping stations. The inclusion of an *"investment component"* in the new two-part tariffs is particularly notable. It means water fees will be structured to include funds earmarked for infrastructure modernization, directly channeling user payments into capital investment uacouncil.org. Over time, as operators become self-sustaining (the plan is within three years of establishment) uacouncil.org, the burden on the state budget can decrease and those savings can be redirected to co-finance upgrades or support small farmers.

Public financing still plays a critical role, especially in kick-starting projects and covering what the private sector cannot. The Ukrainian government continues to budget for irrigation through maintenance funds (₴5 billion annually for basic upkeep uacouncil.org) and through targeted support programs like the 50% cost compensation scheme uacouncil.org. The 2024 support program (Res 628) essentially turns budget money into capital injections at the farm level by reimbursing half the cost of pumps, pipes, and sprinklers being installed uacouncil.org. This not only leverages private money (each public hryvnia is matched by a private hryvnia) but also **attracts bank financing** – banks are more willing to lend to a farmer or WUO if they know half the project cost is guaranteed by the state. Additionally, local budgets in some regions might allocate funds to assist WUOs (for example, a oblast may decide to fund part of a canal repair that benefits many farms).

International donor and development finance are perhaps the most crucial piece for large-scale restoration. Even before the full-scale war, organizations like the World Bank had partnered with Ukraine to devise an Irrigation and Drainage Strategy (approved in 2019) and were contemplating lending projects. Since 2022, donors have stepped up grant-based support. The U.S. through USAID has been a major contributor: beyond policy assistance, **USAID provided $2 million in grants by 2023** for modernizing reclamation systems via WUOs uacouncil.org, and donated equipment to reduce costs for farmers uacouncil.org. In 2024, USAID's Harvest activity funded the

establishment of the WUO Association to strengthen user participation in reform and advocacy. The European Union has also become involved, linking irrigation reform to its broader aid packages. The EU (through DG NEAR) supported the development of the 2050 Irrigation Plan and likely will back its implementation under the “Ukraine Facility” – an initiative to help rebuild Ukraine agroberichtenbuitenland.nl. This could translate into EU grants or loans for irrigation projects in coming years. Other potential players include the European Bank for Reconstruction and Development (EBRD) and European Investment Bank (EIB), which have financed water infrastructure in the region before.

Looking ahead, **post-war reconstruction funds** may heavily feature irrigation. The war inflicted direct damage on canals, pumping stations, and especially the Kakhovka reservoir/dam, whose destruction dried out a huge portion of the south’s irrigation network. International aid for Ukraine’s recovery (the World Bank’s assessed needs, etc.) identifies irrigation and water resource infrastructure as a priority for rebuilding and climate resilience. For example, pumping stations and main canals in Kherson and Zaporizhzhia will require reconstruction that individual farmers or even the Ukrainian budget alone cannot finance. Multilateral funds, perhaps under climate adaptation or food security programs, are likely to be tapped. Even innovative financing like green bonds have been discussed domestically as a way to channel investment into sustainable irrigation (considering efficient water use contributes to climate adaptation).

In summary, Ukraine’s irrigation reform is being funded through a **mix of sources**: farmer contributions and WUO fees, augmented by state subsidies; new tariff models and enterprise structures to attract private capital; and significant donor engagement to cover gaps and build capacity. The underlying strategy is to use limited public funds to **leverage larger private and external financing.** As a result, we are seeing early investment trickle in – e.g. farmers upgrading a pump here, a USAID grant replacing a pipeline there – but scaling up to the billions needed will hinge on passing the remaining laws (like the operator law to improve creditworthiness and governance) and on Ukraine’s stability post-war. The creation of a long-term 2050 plan with EU support is a positive signal, as it provides a roadmap for investors (domestic and foreign) by identifying priority projects and policy commitments. With half a century of service area (over 1 million ha of Soviet-built schemes) sitting underutilized agroberichtenbuitenland.nl, the opportunity for impactful investment is enormous. The reform has begun unlocking that opportunity by building the institutions through which money can flow to concrete results – modern, efficient irrigation systems that support Ukraine’s agriculture.

ADOPTION OF NEW IRRIGATION TECHNOLOGIES AND DIGITAL WATER MANAGEMENT

Modern center-pivot irrigation systems are being introduced as part of Ukraine's drive to upgrade and automate its antiquated irrigation infrastructure.

A key aspect of the irrigation reform is the **promotion of modern irrigation technologies** to replace outdated, inefficient methods. Much of Ukraine's existing irrigation hardware – leaky concrete canals, rusting pumps, and Soviet sprinkler units – is technologically obsolete, wasting both water and energy. As WUOs and private farmers take charge of systems, they are increasingly turning to **precision irrigation and automation** to improve performance. For example, many farms are shifting from old open ditches or high-pressure Soviet sprinklers to **center-pivot and drip irrigation systems**, which apply water more uniformly and with far less loss. Center-pivot rigs (like those now seen irrigating fields in Odesa and Mykolaiv) deliver water directly to crops in a controlled manner, reducing evaporation. Drip irrigation is also gaining traction for row crops and horticulture, as it delivers water to the root zone with minimal waste. These technologies can dramatically increase water use efficiency – a critical benefit given that water resources are becoming scarcer and more contested (the war and climate change have both stressed water availability). They also improve yields by ensuring crops get timely watering tailored to growth stages, something that was hard to achieve with inflexible old systems.

Upgrading pumping and control systems is another priority. One immediate win for many WUOs has been to install modern pumps with variable-speed drives and automation. The difference is stark: farmers report that new pumps consume a third of the electricity of their Soviet-era predecessors for the same volume of water delivered linkedin.com. This translates into huge cost savings on energy – important as energy prices have risen and wartime power outages have been frequent. Moreover, contemporary pumps often come with **automation and remote control**, allowing WUO operators to start or stop pumps and adjust flows with the push of a button (or even via smartphone), rather than manual operation that requires on-site staff. The government's support program covering pump station rehabilitation explicitly pushes for **energy-efficient equipment** uacouncil.org, and donors have provided items like energy-saving pumps and modern irrigation machines to WUOs as in-kind support uacouncil.org. Taken together, these upgrades reduce operating costs, which in turn lowers the water fees farmers must pay, making irrigation more affordable and sustainable.

The reform stakeholders are also encouraging the adoption of **digital water management tools.** While still in early stages, there is growing interest in using

sensors, telemetry, and data analytics to optimize irrigation scheduling and water distribution. Some forward-looking farms are beginning to use soil moisture sensors and weather data to implement **precision irrigation scheduling** – applying water only when and where needed, rather than on a fixed rotation. Satellite imagery and drone surveillance are being explored (with donor help) to monitor crop moisture status over large irrigation schemes, which can guide WUOs in allocating water efficiently and spotting leaks or issues in the network. For instance, a recent Nature Food study used remote sensing to map all irrigated areas and identified the drastic decline in functioning pivots after the Kakhovka Dam's destruction hydrosolutions.ch; such technology, if handed to local managers, could help in *real-time* management of where water is reaching. There are also discussions about **digital metering** of water usage at the farm turnout level, so that WUOs can measure each member's consumption accurately and implement the "pay for what you use" principle fairly uacouncil.org. Some pilot projects have installed smart meters and automatic gate controls on canals to regulate flows. Over time, these digital solutions can create an integrated water management system – often referred to as **"smart irrigation"** – which maximizes crop per drop.

The reform framework has built-in incentives for technology uptake. The two-part tariff introduced by Draft Law 7577, for example, encourages water-saving: the variable charge is proportional to volume consumed, so farmers benefit financially from conserving water (e.g. by switching to drip) uacouncil.org. It also rewards energy efficiency, as reducing pumping costs will help keep the fixed tariff component low. Additionally, by making WUOs responsible for maintenance, the reform motivates them to invest in durable, modern materials (like HDPE pipelines that leak far less than crumbling concrete canals). We see early evidence of this tech adoption in WUO pilot areas. In Cherkasy region, some WUOs are reportedly using **automated fertigation** (fertilizer through drip irrigation) to boost crop performance. In Odesa, the "Water of Life" WUO aimed to introduce "resource-saving technologies" as they expanded their irrigation area, explicitly to **reduce the cost of irrigation** while increasing coverage linkedin.com. This phrase often refers to things like low-pressure sprinklers, automation, or scheduling software to save on water and energy. The government and donors have facilitated **knowledge transfer** on new technologies as well. Ukrainian delegations of WUO members have visited countries like Israel or the U.S. to see modern irrigation tech in action (e.g., learning about advanced drip systems and automated controls), bringing back expertise. Trainings and field days are being organized to demonstrate equipment like GPS-guided pivots or solar-powered pump units.

In the wake of wartime challenges, **innovation has become even more important**. With electricity infrastructure under strain (and at times targeted), there's rising interest in **alternative energy for irrigation**, such as solar-powered pumps or using on-farm solar panels to offset grid usage. While not yet widespread, Mercy Corps and other NGOs have piloted solar irrigation in some areas as a means to reduce reliance on

expensive diesel generators during power cuts. These kinds of technologies align with global trends in sustainable irrigation and could be scaled in Ukraine with the right support. Moreover, the catastrophic loss of the Kakhovka reservoir has sparked considerations for **modern water storage and distribution methods** – for example, building smaller reservoirs or on-farm ponds with lined storage, and using efficient pipe distribution instead of large open canals that are vulnerable in conflict. The long-term irrigation plan to 2050 emphasizes sustainability and climate resilience, which implicitly calls for state-of-the-art technologies and integrated water resource management.

In conclusion, the period 2022–2025 has seen the start of a technological shift in Ukraine's irrigation practices. From modern pivots gracing the landscape to farmers using smartphone apps to time their watering, the adoption of **precision irrigation, automation, and digital management** is gradually taking hold. While legacy infrastructure issues persist, each WUO-led project that replaces an old pump or installs drip lines serves as a proof of concept for the rest of the country. The reform doesn't just aim to fix what was broken – it aims to leapfrog Ukraine's irrigation into a more advanced, efficient era. Achieving that at scale will require continued investment and training, but the early uptake of new technologies is an encouraging sign that Ukraine's farmers are ready to embrace innovation in water management.

KEY CHALLENGES AND BOTTLENECKS IN THE REFORM PROCESS

Despite the considerable progress and positive developments, Ukraine's irrigation reform faces **significant challenges and bottlenecks** that must be addressed to realize its full benefits:

- **Bureaucratic Delays and Institutional Turf Wars:** The implementation of the WUO law has been slowed by complex bureaucracy. As noted, transferring infrastructure to WUOs has been painfully slow – by the third year of reform, only 2 WUOs had actually received physical assets out of dozens formed. Farmers consistently cite **difficulties obtaining the needed approvals from state agencies**. A major issue has been the incomplete reorganization of agencies: the handover of reclamation responsibilities from the State Water Resources Agency (under the Environment Ministry) to the new reclamation agency (under the Agriculture Ministry) was supposed to happen by mid-2021 but was **still not finalized by late 2024**. As a result, the old agency retained control of canals and pumping stations and was reluctant to release them, effectively **blocking WUOs from taking over management**. This intra-government tussle needs resolution – either through high-level political intervention or legislative clarification – otherwise WUOs remain WUOs in name only, without assets to manage. Similarly, delays in passing complementary laws (like the Operators law No. 7577 and tax

amendments) have left a gap in the reform's toolkit. Without an established operator structure, WUOs in 2023–24 had to rely on the old irrigation authorities for bulk water delivery, which often meant operating under the same old inefficient arrangements. All of this adds up to frustration on the ground and has at times **"suspended" the momentum of the reform**. Overcoming bureaucratic inertia and aligning all relevant agencies (water, environment, agriculture, finance) behind the reform is thus a critical challenge.

- **Corruption and Rent-Seeking Risks:** The reform's slowdown at local levels has raised concerns about corruption. Farmers and experts fear that certain officials have a **vested interest in retaining control over water assets** – possibly to extract informal payments or favors – and are therefore stalling WUO empowerment. For instance, if a local water management official must approve the transfer of a canal to a WUO, that official might delay until "encouraged" or might refuse citing technicalities, hoping the farmers give up. Such corruption risks were explicitly called out by UAC's monitoring: places where the old water management system persists are seen as hotbeds for graft. This is a bottleneck because it not only delays implementation but can also **undermine trust** in the reform – if farmers start to believe the new system is just as corrupt as the old, they may disengage. Tackling this requires clear rules (e.g. automatic transfer of certain infrastructure to WUOs once criteria are met, removing discretionary power) and oversight. The idea floated by some reformers is to allow transfers **"without local approvals"** to cut through potential corruption. Additionally, ensuring that the new Operator enterprises have transparent governance (with independent oversight) is crucial so they don't become new loci of corruption. The inclusion of independent experts and farmer reps on operator boards is meant to safeguard this, but it will need vigilant enforcement.
- **War Impacts and Security Concerns:** The Russian invasion has cast a long shadow over irrigation reform. Some of the most irrigated parts of Ukraine – Kherson, Zaporizhzhia, Donbas – have been partially occupied or turned into conflict zones since 2022, making normal operations impossible. The **destruction of the Kakhovka Dam in June 2023** was a devastating blow, rendering the entire Kakhovka canal system (which watered hundreds of thousands of hectares) dry and defunct. This not only slashed the country's irrigation capacity virtually overnight, but also created an environment of uncertainty. Investors and even local farmers may be hesitant to pour money into infrastructure that could be destroyed or lies in areas that are unsafe. In Kherson oblast, for example, even forming WUOs has been moot while fighting raged or the area was occupied. Thus, the war is a bottleneck in any practical sense – large-scale reconstruction of irrigation in affected regions likely has to await improved security or post-war rebuilding efforts. Moreover, the war caused ancillary challenges like **energy shortages and high fuel costs**, which hit irrigation hard (pumps need electricity or diesel; many farmers struggled with power outages, leading some to irrigate with inefficient generators or

not at all)ukrainerebuildnews.comukrainerebuildnews.com. While the reform can't stop a war, it means in the interim the focus has shifted to safer regions (central/western Ukraine) and smaller-scale systems. The challenge will be integrating the war-torn south back into the reform when conditions allow – essentially doing double duty: reconstructing physical infrastructure while also establishing WUOs and new management from scratch in those areas.

- **Financing Gaps and Affordability:** Although multiple financing mechanisms have been introduced, there remains a gap between needs and available funding. The state's subsidy program, while generous, only covered a one-year window and might not be consistently extended at the same level due to budget constraints. If subsidies lapse, farmers might be unable or unwilling to invest, slowing the momentum of restoration. Even with 50% covered, the remaining costs for technologies like drip irrigation systems or center pivots can be high, potentially too high for small farms without loans. Access to credit is an issue – Ukrainian banks have historically been cautious in lending to agriculture for long-term projects, and the war has made them even more risk-averse. WUOs are new and unproven entities from a bank's perspective, so they may face difficulty securing loans until they have a track record. Donor grants, while extremely helpful, are relatively small-scale (a few million dollars here and there) compared to the billions in needs. There is hope that large reconstruction funds will step in, but coordination and timing (when will projects start?) remain uncertain. In the meantime, **the dilapidated infrastructure continues to deteriorate** – pumping stations not maintained due to war or lack of funds will rust, canals will overgrow further. Each year of delay potentially increases the cost needed later. Thus, creating effective models to mobilize capital – perhaps piloting a public-private partnership for a major canal, or bundling farmer demand to approach development banks – is an ongoing challenge. Additionally, ensuring that water tariffs remain affordable after upgrades is a concern. If new operators set tariffs too high (to recoup investments quickly), farmers might not be able to pay, defeating the purpose. The law tries to prevent this by phasing in self-sufficiency over three years and involving users in tariff decisions, but it will be a delicate balance to fund improvements without pricing out users.
- **Technical and Organizational Capacity:** Forming a WUO and running an irrigation system is a new endeavor for many farmers, and not all have the needed expertise or organizational capacity yet. **Capacity building** is therefore an essential but sometimes overlooked component. Training farmers in water management, accounting for a non-profit, equipment maintenance, and conflict resolution within WUOs (e.g. if water is short, how to allocate) is a continuous need. USAID and UAC have provided guides and seminars, but as the number of WUOs grows, maintaining quality of management is a task. If a WUO is mismanaged (due to inexperience or internal disputes), it could fail and become a cautionary tale that deters others. Similarly, the new state Agency and any new Operators have to build

their capacity – hiring skilled staff, developing modern water accounting systems, etc. Some delays in implementation may come simply from a lack of human resources who know how to execute this complex reform at the field level. This is partly being addressed by involving international experts and learning from other countries (Ukraine has looked at experiences in the U.S. west, Spain, Turkey, etc., for managing irrigators' associations), but it remains a challenge to translate paper reform into on-the-ground effective management.

- **Environmental and Climatic Challenges:** While not often the focus of stakeholder debate, there are environmental considerations that could pose bottlenecks. For example, extracting more water for irrigation must be balanced with river ecosystem health and downstream needs (especially after the war altered river flows). The Ministry of Ecology will likely scrutinize large new irrigation projects for environmental impact, which could slow approvals if not aligned with the Water Framework Directive principles (Ukraine is moving toward EU standards). Additionally, climate change is a moving target – as droughts intensify, even improved systems might struggle to supply enough water without new reservoirs or inter-basin transfers, which are big undertakings. These are longer-term challenges, but decisions made now (like what tech to adopt, where to invest first) should account for these factors to avoid future bottlenecks.

In conclusion, while Ukraine's irrigation reform has generated considerable optimism and initial successes, it is **not without hurdles**. The reform's trajectory so far has revealed friction points in governance (bureaucracy, corruption), external shocks (war), financial constraints, and learning curves for new institutions and technologies. The coming years will test the country's ability to navigate these bottlenecks. High-level political commitment – which fortunately seems strong, as evidenced by continued legislative efforts and strategic planning – will be needed to push through administrative resistance. International support will also be vital in both funding and expertise to ensure the reform doesn't lose steam due to the war or economic strain. Farmers, for their part, remain eager for change, and their voice (now amplified through WUOs and the WUO Association) will be crucial in holding the government accountable to the reform's goals. By addressing these challenges head-on, Ukraine can overcome the current stalls and build an irrigation management system that is efficient, equitable, and resilient, securing water and prosperity for its farmers large and small.

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