IRRIGATION REFORM IN UKRAINE: ORGANIZATIONAL AND LEGAL ASPECTS

Mikhail Romashchenko¹, and Oksana Dekhtiar²

ABSTRACT

The rehabilitation and efficient utilization of the existing potential of the irrigation systems of Ukraine requires resolution of institutional and organizational issues. On the background of the global climate changes, the existing natural and social conditions make the role of irrigation stronger in achieving sustainability of the arable farming and transformation of Ukraine into one of the world’s leading food donors.

The State Water Agency of Ukraine (SWAU) currently implements the state policy in development of water management and amelioration of lands, besides management and operation of the relevant state owned assets. The currently existing structural form of management offers no incentives to reform the system itself, therefore an external intervention is needed to push the reform and make relevant efficient managerial decisions.

Amendments to the Ukraine’s legislation in force are needed in order to introduce a clear legal framework for both establishment and functioning of the water user associations (WUAs).

The reform of the Ukraine’s water management sector besides preserving the existing functionality of the irrigation systems should also aim at a gradual transition to the most common market principles.

Once water consumers have been structured into WUAs, the latter could further acquire features of legal entities or establish legal entities to become retail water suppliers, to maintain and operate on-farm irrigation systems and to possibly own those systems.

Keywords: reform, irrigation sector, management, modernization, rehabilitation.

1. THE PROBLEM AND ITS RELEVANCE

A major part of the territory of Ukraine belongs to the arid-semi-arid zone. The global climate changes have caused a considerable expansion of this zone. During the period from 1990 to 2010, the total area of the arid and very arid zones in Ukraine increased by 8 mha compared to the period of 1960-1990. In those conditions, sustainable agriculture is not possible without irrigation (Romashchenko, 2013).

A selection from data of the AQUASTAT Main Database of the FAO is shown in Table 1 for water withdrawal for agriculture and irrigation in certain countries (FAO, 2016).

In terms of the scale and capacity of the existing and operating national water supply system, Ukraine is comparable to such countries as France and Israel. As of early 2015, in the SWAU’s system, there have been 5.5 thousand of operational pumps to the total installed capacity of 1.5 GW. To compare, Mekorot State Corporation (the national bulk water provider in Israel) operates 2.4 thousand of pumps (Mekorot–Israel National Water Co, 2015).

¹ Dr. En., Academician of NAAS, Director of the Institute of Water Problems and Land Reclamation, 37 Vasylykivska Str., Kyiv, 03022 Ukraine; mykhailo.rom@gmail.com
² PhD., Head of the Department of Land Reclamation, Institute of Water Problems and Land Reclamation, 37 Vasylykivska Str., Kyiv, 03022 Ukraine; Oksana.Dehtiar@gmail.com
Unfortunately, the Ukraine’s existing irrigation potential is rather poorly used. Of the 2.17 mha of irrigated lands only 0.48 mha were actually watered in 2014. Such a poor share of the actually watered areas does not allow for sustainable agricultural production, as the climate becomes increasingly arid (Romashchenko, 2014).

Besides, the irrigation system in Ukraine is degraded, especially of the on-farm networks, such as the engineering infrastructures and pumping equipment, insufficient park of and a poor renewal of the sprinkling equipment, violations of the crop growing technologies, changes in the structure of the sown areas, and worsening of the ecological and ameliorative conditions in the irrigated lands.

Therefore, we consider a reform of the existing system of water management sector a prerequisite for efficient utilization of the irrigation systems’ existing potential and their future development.

The purpose of the research is to provide a conceptual justification of the vision of the reform of the water management sector in Ukraine for rehabilitation and sustainable development of irrigation under the current conditions of climate change and transition to the modern economy.

2. ANALYSIS OF THE INTERNATIONAL EXPERIENCE

Towards reforming the management of irrigation systems, the recommendations of the experts of FAO, ICID, IWMI, and others were used to define the most common requirements and principles, namely:

(a) definition of property rights to engineering infrastructure facilities at different levels of irrigation systems management;
(b) development of the legal framework and creating organizational structures;
(c) development of the legal framework for settlements for the system of services, such as water supply, regulation, drainage, repairs and consulting;
(d) coordination of the financial and tax system in agriculture and water management;
(e) framing the rights and obligations of the land-and-water users and water management organizations.

To estimate how efficiently these principles, measures and approaches were practically applied when reforming the water management sector, the experience of Bulgaria, Moldova, Israel and France was analysed. The experience of the reform in the said countries showed that despite the fact that all those countries kept to the general principles, each country had its own specifics and peculiarities.

The analysis of the water management transformation in Bulgaria showed that in a country with a high irrigation potential (in the 1990s, 254 irrigation systems operated

---

Table 1. AQUASTAT Data for Water Withdrawal in Different Countries

<table>
<thead>
<tr>
<th></th>
<th>Moldova</th>
<th>Bulgaria</th>
<th>Armenia</th>
<th>Israel</th>
<th>Ukraine</th>
<th>France</th>
<th>Spain</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Water Withdrawal, bcm</td>
<td>0.04</td>
<td>0.10</td>
<td>1.15</td>
<td>1.13</td>
<td>4.45</td>
<td>3.14</td>
<td>21.3</td>
<td>61.6</td>
</tr>
<tr>
<td>Total Water Withdrawal, bcm</td>
<td>1.07</td>
<td>6.12</td>
<td>2.94</td>
<td>1.95</td>
<td>14.9</td>
<td>33.1</td>
<td>33.5</td>
<td>80.3</td>
</tr>
<tr>
<td>Total Population (million persons)</td>
<td>3.5</td>
<td>7.2</td>
<td>2.98</td>
<td>7.6</td>
<td>45.5</td>
<td>63.9</td>
<td>46.8</td>
<td>120.8</td>
</tr>
</tbody>
</table>

* bcm = billion cubic meter
watering 0.75 mha) the unsuccessful reform did not produce expected results and led to the decline of the irrigation sector. The state-owned water supply “Irrigation System Company” (ISC) carried on the management of the irrigation systems and consisted of 21 semi-autonomous regional branches, while water user associations were formally created without the proper economic and legal framework (Bachev, 2010; Koubratova, 2004; Restrepo et al., 2007).

Water users were not stimulated to modernize irrigation; the privatization of the state-owned assets was incomplete. The maintenance funds were spent by the ISC regional branches in the absence of transparency. All water loss from the mains was due to inefficient service and unauthorized water withdrawal. The transition to the free market without proper regulation and control, as the Bulgaria’s experience shows, can only aggravate the situation.

The experience of Moldova (Fondul Provocărilor Mileniului Moldova, 2016; Irrigation Reform and Rehabilitation Supports High-Value Agriculture in Moldova, 2014) where there are no mains and only 11 local irrigation systems are in operation, can be used for Ukraine only in terms of its application to smaller-scale local systems, for example in the Odessa Region, it however does not seem to be applicable to the larger irrigation systems of Ukraine, such as the Kakhovska, Inguletska, etc. In conditions of Moldova, where smaller systems are used for irrigation, the transfer of the systems to the water user associations may be possible in a single stage, but in Ukraine, such a measure would require an incremental implementation.

The experience of Israel shows that the functions of policy-making and business activities should be separated (Levin, et al., 2009; Mekorot–Israel National Water Co, 2015; The Irrigation in Israel, 2014). The operation and maintenance of irrigation systems can be done by specially created business entities based on the state ownership. An example is the «Mekorot» State Corporation - the national bulk water provider in Israel that provides 70% of the total water supply and operates 3,000 facilities throughout the country, including 800 pumping stations, 1,200 wells, 2,400 pumps, 10.5 x 10⁸km³ of large diameter pipelines and 840 water reservoirs. The annual water supply volume is about 1.5 bcm at the water losses less than 3%. The Israel’s experience gives reason to expect efficient operation of the state-owned structures and can be applied to the bigger Ukrainian irrigation systems, such as the Kakhovska Irrigation System.

France is an example of efficient public, private and commercial water management (Institutional Reform Options in the Irrigation Sector, 2004; Public Water Policy in France, 2015; Tardieu, 2005). The water legislation in France most closely reflects the basic principles of the EU Framework Water Directive. The process of the water policy formulation widely involves all the interested parties – water users, service companies, entrepreneurs, farmers. The French communes are directly responsible before their citizens and the law for investing in and management of the services of water supply and drainage. The method of management – direct or through a contract with a private company – depends on the resolution by the commune. The National Water Committee includes policy makers, water users, chairpersons of the basin committees and state representatives and is a platform for preliminary discussions of the state water policy at the national level. The water for irrigation is chiefly supplied by private companies.

The above critical analysis of the approaches to the irrigation management in different countries proves the need to account for the peculiarities of each country when attempting to reform the irrigation sector.

3. EXPOSITION OF THE SUBJECT MATTER

The 2011-2014 inventory data for the current state of irrigation in Ukraine prove that a network of the mains and distribution canals that was created back in the soviet times exists in the southern regions with the corresponding pumping equipment and regulating hydro structures which design capacities considerably surpass the level of
their utilization (Table 2). The Kherson Region has the most considerable reserves for expansion of the irrigated areas.

**Table 2. Characterization of the Mains and Irrigation Systems in the Southern Ukraine**

<table>
<thead>
<tr>
<th>Name of the Main / Irrigation System</th>
<th>Irrigated Areas, '000' ha</th>
<th>Capacity of the Pumping Stations (Structures), m³/s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Watered Areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Statisticaly</td>
<td>Actually Watered</td>
</tr>
<tr>
<td>North-Crimean Main, the Kherson Region only</td>
<td>101.7</td>
<td>50.7</td>
</tr>
<tr>
<td>Kakhovsky Main</td>
<td>326.0</td>
<td>215.5</td>
</tr>
<tr>
<td>Canals of the Inguletska Irrigation System</td>
<td>122.1</td>
<td>12.7</td>
</tr>
<tr>
<td>Odesa Region Irrigation Systems</td>
<td>71.74</td>
<td>22.1</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>621.54</td>
<td>301.0</td>
</tr>
</tbody>
</table>

A substantial reduction of the irrigated land areas is observed in recent years. Moreover, the reduction in the actually watered areas outpaces the irrigated areas reduction (Figure 1).

![Figure 1. Actually Watered Areas ('000'ha) in Ukraine in 1990-2014.](image)

The current capacities of the irrigation infrastructure are greatly reduced due to up to 40% seepage losses, low energy efficiency of the pumping equipment (Figure 2).

The management of the irrigation systems remains unchanged since the soviet times and modernization is not done due to Funds crunch.

Historically, the existing irrigation and drainage systems of Ukraine were designed and constructed as an integral set of assets with their structure intended for and focused on servicing the large-scale agricultural enterprises.

In 1990s, when reforming the national agriculture – first of all, through division and allocation of land shares, the whole set of assets of the irrigation and drainage systems was disintegrated as a result of splitting of the former large-scale agricultural enterprises. While the inter-farm networks remained in the state ownership, the on-farm systems that had belonged to the liquidated collective and "soviet" farms remained practically without owners. Such a situation resulted in ruining of separate elements of the irrigation and drainage systems, loss of their technical integrity,
vandalizing of pipelines, sprinkling machines and, therefore, in reduction of areas of used irrigated lands. Smaller land users could not afford investment of financial and/or technical resources in reconstruction or modernization. The transfer of the on-farm systems into the communal ownership under the 2003 Resolution by the Cabinet of Ministers of Ukraine either did not stop shrinkage of the actually watered areas.

Figure 2. The Main Elements of the Water Balance of the Kherson Region Irrigation Systems (‘000 m³)

Therefore, the problem of rehabilitation and development of irrigation needs a complex of measures to be implemented based on development of the National Strategy with the main objective to provide for sustainability of the arable farming and transformation of Ukraine into one of the world’s leading food donors. In order to achieve this main objective, it is reasonable for such National Strategy to provide for:

(a) legal and institutional reforms pre-requisite for sustainable functioning of the irrigation and drainage sector to be based on the decentralized management that would involve the water users;
(b) reform of the central management system of the water management sector;
(c) rehabilitation, modernization, reconstruction and further development of the irrigation systems through development and implementation of investment projects while using public and private financing facilities including those of the international donors;
(d) development and introduction of a mechanism to finance the expenditure for management, maintenance, operation and development of irrigation and drainage using a new tariff setting system;
(e) development and introduction of ecologically balanced systems of the ameliorated agriculture that would provide for highly efficient usage, preservation and recreation of irrigated and drained soils;
(f) development and introduction of a system of the institutional and personnel capacity building in the irrigation and drainage sector.

To the best of the accumulated knowledge and findings, the following conceptual provisions could be recommended for the future National Strategy.

It is reasonable for the works for rehabilitation and development of irrigation to be done first of all at the existing irrigation systems where reserve capacities exist for water withdrawal and supply (e.g. the Kakhovsky Main). The total additional watering area only at the large-scale irrigation systems may exceed 635,000 ha (Table 3).
Table 3. Estimated Areas and Costs of Additional Watering in the Southern Ukraine

<table>
<thead>
<tr>
<th>Administrative Region of Ukraine</th>
<th>Additional Watering Area, (‘000’) ha</th>
<th>Unit Cost, thsd. USD</th>
<th>Total Cost, mln. USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dnipro</td>
<td>70</td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Zaporizhya</td>
<td>140</td>
<td>2.0</td>
<td>280</td>
</tr>
<tr>
<td>Mykolayiv</td>
<td>100</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Odesa</td>
<td>100</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Kherson</td>
<td>225</td>
<td></td>
<td>450</td>
</tr>
<tr>
<td>TOTAL</td>
<td>635</td>
<td>-</td>
<td>1270</td>
</tr>
</tbody>
</table>

For the expansion of the watered areas, those irrigation systems should be selected for modernization and reconstruction that are located in the lands that had been watered using the existing on-farm networks to the biggest extent.

The modern watering technologies are chiefly recommended for the modernization and reconstruction of the irrigation systems – first of all, drip irrigation systems and low-pressure sprinkling machines, as well as water and energy saving environment friendly irrigation regimes, water regulation and metering, implementation of seepage control measures in the mains and canals and replacement of the old and inefficient pumping equipment.

While rehabilitating the irrigation, the environmental safety requirements should be met and the specifics of the ecological and ameliorative condition should be taken into account of the irrigated lands, as well as the directivity of the soil processes and regimes, possibility of manifestations of salinization, acidification, alkalization, hydromorphization of lands and the quality of the irrigation water.

Since no domestic facilities of long-term privileged loan financing have been so far available, corresponding investment projects need to be developed and implemented for the rehabilitation and development of irrigation while attracting chiefly foreign long-term loans for the state guarantees.

The opinion looks reasonable that successful development of irrigation is possible only upon reform of the water management system. As of today, SWAU implements the state policy in management, usage, and recreation of the surface water resources, development of water management and irrigation and drainage of lands and operation of the state-owned water economy complex-purpose facilities, inter-farm irrigation and drainage systems, including implementation of management of the state-owned assets that belong to the sphere of SWAU’s responsibilities (Regulations on the State Water Resources Agency of Ukraine, 2014), and, therefore, at the same time, performs as the state regulator of the sector and carries on the activities of the national bulk and retail water provider. The organizational chart of the irrigation and drainage systems management is shown in Figure 3.

The reform of the water economy of Ukraine needs to be aimed at a gradual transition to a market-based model (Figure 4 & 5).

Initially, in order to unbundle the commercial activities from the management (regulatory) function, it is reasonable to establish within the SWAU’s system a state-owned enterprise in the legal form of a public joint-stock company in 100% state ownership based on the existing water supply organizations. In the future, the state-owned share could be decreased by means of emission and sales of the stock as an additional source of financing and refunding the loans for rehabilitation and modernization of the irrigation system infrastructure.
Such State Joint-stock Company (SJSC) would become authorized to exercise the state ownership rights for the water supply systems and (temporarily) the business activity function in providing the water supply services.

At the same time, in the subordination to SWAU, the Water Board would be established to become the platform for discussions of the terms and conditions (including tariffs) of water supplies between the owners of the systems, water providers and the structured (into associations) water users. The Water Board, an advisory body initially, could then start developing into an independent regulator of the water economy, creating thereby the necessary pre-conditions for rehabilitation of the existing irrigation systems and infrastructures, modernization and further development of the same.
SJSC would be obliged to ensure transparent tenders for transfer of the complete sets of assets into management (or concession, lease or other type of the public-private partnership – PPP) of corresponding bulk or retail water providers.

In order to preserves the existing jobs, as well as the existing production capacities, it seems reasonable to use the possibilities of separate transparent and fair privatization of subdivisions in subordination to SJSC – regional water management units and main canal management units, which in such a way would naturally turn into independent bulk water providers.

The main objective of the newly established SJSC would be to exercise the state ownership rights to the engineering infrastructures and to create conditions necessary for emergence or market-entering of independent bulk water providers in order to unbundle the functions of the owner and the operators of the water economy systems.

Figure 4. Institutional System for the Transition Period
The operator would invest own financial means and/or attract loan financing. Certain targeted privileges might be introduced. If, to manage a separate set of assets, an operator is created in the state ownership, such operator could be granted the right to attract loans from international donors for the government guarantees. Operators of retail water supply could become entitled to acquire ownership rights to the respective local irrigation systems and/or to create new systems in their respective ownership. A concessionaire could be entitled to keep his newly created assets in his ownership till the termination of the concession.

SJSC in virtue of PPP might be entitled to delegate to the operators the obligations to operate, preserve, rehabilitate and develop respective complete sets of assets. In such a case, SJSC would be obliged to regularly inspect how operators perform those obligations and to generally monitor the activities of the operators. Later on, the independent regulator could start licensing and routine monitoring of the performance of license conditions. SWAU, on their part, would keep to management of the water resources.

On-farm irrigation systems would be transferred in concession or lease (for at least 15 years) to the operators – bulk and retail water providers. If agricultural holdings or WUAs become willing to undertake the responsibility for operation and maintenance
of irrigation systems, they establish respective operators in their respective ownership with whom SJSC enters into proper legal relations. The backbone systems of bulk water supply (e.g. the mains) and water distribution systems remain in the state ownership (with SJSC exercising the state ownership rights).

It is reasonable for those on-farm systems which are operational, used for irrigation and belong to the balance sheets of agricultural producers or village councils to be transferred into their respective ownership, long-term lease or concession according to the legislation in force. Unworkable on-farm systems could be transferred into ownership, long-term lease or concession of WUAs or land owners upon undertaking the obligation by them to rehabilitate those systems at their own expense. The works of rehabilitation and modernization of irrigation systems should be done by those contractors that are properly licensed and transparently selected. All the above will facilitate attraction of private financing for investments in rehabilitation, reconstruction and modernization of the inter-farm and on-farm irrigation systems.

The view can be proposed that the optimum further development would be to create a free market of water supply services when the operators of bulk and retail water supply are interested to expand their businesses by connecting new water users while the independent regulator is licensing the operators and sets fair tariffs for them that reflect costs of operation and maintenance of the respective sets of irrigation assets.

Organizational measures in the irrigation and drainage sector will need to be implemented on the background of the outrunning improvement of the applicable national legislation in force by making relevant amendments and supplements to the following legislative acts:

(a) The Law of Ukraine “On Irrigation and Drainage of Lands”;
(b) The Land Code of Ukraine;
(c) The Taxation Code of Ukraine.
(d) A new law “On Water User Associations” needs to be developed and adopted to define the legal status and organizational framework for establishment and activities of WUAs.

4. CONCLUSIONS

The irrigation reform in Ukraine needs to be comprehensive to cover all the elements of the national structure for supply, transportation, distribution and consumption of water resources and based on the world’s best practices and include:

(a) development of the National Strategy of Irrigation Rehabilitation and Development;
(b) making relevant amendments and supplements to the applicable legislation in force;
(c) structuring water users into water user associations (WUAs) which further acquire attributes of legal entities or create legal entities to become retail water suppliers;
(d) institutional reform in the water economy management to initially establish the state-owned joint stock company in order to unbundle the functions of the owner and water supply operator, and establishment of the Water Board as an advisory body initially to further develop into the independent regulator of the sector;
(e) development and implementation of investment projects for rehabilitation and development of irrigation.
REFERENCES


Regulations on the State Water Resources Agency of Ukraine (approved by the Cabinet of Ministers of Ukraine of 20 August 2014. Number 393).


