

The Future of Water in Agriculture in Albania

A Broad Sector Rethinking

Regassa Namara, Ranu Sinha,
Pieter Waalewijn, Drita Dade,
and Agim Demukaj

About the Water Global Practice

Launched in 2014, the World Bank Group's Water Global Practice brings together financing, knowledge, and implementation in one platform. By combining the Bank's global knowledge with country investments, this model generates more firepower for transformational solutions to help countries grow sustainably.

Please visit us at www.worldbank.org/water or follow us on Twitter at [@WorldBankWater](https://twitter.com/WorldBankWater).

About GWSP

This publication received the support of the Global Water Security & Sanitation Partnership (GWSP). GWSP is a multidonor trust fund administered by the World Bank's Water Global Practice and supported by the Australian Department of Foreign Affairs and Trade, Austria's Federal Ministry of Finance, the Bill & Melinda Gates Foundation, Denmark's Ministry of Foreign Affairs, the Netherlands' Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency, Switzerland's State Secretariat for Economic Affairs, the Swiss Agency for Development and Cooperation, and the U.S. Agency for International Development.

Please visit us at www.worldbank.org/gwsp or follow us on Twitter at [@TheGwsp](https://twitter.com/TheGwsp).

THE FUTURE OF WATER IN AGRICULTURE IN ALBANIA

A Broad Sector Rethinking

Regassa Namara, Ranu Sinha, Pieter Waalewijn,
Drita Dade, and Agim Demukaj

© 2022 International Bank for Reconstruction and Development / The World Bank

1818 H Street NW, Washington, DC 20433

Telephone: 202-473-1000; Internet: www.worldbank.org

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this work is subject to copyright. Because The World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given.

Please cite the work as follows: Namara, Regassa, Ranu Sinha, Pieter Waalewijn, Drita Dade, and Agim Demukaj. 2022. "The Future of Water in Agriculture in Albania: A Broad Sector Rethinking." World Bank, Washington, DC.

Any queries on rights and licenses, including subsidiary rights, should be addressed to World Bank Publications, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2625; e-mail: pubrights@worldbank.org

Cover design: Melina Rose Yingling, World Bank.

Cover photo: Magdevski / iStock.

CONTENTS

Acknowledgments	v
Key Messages	vii
1. Introduction and Context	1
2. World Bank Engagement in Albania’s Irrigation and Drainage Sector	5
2.1 Key Outcomes	6
2.2 Key Lessons Learned.....	7
3. Drivers and Determinants of Irrigation and Drainage Sector Development	9
3.1 Biophysical Factors	9
3.2 The State of Infrastructure.....	13
3.3 Financing.....	15
3.4 Energy Costs.....	19
3.5 Socioeconomic Factors.....	20
Notes	25
4. Enabling Green, Climate Resilient, Inclusive, and Sustainable Agricultural Transformation: The Irrigation and Drainage (Eco)system Approach	27
4.1 Rationale for a New Conceptual and Operational Framework	27
4.2 The Irrigation and Drainage (Eco) System Approach.....	28
Note	31
5. Revitalize the I&D Sector for Sustainable, Climate-Resilient, and Inclusive Rural Economic Transformation	33
5.1 Potential Intervention Areas	33
Bibliography	41

BOXES

BOX 1	The Changing Terms of Trade for Irrigation.....	21
BOX 2	Irrigation Technology Use in Albania, Compared to the Western Balkan Region	23

FIGURES

FIGURE 1	Typical Rainfall and Evaporation Distributions for Four Locations	11
FIGURE 2	Seasonal and Annual Changes in Average Temperature.....	12
FIGURE 3	Average Changes in Seasonal and Annual Precipitation Since 1990	13
FIGURE 4	Expenditures on Irrigation, Drainage, Dam Safety and Flood Protection, by Source of Financing and Main Economic Category, 2015-20	18
FIGURE 5	Agriculture Real Growth and Contribution to Real Economic Growth.....	19
FIGURE 6	Proportion of Potential Irrigable Area That Is Irrigated, for Selected Municipalities	22

TABLE

Table 1	Food, Beverage, and Tobacco Trade (in million ALL).....	3
----------------	---	---

ACKNOWLEDGMENTS

The team would like to express their sincere gratitude to government officials for their feedback during the consultations of the report. We would like to recognize the support of Irfan Tarelli (MoARD), Arben Mukaj (MoARD), Arduen Karagjozi (WRMA), and Gerta Lubonja (WRMA) for providing relevant documents and reviewing the final report. The authors are grateful to those who contributed to the development of this report in various ways. The Albania country management unit provided financial contributions and logistical supports to the study. Special thanks goes to Maryam Salim (the former Albania Country Manager), and Evis Sulko (Sr. Country Operations Officer) for their initiation of the study and guidance during the preparation of the report.

The report benefited from the advice provided by the members of the Water in Agriculture Global Solutions Group of the Water Global Practice. David Michaud (the former Practice Manager of the Water Unit of ECA) played significant role in both the conceptualization of the underlying study and development of the report. The team would like to thank Winton Yu and Emanuel Salinas for their support in disseminating the key results of this study. The insightful reviews received from IJsbrand De Jong, Ahmed Shawky, Silvia Mauri, Wilfried Hundertmark, and Simon David Ellis greatly shaped the content of the report and enhanced its relevance.

The report benefited from the country overviews prepared as part of the Western Balkan regional study prepared by consultants, namely Steve Goss, Paul Van Hofwegen, Juan Antonio Sagardoy, and Erjon Kalaja with the support of Svetlana Valieva.

We would also like to thank Estella Malayika, Carolina Delgadillo and Elona Qana for their administrative support. The team appreciates the editorial assistance received from Erin Ann Barrett, Melina Rose Yingling, and Marcelle Ide Mireille Anyu Djomo.



KEY MESSAGES

- **Irrigated agriculture is critical for inclusive development of the rural economy of Albania.** The lion's share of cultivated land in the country is irrigated. Agriculture significantly contributes to GDP and employs about 40 percent of the total workforce. Women are assuming a substantial role in the agricultural sector due to demographic changes in rural areas.
- **Irrigated agriculture in Albania, and the associated assets, are uniquely vulnerable to various hazards** including floods, droughts, and seawater intrusion. It is expected that these hazards will be exacerbated due to climate change.
- **Despite recent upward trends in performance, the sector is constrained by a host of challenges,** chief among them a backlog of infrastructure rehabilitation and modernization needs.
- **In order to eradicate rural poverty, there is a need to modernize the country's heavily degraded irrigation and drainage (I&D) infrastructure.** However, it is equally important for Albania to break the vicious cycle of a rehabilitate/neglect/rehabilitate syndrome, by ensuring regular maintenance of infrastructure.
- **Due to the poor quality of service delivery and land fragmentation, utilization of the equipped irrigation areas is suboptimal.** The imperfections of agricultural land markets, and extreme land fragmentation is disincentivizing farmers from making long-term investments.
- **In Albania, as in other countries in the Western Balkan region, a vibrant private or farmer-led irrigation sector has developed.** Private irrigation focuses on growing high-value crops for both local and international markets. If adequately supported, this sector can significantly contribute to the government's plan of doubling agricultural exports.

- To enhance water security, climate resilience, and agricultural competitiveness, and to ensure revival of the rural economy, **interventions are required in the following five areas:**
 - i. Irrigation and drainage infrastructure modernization**, including rehabilitation of tertiary network, optimizing dam storage, piloting of pressurized systems for enhancing systemic and on-farm irrigation efficiency, and rehabilitation of drainage systems;
 - ii. Enhancing the flood risk resilience** and hydromet capacities of Albanian agencies;
 - iii. Scaling up private or farmer-led irrigation**, and supporting agricultural value chains;
 - iv. Investing in institutions, information, and knowledge;**
 - v. Encouraging green and environmentally sound farming and irrigation practices.**
- To ensure optimal use of irrigation potential there is a need to shift from the current infrastructure-centred intervention approach to the irrigation and drainage (eco) system approach, which puts farmers and their wide diversity of circumstances squarely at the centre of analysis and support.

1

Introduction and Context

Investment in agricultural water management can potentially contribute to many of Albania's development goals. Due to its continental Mediterranean environment, with four distinct seasons and relatively abundant water and land resources, biophysically Albania has a comparative advantage in agricultural development. Given this reality it is paradoxical that the country is a net importer of agricultural commodities. Albanian agriculture satisfies only 30 percent of the country's demand for food and feed, with a trade deficit of \$680 million. The government hopes to boost agricultural production by providing financial support to farmers and facilitating private investment in the agro-processing sector.

However, the endowment of natural resources alone is not enough for sustainable agricultural development. Realization of the agricultural development potential of Albania is conditioned by a host of other factors including national, continental, and international policies and strategies; trade agreements; and overall economic conditions. At the national level, the irrigation and drainage (I&D) strategy; the water resources management strategy; and the river basin management plans all affect the kinds and mix of interventions that could be designed to improve the sector.

At the continental level, accession to the European Union (EU), which involves harmonization and negotiation of 35 separate "chapters" of the *Acquis Communautaire*, the accumulated body of EU legislation and systems, provides a framework for the sector's development pathways. One major milestone in the environment chapter is harmonization with the Water Framework Directive (WFD), which the EU adopted in 2000. The essential aspects of the WFD include protecting the quality of surface and groundwater resources; achieving decentralized management of water resources by promoting the role of river basin authorities; and ensuring more efficient use of water and water

cost recovery. In addition, there are several other water-related directives of the EU, including the one on flood protection (2007), the Groundwater Directive, the EU Green Growth Agenda, and the Nitrate Directive. All of these impact the management of water resources.

At the international level, the overall demand for exports, and the amount of available remittances provide the conditions needed for growth. The recent agricultural export performance of Albania, despite the COVID-19 pandemic-induced economic downturn, indicates the promise the sector can offer going forward. Interventions in the I&D sector, together with other supportive measures, are contributing to the unlocking of export potential. Albania's geographic location is a natural competitive advantage waiting to be fully leveraged. Given its physical proximity to the larger regional market of the Western Balkans and the EU, goods can potentially be traded quickly and inexpensively. In addition a large diaspora, currently around half a million Albanians abroad, can also contribute to the country's integration into the global economy. Their remittances are an important source of funding for the economy.

Over the past several decades, the I&D sector of Albania has evolved in response to changes in economic policies and institutions, changes in rural demographics, changes in biophysical conditions, and emerging economic opportunities.

Before the 1990s, Albania had collective agriculture and massive investment in I&D infrastructure. During this era, the most prominent government policy priority was food self-sufficiency. Even though the system of collective agriculture ensured economies of scale in agricultural mechanization and other infrastructure, it suppressed farmers' incentives and entrepreneurial spirit. During the early years of the communist regime, a wave of investments and radical reforms were undertaken in all sectors of the economy. Specifically, the agricultural sector underwent deep transformation in land ownership and organizational structure. In 1945, the communist government initiated agrarian reform, the primary goals of which were the expropriation of land from large owners and redistribution to landless farmers, followed by large-scale collectivization of agricultural land. Investments were made in mechanization, infrastructure, land reclamation, terracing, and construction of large I&D networks. However, despite the reforms and investments in modernization, the agricultural sector still struggled to meet the food demands of the population.

After 1992, Albania once again underwent a deep political, economic, and social transition, with land reform being one of the most important policy changes. Albania redistributed land that had previously been held by agricultural cooperatives and state farms to their members on an egalitarian basis. This era was characterized by backlog of rehabilitation needs of the irrigation and drainage infrastructure, diminution of farm size, and fragmentation of land-holdings.

From 2014 to 2019, the country observed a period of relative growth in agricultural value added and labor productivity. During this period, Albanian agriculture showed steady growth. The growth recovery since 2014 has been driven by domestic consumption, fueled by renewed job creation, improvements in credit conditions, and the inflow of remittances. The annual growth rate varied from 2.7 to 7.9 percent, depending mainly on weather conditions; the sector has been growing at a higher rate than the rest of the economy. By 2011, **labor productivity, measured by gross value added per annual work unit had grown by 46 percent, compared to 2007; but this is still low compared to the overall EU average, as well as the average for the 10 new EU member states.** In 2012, labor productivity was €3615 per annual work unit in Albania, compared to EUR 6914 for the 10 new EU member states.

Over the past decade, Albania has experienced faster growth rates. The rapid growth and recovery during these years is mostly a result of the ability of farmers to quickly adapt to the changes brought about through privatization, and modification of their production structures. However, two recent, devastating shocks in quick succession - a highly destructive earthquake in late 2019, followed by the global COVID-19 pandemic in early 2020 – have reinforced the need to strengthen the foundations of Albania’s growth model as the basis for a vigorous and sustainable economic recovery.

The agricultural sector continues to play an important role in the Albanian economy, contributing about 19 percent to the GDP and employing roughly half of the active labor force in the country. This sector is the most important source of income for the majority of rural households. However, Albania has exhibited a consistent agricultural produce trade deficit during the past five years, as shown in Table 1.

In 2020, Albania imported 365,000 tons of cereals, mostly wheat and maize. Imports from Russia and Serbia, worth about \$105 million, represented almost 80 percent of the total. The country’s most important export products are fruits, greenhouse

TABLE 1 Food, Beverage, and Tobacco Trade (in million ALL)

	2016	2017	2018	2019	2020
Imports CIF	100,365	106,738	106,508	110,365	110,927
Exports FOB	25,347	30,081	32,334	35,374	39,050
Trade Balance	-75,018	-76,657	-74,174	-74,991	-71,887

Source: INSAT 2021.

vegetables, medicinal and aromatic plants, and olive oil. Agro-processing is growing, but still serves a very small market.

The development of greenhouses is quite significant. In a period of seven years (2013 to 2019) the area of greenhouse development has nearly doubled. Most of these greenhouses use private irrigation systems. The greenhouse area size reflects the size of open field parcels, which vary mostly from 0.2 – 0.5 hectare, which is suited to the increasingly diminishing farm size per capita, and land fragmentation. The growth of the area planted with fruit trees is also quite significant. From 2013 to 2019 this area has increased by 56 percent. The trees that have shown the largest expansion have been olives, with a 64 percent increase in the number of trees and citrus trees that have shown an increment of 100 percent.

Individual irrigation and farmer-led irrigation are fast developing in Albania, even though there are no official statistics about the extent of the area and the value of the production involved. In Albania, individual irrigation refers to a situation in which one farm is entirely responsible for abstracting, transporting, and applying its irrigation water, with the only public role being that of licensing the abstraction. The irrigated area may range from a small plastic greenhouse to hundreds of hectares on a corporate farm, but the key feature is that there is one single organization that is responsible for the entire process; so there is no requirement for collective decision-making or billing of users. The main water sources for farmer-led irrigation are boreholes, rivers, and municipal water supply and drainage networks. This development is an adaptation to the prevailing land-holding situation and the unreliability of public irrigation service delivery, as well as a response to market opportunities. With higher-value crops, there is a tendency to create independence in water sourcing and irrigation. Increasingly farmers are using water pumped from groundwater wells and drainage networks for drip irrigation systems on these crops. The area covered by private farms using their own irrigation facilities is not reported, but considering that there are more than 4,000 wells in the country, the area covered is most likely greater than 8,000 hectares, considering the average size of farms.



2

World Bank Engagement in Albania's Irrigation and Drainage Sector

The World Bank has supported the irrigation and drainage (I&D) sector in Albania through a series of four projects: the Irrigation Rehabilitation Project (1994 -1999); the Second Irrigation and Drainage Rehabilitation Project (1999 to 2005); the Water Resources Management Project (2004 to 2009), and the Water Resources and Irrigation Project (2012-2021). The main objectives of these projects were to improve the performance of selected irrigation systems; achieve sustainable and equitable use of irrigation water for increased agriculture production, and reduce the risk of floods; establish an institutional and legal framework for the sector; and create a strategic framework for the management of water resources at the national level, and in selected river basins.

The key activities have been:

- I&D system rehabilitation and modernization, including irrigation, drainage, dam, and flood protection infrastructure;
- Institutional support or reform, with a focus on water user associations, drainage boards, and I&D units at municipalities;
- Technical assistance, including the development of guidelines to improve the country's design; operational standards in irrigation; development of an irrigation operation and maintenance manual; and development of an monitoring and evaluation (M&E) system;

- Integrated water resource management; and
- Implementation of an Irrigation and Drainage Management Information System (IDMIS) in selected municipalities.

The government has accelerated reforms and started transferring major responsibilities, such as the operation and maintenance of the headworks, main canals, and reservoirs, initially to the federations of WUAs, and later to municipalities.

2.1 KEY OUTCOMES

More than 183,666 hectares of Albania's I&D system, and 44 dams were rehabilitated. These projects have increased agricultural production and enhanced rural employment. The amount of irrigated area was increased by 30-50 percent, and yields increased by about 20 percent, mostly for irrigated maize, vegetables, fruits, and forage crops. This consequently also increased livestock numbers. But the potential for growth is still higher. For example, wheat yields can double with good drainage, releasing land for forage or vegetable crop production.

Due to relative improvements in the reliability of irrigation service delivery, the area under high-value crops has increased, while the area under rainfed subsistence crops has declined. Farm income has substantially increased--by about \$750 to \$1500 per year--generating additional labor requirements of more than 30 person-days, with returns of \$10 per day. Thus, the I&D infrastructure rehabilitation has had very positive economic and rural poverty reduction impacts.

These projects have contributed to improved equity in the distribution of irrigation water among farmers, which was a serious social issue, particularly for large irrigation schemes with long main canals where upstream farmers were capturing irrigation water without considering the impact on downstream farmers. They have also substantially reduced flood risks through rehabilitation of deteriorated drainage and flood protection facilities.

The projects have also contributed to formulation of strategic frameworks for the I&D system, including the development of a National Integrated Water Resource Management Strategy; River Basin Management Plans; and an Irrigation and Drainage Strategy. The frameworks developed are serving as a "compass" indicating the direction in which the system has to move in order to be further improved, and to become fully functional and sustainable.

The technical assistance component of these projects has contributed to operationalizing the framework (i.e. putting it into practice); for example, approval of the I&D infrastructure maintenance tariff in municipalities.

Various training modules have also been developed and delivered to the relevant I&D units (IDUs) of the municipalities, including: Preparation of an Irrigation Service Plan (a legal requirement of IDUs); Operation and Maintenance of Dams and Flood Protection; Functioning and Maintenance of Pumping Stations; A Strategic and Legal Framework for Irrigation and Drainage in Albania; the Establishment of Water User Organizations (WUOs); Crop Water Requirements (a reference for agronomists); Climate Adaption; and Gender Aspects and Application of the Irrigation and Drainage Management Information Systems (IDMIS).

2.2 KEY LESSONS LEARNED

Water source protection activities, for example micro-catchment improvement, were not integrated into the projects to ensure the sustainability of both the resource and the infrastructure.

The overall development of agriculture depends on other factors, such as the availability of quality inputs (seeds, fertilizers) as well as access to markets. However, these aspects were not fully integrated in to the projects.

While the distribution of water within the irrigation scheme (intra-WUO) has improved, distribution among various irrigation schemes (inter-WUOs) was not equitable. This underlines the need to integrate irrigation management into broader river basin-based water resource management.

Sustainability of irrigation service delivery requires further strengthening. Under the World Bank projects, extensive support was provided to improve the operation and maintenance of the irrigation schemes. A rapid inventory done for the areas rehabilitated under IRP and SIDRP to assess the maintenance carried out by the WUAs indicated that of the total 143,666 hectares rehabilitated, only about 119,427 hectares (83.1 percent) have been adequately maintained. Moreover, out of the total of 292 WUAs established, only about 225 were operational. Regarding cost recovery, the amount collected from irrigation charges remains too low.

One of the main results achieved from decentralization is the rehabilitation of drainage canals, which have not been adequately addressed for decades. Prior to decentralization, the

central government was focused mainly on irrigation canals and had neglected the drainage canals. The importance of drainage canals in protecting agricultural land is quite positive, and obvious.

Institutional architecture of IDUs. The institutions set up at municipalities consist of irrigation masters, administrative units, and IDUs. IDUs operate within the Directorate of Agriculture, the Administration of Water and Environment, or under the Public Property Maintenance Entity that is subordinate to the municipality. The latter arrangement often encounter problems regarding decision making on matters such as budgeting.

Legislative framework governing the I&D sector. The working connection (or coordination) between the regional directorates for I&D, and the municipalities regarding management of I&D schemes needs further strengthening, especially for cases in which municipalities manage water sources that serve other municipalities. Normally, such cases (that is, multi-municipality of I&D water systems) are left to the RDIDs to manage.

- **The role of WUAs has diminished.** Even though there is a strong emphasis both in the legal framework and in the national I&D Strategy on WUAs, municipalities are reluctant to engage in the establishment of such organizations. The law on administration of I&D has defined clear regulations and procedures in the establishment and organization of WUOs, but currently there are no WUAs in place. The strategy has outlined a process and timeline until WUAs might take over the operation of tertiary canals from municipalities. The transfer of management of tertiary canals to WUOs could be a solution to the problem of deterioration of tertiary canals, which affects project results. Investments in tertiary systems currently do not receive priority from the government. On-farm networks obtain support from the government and the IPARD program, but IPARD program support excludes on-farm systems that are connected to existing irrigation schemes.

3

Drivers and Determinants of Irrigation and Drainage Sector Development

3.1 BIOPHYSICAL FACTORS

The per capita arable land resource is limited. Only 25 percent of the country's land is arable; about 0.2 hectares of arable land per capita. Furthermore, land degradation and soil erosion have resulted in decreased agricultural land surface. Albania's arable land per capita is the lowest in Europe; therefore, the intensification of agriculture on the available arable land is a promising pathway for transforming agricultural productivity and production. And irrigation is a potent instrument that can be used to realize the drive to intensify agricultural production. Large amounts of abandoned land tend to be prone to degradation and erosion and characterized by low soil fertility. More than 20 percent of Albanian soil is at risk of being eroded at a rate of more than 5t/ha/year; 70 percent of the territory is eroding at 20t/ha/year; and only 10 percent of the soil is less affected by this phenomenon. Thus, agricultural productivity is constrained by declining soil fertility, increasing land degradation, and inadequate use of fertilizer.

The water resource endowment of Albania is estimated at 13,000 cubic meters per capita per year. Although Albania is endowed with ample freshwater resources, it also experiences high variability, with mild winters characterized by abundant rainfall and hot, dry summers. Spatial and temporal distribution of rainfall and temperature results in large variations across the country. Around 70 percent of the rain falls from October to March, with most of the precipitation occurring in November, while July and August have the lowest levels of rainfall.

The majority of the river flow (86 percent) is from October to May, and 14 percent is from July to September (the dry period). Groundwater is mainly used for drinking, with only a small percentage used for irrigation.

Figure 1 shows rainfall and evaporation distributions for four locations. From this chart it can be seen that water deficits can rise to a maximum of 150 mm in August and the deficit lasts for nine months, from March to October.

The efficiency of use of the withdrawn water is low, due to high levels of water losses. The quality of the water is also deteriorating, due to untreated sewage discharge and inappropriate dumping of solid urban waste into water bodies.

The availability of water resources is also affected by climate change and climate variability. Climate change affects both the water resources and crop water requirements. Climate and climate variability is creating droughts, floods, and heatwave hazards, which affects the critical infrastructure, including irrigation networks, livestock shelters, and storage facilities. Almost 4,000 disaster events have occurred between 1852 and 2013. During the period 1990 to 2014, floods caused the greatest economic losses, followed by flash floods and landslides. Flood hazards occur on average once every six years. During the last 33 years the economic loss caused by floods is estimated at \$2.3 billion. These floods were caused by a combination of high rainfall levels and release of excess water from the hydropower stations; they affected large surfaces of arable land, livestock, and houses. The coastal areas, which currently host 65 percent of the country's cultivated land, 60 percent of its fruit trees, 90 percent of its greenhouses, 75 percent of its vegetables, and 64 percent of its field crops, have been identified as the most vulnerable areas, as they are not only subject to inundation due to floods, but also by seawater intrusion from storm surges.

Albania is considerably exposed to climatic risks compared to other European and Central Asian countries. Seasonal temperature variations suggest that there will be a lengthening in the growing season by 22 days in the north and 37 days in the south in 2100s when compared to situation in 1990s (See Fig.2). The largest increases in temperature are expected to occur during the spring and summer. **This coincides with the main period of plant growth and fructification for most crops: the maximum number of days without precipitation occur consecutively during three quarters of the period in which crops are developing.**

It is projected that for most agricultural crops annual rainfall will not be sufficient to meet the water requirements; thus these crops will require supplemental irrigation (See Fig.3).

FIGURE 1 Typical Rainfall and Evaporation Distributions for Four Locations

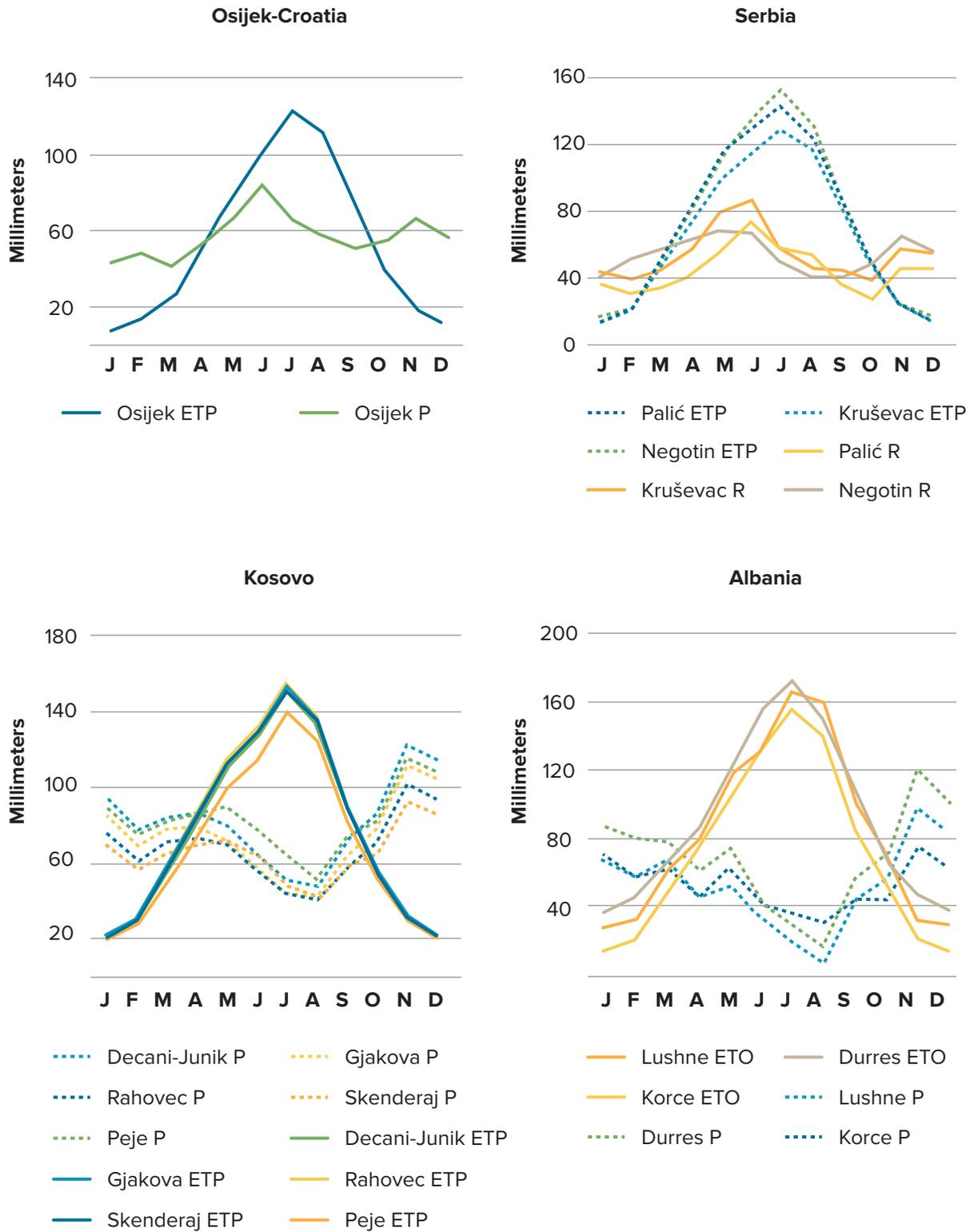
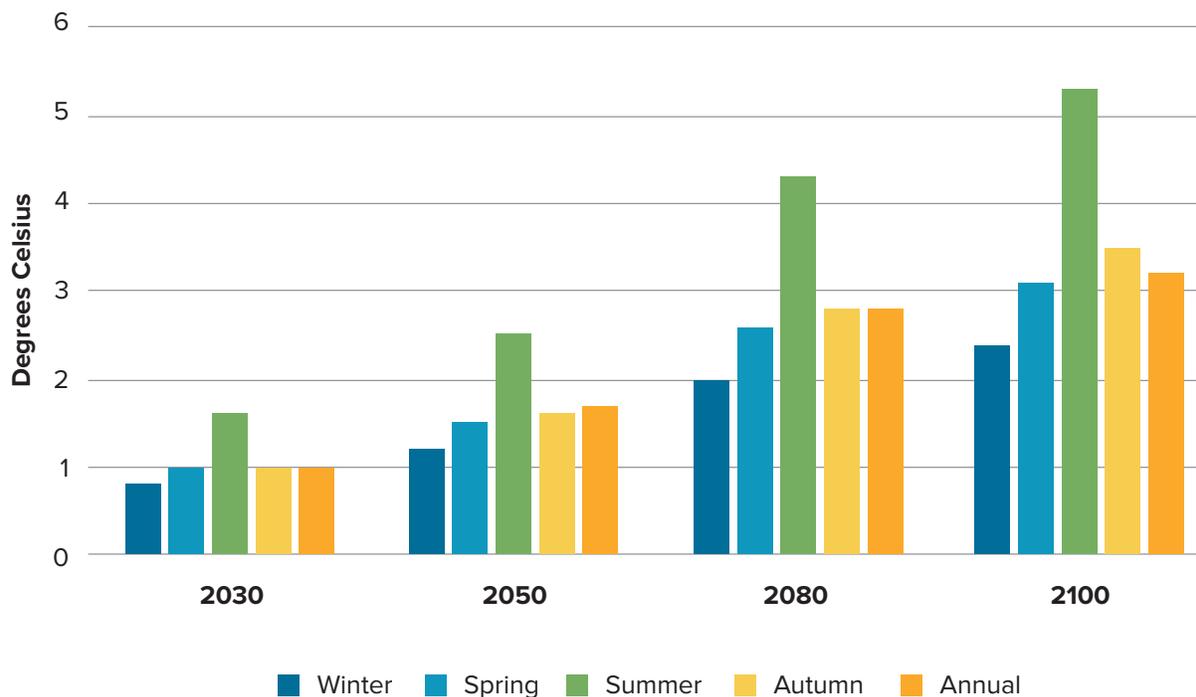
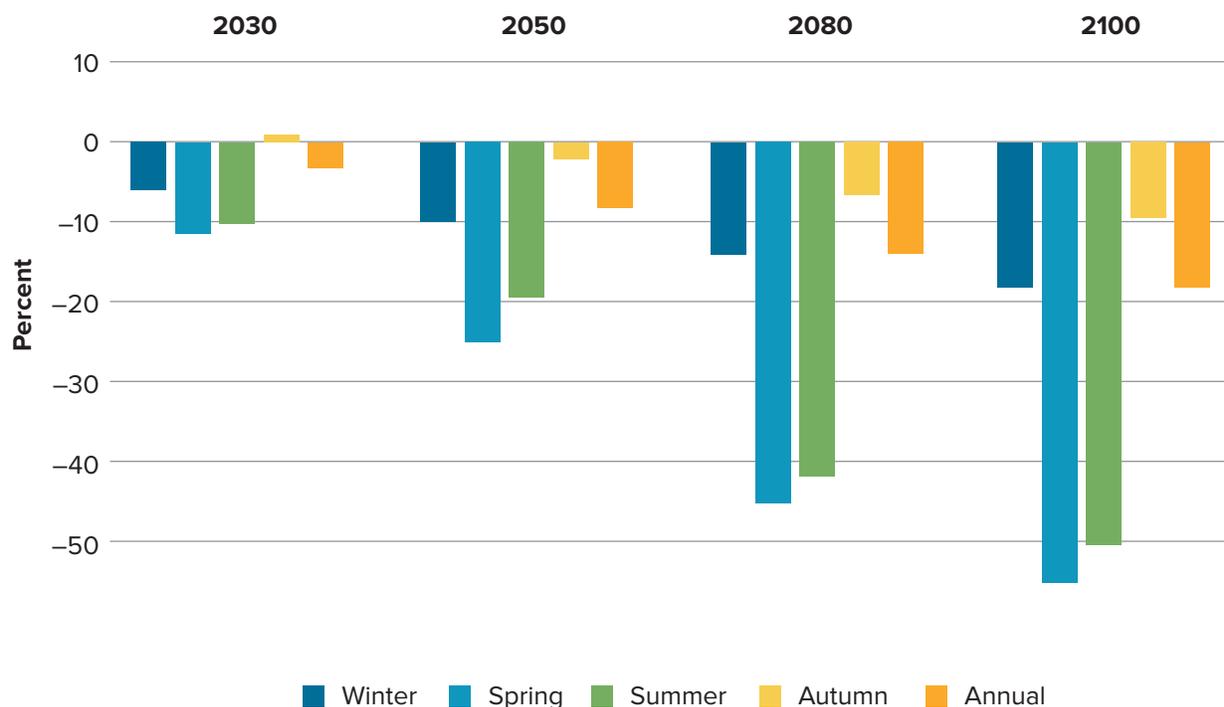


FIGURE 2 Seasonal and Annual Changes in Average Temperature

In Albania, livestock makes up 59 percent of the total value of agricultural production, and livestock are extremely sensitive to temperature, especially in summer. The crop subsector was the most affected and extensive losses have occurred, particularly in fodder crops, followed by damage to greenhouses for early production of vegetables, fruits, and orchards.

For the past several decades, Albania has suffered from an increase in the intensity and frequency of droughts. The 1989-1991 drought, which affected over 3 million people and caused economic losses of about \$24 million, was one of the most devastating in Albanian history. It took almost six years for the Albanian economy to return to predrought levels. The devastating droughts in 2003 and 2007 caused severe energy shortages: the 2007 drought decreased production of the Fierza hydroelectric power plant by 33 percent. Thus, Albania's agriculture and energy sectors are at risk of increasing water insecurity due to climate change. Increasing the level of resilience to climate variability and hydroclimatic change is therefore crucial for communities whose livelihoods are partially or entirely dependent on the agricultural sector. Overall, the agricultural sector will need to shift away from rainfed agriculture to become almost completely reliant on irrigation (FAO 2018).

FIGURE 3 Average Changes in Seasonal and Annual Precipitation Since 1990

3.2 THE STATE OF INFRASTRUCTURE

In Albania, more than 626 dams have been constructed between 1960 -1988, mainly for the purpose of irrigation, but also for hydropower and flood protection. The design capacity was for about 560 million cubic meters (m³). However, currently 410 (65 percent) of these reservoirs have significant damages, which has reduced their capacity to about 300 million m³. According to the “Irrigation, Drainage, and Flood Protection Strategy ” of Albania, about 1 billion m³ of water from rivers and reservoirs is needed per irrigation season, in order to irrigate 360,000 hectares: but the current water availability has been estimated to be only between 0.6 and 0.7 billion m³ per season. It has also been estimated that, due to the anticipated effects of climate change, there will be a need for 1.5 billion m³ of water storage per season. Groundwater extraction is limited to small individual farms, typically to be used in drip irrigation for greenhouses, vineyards, and fruit trees.

The floods have worsened in recent decades, most likely due to deforestation, overgrazing, and erosion, combined with a lack of maintenance of the drainage canals and pumping stations. Water evacuation is difficult due to a damaged drainage network and only semi-functional pumping stations. Albania has a history of relatively frequent flooding,

especially over the last two decades. Flood events occur on a daily to weekly timescale, and are most prevalent from May to December. Climate change could potentially increase the frequency and magnitude of flooding in the years to come. Rainfall events in future scenarios are likely to be larger and less frequent. Also, increasing sea level rise and storm surges are expected to increase flooding in coastal areas.

About 360,000 hectares of arable land were equipped with irrigation networks from various water sources, and about 280,000 of arable land has been drained. Irrigation systems were generally designed with a hydro module of 0.8 – 1.2 liter/second/ha, with an irrigation norm of 2,000-7,000 m³/ha. The total length of the irrigation canals is 25,000 kilometers (km), of which there are 2,000 km of main canals, 6,200 of secondary canals, and 16,800 of tertiary canals. Nowadays, most of the irrigation systems have an efficiency of about 30– 60 percent. In some cases, a large part of the irrigation canals and water control structures have deteriorated due the lack of sufficient maintenance.

According to the National Irrigation and Drainage Strategy, to improve the functionality of drains, about 18 million cubic meters of silt, which was created due to a lack of periodic maintenance, needs to be removed. It is estimated that for a sustainable level of maintenance, about 5-6 million cubic meters need to be removed annually from the drains. Of the total area that is equipped with drainage infrastructure, about 205,000 hectares are drained by gravity flow to the sea, and 75,000 hectares are drained by pumping water through 29 pumping stations. The total length of the drainage canal network is 15,700 kilometers, of which 2,000 is in primary drains, 2,700 in secondary, and 11,000 in tertiary drains. Most of the pumping stations have been in use for 30 to 45 years, with limited maintenance and upgrade; they are in serious need of both rehabilitation and modernization, to improve their pumping capacity and efficiency. These pumping stations had an installed capacity of 28,000 kW, with a capacity to remove water at an average rate of only 390 m³/second. However, the average capacity has declined by 30 percent of their design capacity. The resulting high cost of electrical energy is a major concern.

Lack of investment, and the country's natural phenomena have created the need for a full reconstruction of drainage infrastructure in about 8,000 hectares of peat in Torrovica's field (in Lezha) and the Maliq fields. Poor drainage conditions have inhibited proper cropping, and the need for irrigation is conspicuous in the coastal lowlands of Shkoder, Lezhe, Durrës, and Divjake.

Feasibility studies and a detailed inventory of the functionality of drainage canals and structures is required in order to enable prioritization of major repair works, prepare an asset management plan, and plan capital investments. According to the National Irrigation and Drainage Strategy, the priority actions regarding drainage and

flood protection are: (i) feasibility and design studies for drainage infrastructure and flood protection; (ii) cleaning of the primary and secondary drainage canals; and (iii) rehabilitation of 14 drainage pumping stations in the western region. Priorities for the rehabilitation of drainage pumping stations are to be determined primarily by the degree of the risk of flooding, and the size of the area to be drained. This effort can build on recent GIS mapping and the inventory of the I&D infrastructure for 35 municipalities as part of the recently completed Water Resources and Irrigation Project¹. Operation and maintenance of the pumping stations needs to be improved not only through the rehabilitation of stations, but also through staff training.

3.3 FINANCING

3.3.1 OPERATION AND MAINTENANCE COSTS

Development and implementation of cost recovery tariffs that at least cover operation and maintenance costs is a must in order to guarantee sustainability of I&D activities; while rehabilitation and modernization investments will depend on the availability of central government funds. Albanian municipalities generate little, and unsustainable, revenue from I&D tariffs. They have adopted I&D tariffs, and most of them are collecting them. However, the coverage and magnitude of the fees collected is very small, varying from zero to about 15 percent. The collection rate depends on weather conditions, affordability, and measurability of the volume of water use. The wet season needs less irrigation, therefore produces less revenue, whereas the dry season is the opposite. Municipalities levy low tariffs, or even exempt farmers in some cases based on affordability considerations. The most common bases of irrigation service fee charging in Albania are area-based, and number of irrigations-based fees. Area-based fees, where most irrigation is from open canals, make it complex and inefficient to measure individual water use. With irrigation-based fees, a fixed rate is applied to each irrigation, and farmers pay according to the number of irrigations made. If properly applied, this method allows for good recovery of the irrigation service fee.

The irrigation law of 2017 permits municipalities to introduce irrigation service charges to recover the cost for operating and maintaining the system. The law sets out the procedures for municipal councils to decide on the type of charges there will be, and the setting of tariffs. These charges can be system-specific, based on real cost and prorated according to irrigated area, or based on irrigation volume. Recent developments include a base fee that covers the system maintenance costs and adds a fee for actual water use. The collected fees are supposed to be entered into system accounts to be used for that specific system only. Some municipal councils have approved and adopted a tariff system. However, many

municipal governments are hesitant to enact regulations to set tariffs and collect fees. Some of the reasons given by the municipalities for this are (i) the absence of clear regulations and guidelines on the calculation of tariffs; (ii) the absence of a reliable land register to correctly assign the charges; (iii) lack of reliable service provision, since irrigation systems are not yet performing as required; and (iv) lack of the political will to charge farmers, or the desire to support them. Furthermore, the irrigation fee structure per hectare of irrigated land varies in each of the municipalities, and sometimes even within the same municipality. Usually there is no difference in irrigation fee collection between greenhouses, open fields, or between large and small farms. Depending on the condition of the irrigation system and water availability, the irrigation service fee varies from 85-400 euros per hectare.

In addition, water use fees are prescribed by law in Albania, but this is not applied in practice, and several municipalities are not even aware of the need to pay it. The water use fees are set in order to establish the scarcity value of the resource and contribute to its rational use. The water use charge has to be paid by all legal and physical persons who are abstracting and pumping water from its natural sources, regardless of the purpose for which it is used. The charge is supposed to be paid by all users of water, including users of irrigation systems. This charge is also applied to groundwater users, since groundwater is a public resource.

The drainage maintenance fee has been approved in a few municipalities, but it is rarely applied. There seems to be a consensus that such a tariff would be a “burden” to the farmers, and that it might create political problems. Drainage has been defined as a public function because it benefits many people who cannot be easily identified. Although some beneficiaries, such as farmers and business owners, can be identified and linked to specific drainage systems, many direct and indirect beneficiaries cannot be linked and assessed. Therefore, drainage that is not directly related to irrigation systems is a public function, and its cost is born by state budgets; but part of it is recovered through drainage fees imposed on beneficiaries who often are not clearly defined.

Tertiary canal maintenance is the responsibility of municipalities with some contributions from the owners of the parcels where it passes by. Due to the lack of maintenance of these tertiary canals, some municipalities offer a service for cleaning the canals by asking the respective farmers to contribute only the cost of the fuel needed to excavate and transport the materials.

3.3.2 CAPITAL COSTS

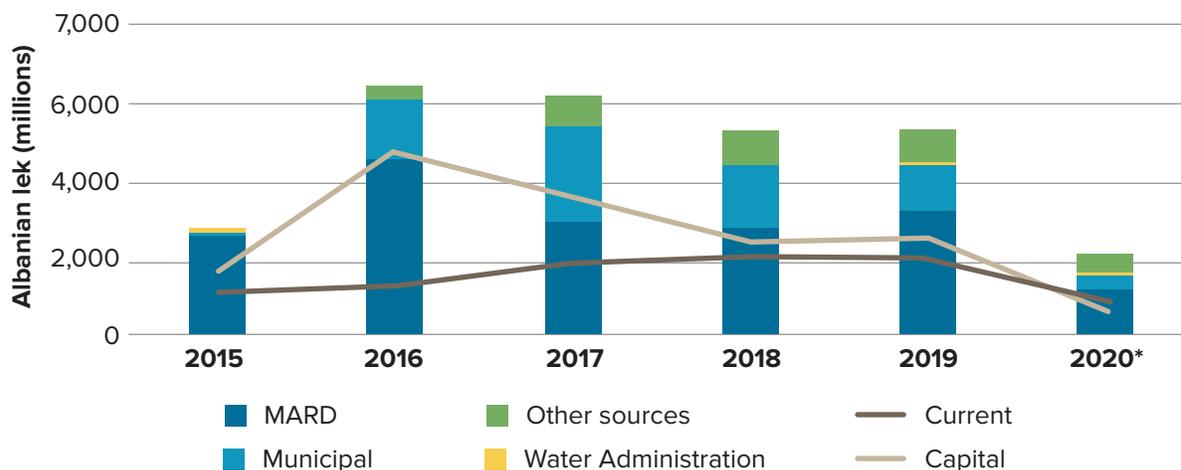
The overall estimated costs for achieving the objectives for irrigation, drainage, dam safety, and flood protection are significant, and difficult to accommodate in the budget.

The key goals for the irrigation subsector are to restore irrigation to its potential service area; have it be used for the production of high-value vegetable and fruit crops; have adequate financing for the fixed and variable costs of management; and have the irrigation systems managed in such a way that the deterioration of canals and structures is slowed to a minimum.² The overall estimated cost of implementing the irrigation development strategy is about \$606 million (\$253.6 million for irrigation; \$56.3 million for drainage; \$130.2 million for dam safety; and \$166 million for flood protection). Most of these costs are planned to be spent in the first five years: about \$75 million per year.³ The actual budgets in the last few years have tried to reflect this new focus of the sector, and have resulted in some progress, but so far the government has not managed to fully address the large investment needs in any of the sectors. The data for the first years of I&D strategy implementation (2018 and 2019) show an annual spending of about \$50 million.

The total expenditure for irrigation, drainage, dam safety, and flood protection as a share of total budget expenditure has been persistently low compared to spending in other sectors. This spending was within a boundary of 0.60 to 1.50 percent of total public expenditures.⁴ Also, the budget for 2021 and the projections for 2022 and 2023 show a decline in the amount allocated for these expenditures, which are still handled mainly by the central government through the Ministry of Agriculture and Rural Development (MARD), even after decentralization. The second largest source of financing is the municipal budget.

Recent expenditures for irrigation, drainage, dam safety and flood protection have shifted toward higher capital and lower current expenditures (Figure 4). The current expenditures grew rapidly in 2017 by 42.3 percent year on year, with a slower growth of 10.2 percent in 2018 and a decline in the following years and are now divided unevenly between the central government and municipalities. Decentralization in 2016 which transferred more responsibilities to the local governments, and overall reform had an important role in these dynamics. Current spending by the central government grew by 25.9 percent, and by municipalities, 60.6 percent in 2017, to decline following years. Investment expenditures increased by over 200 percent in 2016. Introduction of new projects in irrigation, but also drainage and flood protection were the drive to this increase. Following a decline in investments in 2017 and 2018, the next two years they grew strongly by 35.1 and 33.2 percent year on year. Respectively. The bulk of public investment spending in irrigation, drainage, dam safety, and flood protection has gone for rehabilitation of irrigation infrastructure, taking a 61.4 percent share of total investment in 2015-2020 period. Second largest investment share went to investment in flood protection infrastructure, with 19.5 percent over the period.

FIGURE 4 Expenditures on Irrigation, Drainage, Dam Safety and Flood Protection, by Source of Financing and Main Economic Category, 2015-20



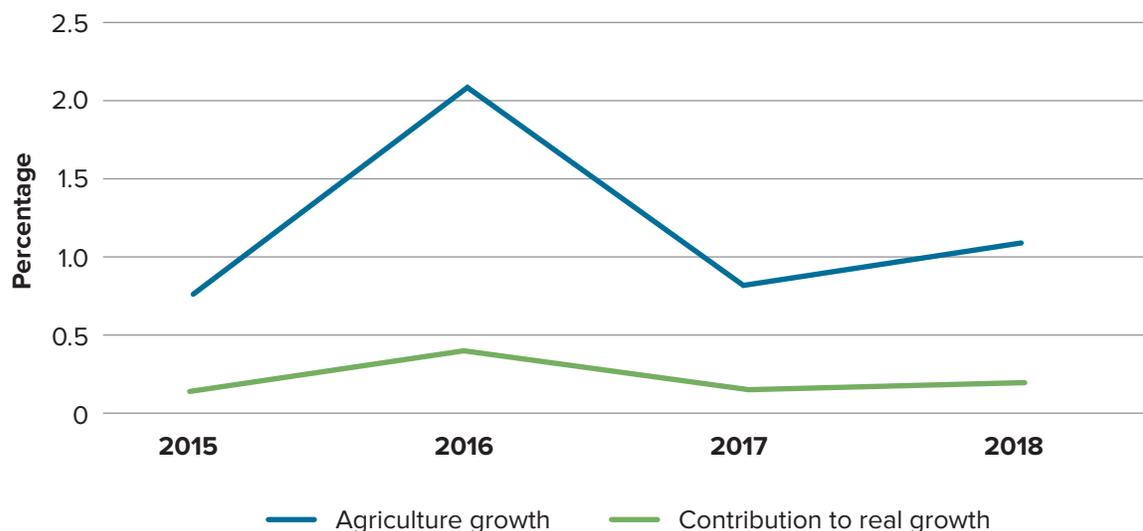
Source: Calculation by World Bank consultant, using BOOST database of MFE.

* Note: data for 2020 are for the first half of the year only.

The execution rate of the original budget for irrigation, drainage, dam safety, and flood protection ranged from 64.7 percent in 2016 to 98.8 percent in 2018. Both decentralization and the new, relatively large irrigation and flood protection projects were introduced in 2016, but the needed absorption capacity was not there. In the following years, execution accelerated, especially at the central level, while municipalities needed more time to create their absorption capacities. Irrigation, drainage, dam safety, and flood protection budgets usually go through many changes during the budget year, as more funds are added to the budget, new projects added, and old projects are completed. Better project preparation is needed in the budgeting phase, to avoid frequent changes, such as cancellations and/or delays in project implementation during the fiscal year.

Investments in irrigation, drainage, dam safety, and flood protection have produced positive economic outcomes in Albania, although it is difficult to quantify their impact and to claim strict attribution. However, referring to the statistical data from 2015-2018⁵, agricultural production in the country had positive real growth and has contributed to overall economic growth in the country (Figure 5). Also, the cropping pattern is changing to high-value crops such as fruits and vegetables. Significant improvement in the export/import ratio of agricultural products was noted over the study period, on average by 12-15 percent each year, suggesting increased productivity and competitiveness of the sector.

Thus, the overall allocation of funds to irrigation, drainage, dam safety, and flood protection needs to be increased, with an emphasis on maintenance and operation, while

FIGURE 5 Agriculture Real Growth and Contribution to Real Economic Growth

Source: INSTAT, Calculation from World Bank consultant.

at the same time improving the absorption capacity and execution rates, particularly at the level of municipalities. More funds are needed immediately, especially for investment in rehabilitation of water reservoirs. The water accumulation capacity of the reservoirs has declined significantly, due to their filling with alluvium, and most of them are at the end of their life cycle. Today they can accumulate only about 300-350 million cubic meters (m³) of water in an irrigation season, out of an original capacity for 560 million m³.

Either a sustainable financing of operation and maintenance (O&M) costs through central government funding, or an increase in irrigation and drainage tariff revenues is necessary in order to increase the sustainability of the country's I&D infrastructure and services. A revision of the irrigation administration structure can bring about better outcomes, especially for the tertiary network. Currently, municipalities are responsible for tertiary network of every irrigation schemes. If the tertiary network does not work, all of the efforts made in the primary and secondary networks will be useless. A creative solution to this problem should be found, even if it means bringing the tertiary network under the responsibility of WUO.

3.4 ENERGY COSTS

Prior to 1991, about 640 pumping stations were being used to irrigate 110,000 hectares. Today, almost all of these pumps are either no longer functional, or nonexistent due to high electricity costs, poor maintenance, damage, and theft. The government strategy

recognizes that 300 pumping stations with the potential to irrigate 75,000 hectares are still worth rehabilitating and modernizing. These pumping stations consume an estimated \$7-8 million in electricity costs per irrigation season, and require subsidizing from the central government for their sustainable operation. Farmers cannot fully accommodate these energy costs: if they are charged the full O&M costs the financial viability of irrigated agricultural production will significantly decrease due to unfavorable terms of trade for irrigation (Box 1). From 1960 to 2015, the real price of wheat has declined, while that of oil has increased. Thus, in rehabilitating and modernizing these pumps, it would be prudent to harness alternative and clean energy sources such as solar and wind power to the extent possible.

At the irrigation scheme level, economic analyses show that new public irrigation systems, whether they are open or pressurized, will only be profitable with a high level of uptake, and a substantial share of high-value crops. Experience in Albania shows that these conditions are often not met. Rehabilitation of existing canal systems is cheaper, and can be cost-effective even for low-value crops. Individual irrigation should be developed only where it is financially viable, and should be strongly focused on high-value crops; economically it is a very attractive option, but it raises questions about water resource management.

3.5 SOCIOECONOMIC FACTORS

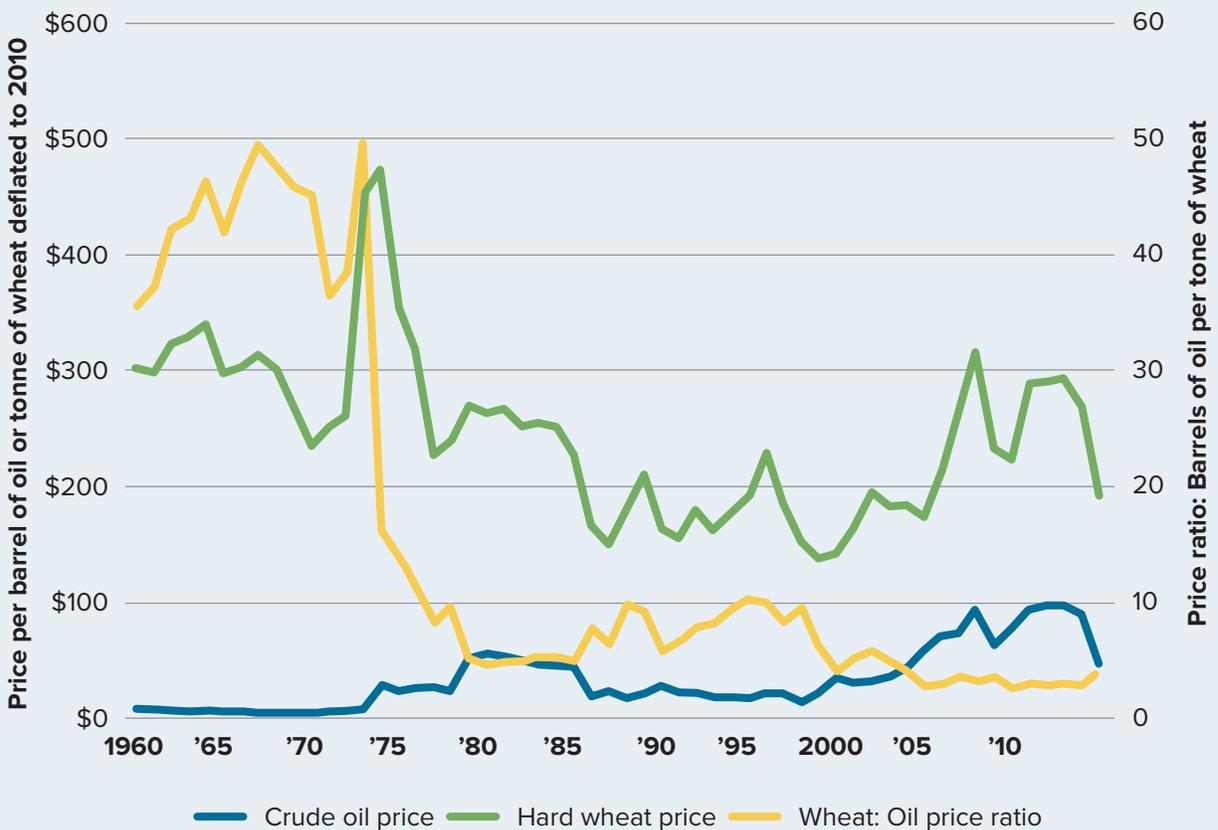
Demand for food is increasing both in terms of quantity and quality, due to the growing middle class, which is choosing to follow healthier and more nutrient-rich diets; a growing tourism market; and export potential. However, agricultural productivity is not growing at a pace commensurate with that of the growth in demand for food, due to a host of factors, including socioeconomic issues. The implementation of land reform in the post-communist era resulted in the creation of 400,000 family farms owning about 1.9 million separate parcels of land. The average farm size is about 1-1.2 hectares, consisting of three to five plots of land per family, dispersed across different villages to equalize both land quantity and quality; this has resulted in land fragmentation and an orientation toward supplementary income among farmers.

Furthermore, there are problems with land registration and ownership, and the land market is underdeveloped. With the existing farm structures and the level of land fragmentation, it is difficult to make use of large-scale agricultural infrastructure, including irrigation, especially in hilly and mountainous areas. Consequently, farmers often fail to make full use of potentially irrigable land. In some municipalities, the percentage of irrigable land that

BOX 1 The Changing Terms of Trade for Irrigation

This chart shows how the real price of oil rose from 1960 to 2015 (black line), and how the real price of wheat fell over the same period (green line). At the beginning of this period, a ton of wheat would buy around 40 barrels of oil; by the end of the period it would buy only around 4 barrels.

Of course, irrigating farms produce crops other than wheat, and there are sources of energy other than oil. But the prices of cereals and similar crops tend to rise and fall together, due to the scope for substitution in animal feeds, and oil still provides a substantial share of international electricity generation capacity. Thus, wheat can be taken as a proxy for arable crops in general, and oil as a rough proxy for the price of energy; therefore, the basic conclusion – that the price of energy has gone up while at the same time the price of food has gone down – is robust. This has clear implications for the economics of irrigation systems that rely heavily on pumping, or that divert water away from hydropower generation: what made economic sense in the past will not necessarily make sense today.

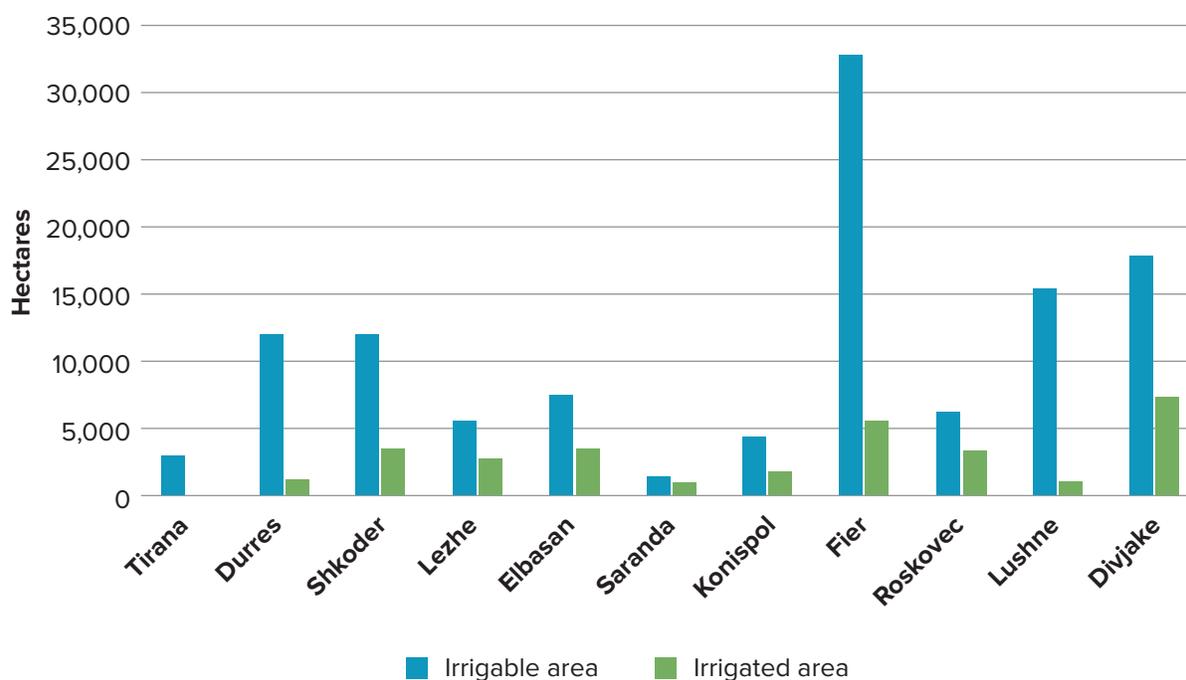


is actually irrigated is on average only 26.3 percent (Figure 6). Imperfections in the land market due to an inadequate legal and policy framework, and inefficiencies in land registry operations have contributed to large-scale abandonment of arable land in Albania.

A significant demographic change in the farming population has resulted in the abandonment of about 120,000 hectares of agricultural land, and has affected the gender composition of the farming population. Due to out-migration of rural landowners who seek economic opportunities abroad and in urban areas, more than 60 percent of the workers in agriculture today are women. This demographic transition has also resulted in the aging and a reduction in the number of workers with key skills within the agricultural labor force, coupled with a lack of training and educational opportunities for new entrants. Consequently, large parts of the area have been abandoned and left fallow, or used for pasture, because of better off-farm employment opportunities in the tourism industry, or migration to foreign countries.

Moreover, in terms of productivity, farms in Albania are performing below their potential levels partly due to small farm sizes, diseconomies of scale, and poor quality of irrigation water delivery services. Overall, farmers' interest in investing in their operations has generally been low, mostly due to outmigration, poor market access, the low level of

FIGURE 6 Proportion of Potential Irrigable Area That Is Irrigated, for Selected Municipalities



BOX 2 Irrigation Technology Use in Albania, Compared to the Western Balkan Region

In the Western Balkans, surface irrigation is widely used, accounting for 40-70 percent of irrigated farm holdings. Continental Croatia, where drip irrigation is the most prevalent form, is an exception. In Albania 72.9 percent of the farm holdings use surface irrigation (as compared to the regional average of 67 percent); 20.1 percent use sprinkler irrigation (compared to 17 percent on the regional average) and 6.9 percent use drips (compared to the regional average of 15 percent).

development of the processing industry, underdeveloped I&D systems, poor technology (see Box 2), and weak organization of farmers due to reluctance to organize based in communist-era experiences. Consequently, two types of farmers have emerged: (i) farmers who are primarily engaged in farming as a supplementary source of income, with their major income coming from nonfarm income and remittances; and (ii) commercially oriented farmers who are cultivating cash crops such as fruits and vegetables for domestic and international markets.

3.5.1 POLICIES

Despite the rich base of natural resources, agri-food systems in Albania face numerous challenges and remain constrained by deeply rooted structural problems. The average farm size is several times lower than for the EU overall. Labor productivity and yields are very low due to underdeveloped technological capabilities and an orientation toward subsistence crops. However, agriculture and related sectors still contribute around 19 percent to the GDP, and employ close to 40 percent of the total labor force.

Irrigated agriculture in Albania needs substantial transformation in order to align with the requirements of EU policies and strategies. In June 2014, the country was awarded candidate status by the EU. In March 2020 the members of the European Council endorsed the General Affairs Council's decision to open accession negotiations with Albania, and in July 2020 the draft negotiating framework was presented to the member states.

The planned EU expansion in 2025 will open access to a market with more than 500 million consumers. However, the EU also imposes stringent standards, and there will be increased competition. Furthermore, accession to the EU requires the existence of a functioning market economy and sufficient capacities to cope with competitive pressures and market forces

within the EU. Albania is now required to align its institutional framework with EU legislation in general and the Water Framework Directive (WFD) in particular.

The aim of WFD is to establish a framework for the protection of inland surface waters, transboundary waters, and coastal and groundwater in order to prevent deterioration of and protect aquatic and terrestrial ecosystems; promote sustainable water use; reduce pollution of groundwater; and mitigate drought and flood hazards. More recently, the EU has developed guidelines for implementation of the Green Growth Agenda for the Western Balkans, which lays out requirements against three themes: (i) depollution of air, water, and soil; (ii) the development of sustainable food systems in rural areas; and (iii) biodiversity and the protection of ecosystems. Within the theme of depollution, the agenda lays out priorities for modernization of water monitoring infrastructures. Irrigated agriculture in Albania will need substantial transformation in order to align with requirements of EU policies and strategies.

The EU remains Albania's primary trading partner. In 2018, the EU provided 61 percent of Albania's imports and received 76 percent of its exports. Albania's primary trading partners are Italy, Germany, China, Greece, and Turkey.

Albania has access to markets through the following trade agreements:

- In 2006, Albania signed the Stabilization and Association Agreement with the EU. This agreement, which was ratified in 2009, liberalized trade relations between the EU and Albania in terms of tariff barriers for agricultural and industrial goods.
- The Central European Free Trade Agreement (CEFTA)⁶. CEFTA is an international trade agreement between seven countries, mostly located in Southeastern Europe. Current members of CEFTA include Albania, Bosnia and Herzegovina, Moldova, Montenegro, North Macedonia, Serbia, and United Nations Interim Administration Mission in Kosovo (on behalf of Kosovo), in accordance with UNSCR1244.
- The European Free Trade Association (EFTA)⁷. The EFTA member states include Iceland, Liechtenstein, Norway, and Switzerland.
- The World Trade Organization (WTO). Albania joined WTO in 2000, and applies WTO rules on its import licensing.
- Free trade agreements with Turkey.

Albania was initially granted access to the EU market through "Autonomous Trade Preferences" through which the EU granted unlimited tariff-free access for most goods

without limit, and set tariff quotas for some sensitive products such as wine, beef, mutton, and lamb. These were progressively replaced by negotiated “Stabilization and Association Agreements,” under which the country had to grant trade concessions for goods coming in from the EU, and commit to a process of political and economic integration. Other market opportunities include emerging countries of the Middle East and Asia.

3.5.2 INSTITUTIONS

There is a high level of fragmentation of institutional responsibilities, which are not clearly defined, especially at the local level; are often duplicative; and sometimes contradictory. For the last several years there has been a growing institutional gap related to the management of I&D systems. The previously established Water User Organizations (WUOs) were responsible for the secondary and tertiary canals, but most have fallen into inactivity due to a lack of capacity building. As of 2016, the management of most I&D systems in the country had been transferred to municipalities.

Law nr.24/2017 on Administration of Irrigation and Drainage determined the main tasks of the Regional Directorates of Irrigation and Drainage, the municipalities, and the WUOs. Law Nr. 139/2015 On Local Self-Governance determined that municipalities are responsible for the administration, use, and maintenance of water and drainage infrastructure, and these responsibilities have been transferred to them. Government Decision Nr. 1108, dated December 30, 2015, stipulated the transfer of irrigation and drainage infrastructure personnel, and the movable and immovable assets of the regional boards of drainage of Ministry of Agriculture and Rural Development to the municipalities. There is a lack of synchronization of agricultural and irrigation development plans and interventions at the local (municipality) level. Furthermore, municipalities do not have agricultural sector development plans or strategies.

NOTES

1. IDRA Research and Consulting: Final Report on GIS Mapping Implementation along with list of observations and lessons learned, May 2021.
2. Irrigation and Drainage Strategy in Albania, Ministry of Agriculture and Rural Development (MARD), May 2017. The same objectives were carried forward to the sector strategy of May 2019.
3. Irrigation and Drainage Strategy in Albania, Ministry of Agriculture, Rural Development and Water Administration, May 2017.

4. Data source, BOOST database of Ministry of Finance and Economy (MFE). Calculations by World Bank consultant.
 5. 2018 was the last year with available data on the agriculture contribution to growth at the time these analyses were done.
 6. <https://cefta.int/cefta-parties-2/>.
 7. <https://www.efta.int/about-efta>.
- 

4

Enabling Green, Climate Resilient, Inclusive, and Sustainable Agricultural Transformation: The Irrigation and Drainage (Eco)system Approach

4.1 RATIONALE FOR A NEW CONCEPTUAL AND OPERATIONAL FRAMEWORK

Combating these multiple challenges and making use of emerging opportunities requires the adoption of a comprehensive yet practical and pragmatic approach. This is because:

- *The current and future goals of irrigation development are significantly different from yesterday's goals.* While in the past the main stated goal of the sector has been contributing to food security and creating jobs in rural areas, the I&D sector of the future will be required to contribute to additional Sustainable Development Goals (SDGs) that include food and nutritional security, sustainable use of land and water resources, enhancing biodiversity, minimizing greenhouse gas (GHG) emissions, enhancing resilience against climate change and variability, and reduction of agricultural nonpoint source pollution. Albania is relatively water-rich, but sustaining water resources through efficient use, and protection of water bodies from pollution will remain key in order to meet the demands from all users at the local level (agriculture, industry,

and hydropower); further develop tourism potential in the country; and adapt to the impacts of climate change.

- *Today performance of the irrigation sector is conditioned by a multitude of circumstances, including the changing climate, national and EU policies and frameworks, and severe competition for access to markets due to an increasingly globalized world.* Since 2016, the government has implemented territorial administrative reform that led to the reorganization of 368 local government units into 61 municipalities; as a result, irrigation management has become a key function and responsibility of the municipalities. The government also prepared and approved the Integrated Water Resources Management Strategy; the National Irrigation and Drainage Strategy and Action Plan; and the River Basin Management Plans for the Drin-Buna and Semani basins. **The implementation of the key actions and measures of these strategic documents requires an integrated approach, and substantial financial resources.**
- *In response to these changes, the performance yardsticks and metrics for assessing outcomes for the sector also need to be reassessed, to ensure that the sector is adequately responding to the multiple goals enumerated above.*

These realities call for rethinking how the I&D sector will be supported so that it can align itself with current and future demands and circumstances. I&D is inherently part of a complex socio-technical-ecological system that is influenced and affected by weather and climatic, agroecological, socioeconomic, governance, policy, and human behavioral factors (Izzi et al. 2021). These factors are called “irrigation and drainage (eco)systems.”¹ In a nutshell, this term covers the biophysical policies, institutions, and socioeconomic circumstances that impinge upon, interact with, and influence the performance of the sector, including the achievement of associated development goals. These (eco)systems play a powerful role in influencing outcomes from investments in I&D infrastructure at multiple scales and dimensions.

4.2 THE IRRIGATION AND DRAINAGE (ECO) SYSTEM APPROACH

The irrigation and drainage (eco) system approach differs from the conventional infrastructure-centered approach in several important ways. In the infrastructure-centered investment approach, the main focus is on rehabilitation and maintenance of I&D assets such as canals, dams, reservoirs, and pump stations, with service delivery performance often linked to narrow physical and institutional indicators that do not account for or respond to the

dynamic and multiscale nature of the overall (eco)system. Current investment strategies tend to overlook the inherent diversity of hydro-climatic farming systems, rural socioeconomic systems, market opportunities, and the priorities and incentives of farmers that are influencing irrigation outcomes (Castillo et al. 2007; Sinha et al. 2018; Lankford et al. 2020). This can lead to suboptimal impacts on agricultural productivity, environmental sustainability, and climate resilience, even after the systems are rehabilitated. To account for the (eco) system and its related impacts, the key performance indicators of the sector also need to evolve, in order to reflect the current circumstances and goals set for the sector. The I&D sector is particularly important for achieving the UN's SDGs because of the many benefits it provides, which must be balanced against the potential social and environmental harms caused by the sector. Some of the indicative performance indicators are the productivity and efficiency of water use at multiple scales; the source, productivity, and efficiency of energy use; reductions in GHG emissions; reductions in pesticide toxicity risks; and reductions in the level of nitrates in groundwater.

The value proposition of an I&D (eco)system approach is that: (i) it seeks to take an “outcome-oriented” approach to selecting I&D infrastructure and non-infrastructure solutions; and (ii) it proactively considers resilience and sustainability issues in project and policy design. This goes beyond mitigating climate and environmental impacts *post facto*. Thus, the approach directly aligns well with the World Bank Group's Corporate Climate Change Action Plan Strategy for 2021-25, which presents a paradigm shift of the World Bank toward a Green Inclusive Resilient Development (GRID), an interlinked approach to responding to the multidimensional development goals of society.

This approach also aligns well with the Green Agenda for the Western Balkans; the European Green Deal; the EU Water Framework Directive; the EU Nitrates and Groundwater Directives; the EU Common Agriculture Policy; and so on.

The irrigation and drainage (eco) system approach complements and leverages the conventional infrastructure-centric approach in important ways:

- **It is an integrated approach that customizes I&D infrastructure and non-infrastructure investments to the constraints and needs of different types of farming systems; to diverse agroclimatic zones; and to the systemic and cross-sectoral factors that influence and impact outcomes in the I&D sector.** It involves investment in information, institutions, research and innovation, and incentives, based on the needs of different farm types. It entails application of innovative solutions such as nature-based systems, and retrofitting of existing I&D infrastructure.

The integrative aspects of this approach can be conceptualized at various scales, and may take various dimensions, including:

- *Integration within the basin.* Water security, water stewardship, and multiple onsite services in the basin. For example, in Albania the integration may entail flood protection, flood evacuation, integration with hydropower, improving lagoon water quality, and integration of urban and recreational water values.
- *Interconnectedness of water, agriculture, and food systems.* Supporting a range of farming systems, from small-scale to commercial producers, with tailored approaches for each – linking climate risk management in agricultural production with other forms of risk management (insurance, trade, phytosanitary, agroenvironmental measures, and other market-based mechanisms. In the context of Albania, this calls for diversified livelihood strategies and integrated rural development.
- *Integration of water policy objectives into other policy areas and delivery mechanisms.* This calls for coordination between various tiers of government as well as between sectors; and between government and the private sector.
- **A proactive effort to ensure optimal use of improved or new I&D potential.** It is important to understand that investment in large-scale public irrigation schemes is seen as a public good, which is traditionally under the domain of the water sector; while on-farm irrigation is considered private, and is supported by agricultural or rural development policies. The sectoral silos associated with the I&D and agriculture sectors can lead to a disconnect between scheme-level physical infrastructure interventions and agriculture that is focused on farm or field-level interventions. This disconnect poses a major obstacle for Albania, due to weak alignment across the sectoral investment strategies, particularly at the lower administrative levels.
- **Changes in performance monitoring, and the metrics of success.** Identification and application of holistic performance indicators that goes beyond narrow physical criteria and accounts for the dynamic, multiscale, and multidimensional nature of the I&D (eco) system, including agricultural productivity, sustainable water use in agriculture, environmental sustainability, and climate resilience.
- **A diversified irrigation service delivery model,** including support for private irrigation. In multiuser or public irrigation systems, a move toward on-demand irrigation water services is encouraged in order to enable the flexibility, reliability, and adequacy of irrigation water supply. This also includes support to farmers in multiuser irrigation schemes who are making investments and innovating to valorize the I&D

infrastructure through, for example, conjunctive use of surface and groundwater resources.

- **Diversified institutional models** for I&D operation, management, and maintenance, which is fit for the purpose.
- **Application of innovative financing models**, including performance-oriented fiscal transfers to municipalities, and results-based financing of individual projects or programs. This also entails changes in the metrics of success, or performance monitoring to set the service provider on a path toward providing reliable, safe, inclusive, transparent, and responsive I&D services.
- **Partnerships at the local and national levels of administration**, to leverage financial resources, harmonize policies, coordinate investments, and ensure the principle of financial additionality. This focuses on creating clear institutional responsibilities, accountability, effectiveness, and regulations.

The proposed approach is a problem-driven, iterative approach with an emphasis on fixing the most pressing problems in the I&D (eco)system: this might not be simply infrastructure, but legislation including infrastructure repurposing. The proposed interventions could be short-term ones that set the stage and prepare for longer-term investments; or they might be long-term, spanning five or more years. For better outcomes, the choice of interventions should be guided by a broad socioeconomic rationale; but the broader lens does not need to make interventions more complex. Simple interventions can be crafted that deliver a high impact at low cost. This approach proposes a quick scanning, visioning, ideation, accountability and delivery mechanism; detailed diagnostics on specific bottlenecks and opportunities; and adaptive implementation and learning during implementation, toward higher-level goals.

NOTE

1. The term “(eco)system” has a wider meaning than the literal interpretation of natural ecosystems. In the present context the irrigation and drainage (eco)system is a broader term that comprises a combination of hydrological, environmental, social, economic, governance, and human systems that interact upon and influence outcomes of I&D sectors.



5

Revitalize the I&D Sector for Sustainable, Climate-Resilient, and Inclusive Rural Economic Transformation

5.1 POTENTIAL INTERVENTION AREAS

This study shows that irrigated agriculture is uniquely critical for the rural economy of Albania, since the lion's share of the country's cultivated land is irrigated; and the sector significantly contributes to the country's GDP, employs close to 40 percent of the total workforce, and has the potential to boost the country's foreign exchange earnings. However, despite recent upward trends in performance, the sector is constrained by a host of challenges, as detailed in Chapter 2. The key challenges and features of irrigated agriculture in Albania are summarized as follows:

- *There is a backlog of infrastructure rehabilitation and modernization needs.* The I&D assets are often multipurpose, including flood protection and hydropower. To eradicate rural poverty and ensure shared prosperity, there is a need to modernize the current, heavily degraded I&D infrastructure, and break the vicious cycle of rehabilitate-neglect-rehabilitate, by ensuring regular maintenance of infrastructure.
- *Irrigated agriculture in Albania, and its associated assets, are uniquely vulnerable to various hazards including floods, droughts, and seawater intrusion due to climate change;* this is impacting both the supply of

and the demand for the water resources needed for food production. According to the World Bank's Climate Brief for Albania, "Climate change is expected to diminish the water resources in the country. A decrease in the mean annual and seasonal precipitation, along with an increase of the mean annual and seasonal air temperature might lead to a decrease in the long-term mean annual and seasonal runoff, and would thereby reduce surface water flow. With reduced surface water flow and increased evaporation, reservoir storage may decrease, affecting drinking water and hydropower energy production." The reduction in water resources would also cause changes in the erosion of riverbeds, and modification of turbidity and sediment load, thereby threatening the quality of the water. Reduction in groundwater recharge and increases in salinity, along with increases in population and consequently increased demand for water, will likely lead to a shortage of adequate water quality and quantity for drinking and irrigation.

- *The imperfections of agricultural land markets and extreme land fragmentation is disincentivizing farmers from making long-term investments in their farms.*
- *There is a changing gender role in irrigated agriculture, and agriculture in general, due to rural demographic changes.*
- *Changes in irrigation management of the institutional architecture have diminished the role of water user associations (WUAs).*
- *The emergence of vibrant private irrigation with a focus on high-value crops for both local and international markets by investment in irrigation facilities and greenhouses.*
- *The need to align with EU policy directives and frameworks is bringing about both advantages and disadvantages to farmers.*

To achieve multiple and often contradictory development goals, Albania at the very least needs to improve the operational performance and the quality of service delivery of its infrastructure; enhance its flood risk management capacities; and increase agricultural productivity in selected high priority, agriculturally important municipalities.

To enhance water security, climate resilience, and agricultural competitiveness, and to ensure revival of the rural economy, interventions are required in the following five areas.

The identification of these intervention areas is informed by the need for alignment with the EU Water Framework Directive, the Agricultural Competitiveness Agenda, and the Green Growth Deal. Specifically, the Green Agenda for the Western Balkans addresses important issues such as decarbonization; depollution of air, water, and soil; the need for a circular economy; farming and food production; and protecting biodiversity.

5.1.1 INTERVENTION AREA 1: MODERNIZE ALBANIA'S I&D INFRASTRUCTURE.

Continue strategic investment in modernization of the infrastructure, but complement this with interventions that allow for the optimal and sustainable use of the potential created.

Such interventions include rehabilitation/modernization of irrigation schemes from the water sources to tertiary canals; optimizing dam storage; piloting of pressurized systems for enhancing system and on-farm irrigation efficiency; and rehabilitation of drainage systems, including the peat areas of Maliqi and Torovicë. The specific activities under this Intervention Area are:

- *Improving the performance of the existing irrigation systems* (about 100,000 hectares with gravity and pumping stations);
- *Rehabilitation and modernization of drainage systems* by removing 18 million cubic meters (m³) of silt from the main drains; removing 2 million m³ of silt from high-water channels; rehabilitation of 14 pumping stations in the western lowlands; and construction of new drainage pump stations in the peat areas of Maliqi (Korçë) and Torovicë (Lezhë). In some municipalities extensive peat bogs exist and have been reclaimed, but they now suffer from continuous land subsidence, and are contributing to a serious level of GHG emissions. Peat areas require special treatment and different water management systems. An inventory of the country's peat areas and their present condition (type and depth of the peat; land ownership) is a first step, to be followed by special land use and water management planning for these areas.
- *Drainage is just as important for agricultural productivity as irrigation.* Especially in the coastal municipalities, many previous swamps in the lowlands have been reclaimed and now demand intense maintenance of the drainage canals. Many of these canals also serve as a source of water for farmers who use pumps for irrigation. The inadequate conveyance capacity and high level of losses in the canal systems, combined with poor drainage conditions and salinity problems have inhibited proper cropping and irrigation, especially in the coastal lowlands.
- *Rehabilitation and modernization of selected agricultural dams* that have been identified as having technical damages. Prefeasibility study shall be conducted to prioritize Dams for rehabilitation/modernization from the 626 dams available in the country. This is needed to ensure dam safety and the availability of water for irrigation and other uses.
- *Support to improve tertiary canals and drains.* This need has been expressed by both farmers and municipalities, but only limited activities have been initiated thus far.

5.1.2 INTERVENTION AREA 2: ENHANCE FLOOD RISK RESILIENCE AND THE HYDRO-MET CAPACITIES OF ALBANIAN AGENCIES.

There is a need for construction, rehabilitation, and/or reconstruction of flood protection embankments in carefully selected, priority flood-prone, and agriculturally active areas.

This can build on the experience of the recent investment in the Drin riverbank rehabilitation, as part of the ongoing Water Resources and Irrigation project to protect agricultural land and I&D infrastructure.

All of the rivers in Albania cause periodic flooding; however, the Drin River, together with the Buna, have a greater impact on arable land, as well as on farmers' homes, businesses, and infrastructure. Thus there is a need for construction, and rehabilitation or reconstruction of flood protection embankments in carefully selected priority flood-prone areas.

The infrastructure investment should be complemented by GIS mapping; building on the findings and advancements of the water cadastre report to enable the government to monitor, measure, and plan for climate shocks in their irrigation investment planning; and the operation of their irrigation systems.

5.1.3 INTERVENTION AREA 3: INVEST IN INSTITUTIONS, INFORMATION, AND KNOWLEDGE.

Continued interventions, including technical assistance, are needed to scale up the gains that have been made so far, and to ensure sustainable use of the I&D potential created, and water resources overall. These interventions may include:

- *Supporting the implementation of I&D strategies, and integrated water resource management.* This will support water permitting and use, including monitoring farm-to-basin water supply and demand; setting appropriate I&D tariffs; and agreeing to on-demand water allocation mechanisms to align with the areas where pressurized systems will be developed. This will require:
 - Purchase, operation, and maintenance of monitoring equipment;
 - Preparation of a water balance study for the entire country;
 - Assistance for the preparation of the flood risk maps and flood risk management plans for all river basins.

- Development of a GIS-based vulnerability, loss, and damages assessment tool, and establishment of a database to record, analyse, and predict flood events and associated losses;
 - Evaluation and implementation of nature-based solutions to reduce flooding and increase groundwater replenishment;
 - Improvement of the capacities of institutions and municipalities;
 - Enhancement of the interagency coordination among water, irrigation, basin, agricultural and hydro-met agencies at the national, river basin, and on-farm management levels; and
 - A feasibility study on the impacts of Hydro-power Plant (HPP) constructions on water resources for irrigation, and assessment of the possibility of integrating those works into the functioning of irrigation.
- *Deepening institutional and policy reform and support services at the local level.*
 - Though the potential for the integrated development of irrigated agriculture exists, there is almost no incentive at the municipal level to engage in coordinated efforts that enable synergies between agriculture, irrigation management, and irrigation investment. There are apparently no agricultural sector development plans or strategies at this level. One major issue that is preventing concerted planning efforts is that planning and programming for the sector is supposed to be done at the regional level, with an apparent disconnect with the municipalities. In other words, coordination between the municipality I&D and planning and investments units, and the Regional Irrigation Boards needs to be improved.

Despite the central government's continued support through enabling legislation and financial contributions, as well as some capacity building, most municipalities do not have the institutions, expertise, and resources needed to develop and manage the I&D systems and dams at a sustainable level.
 - *Instituting performance-based budget allocation to municipalities.* It will be essential for development and management purposes that the newly established I&D units have access to national or regional knowledge centers where technical information and expertise can be made available to support local I&D planning, with specific designs and management solutions.
 - *Enforcing operating and maintenance (O&M) regulations* can be carried out through the I&D units. The O&M of I&D systems is generally delegated to enterprises. However, in practice the country's municipalities are responsible for not only I&D but also for other public services such as roads, urban greens, and urban drainage. However, these are merely extensions of government agencies

that are fully dependent on allocations of budget and staff by the municipality. Some technicians and dedicated field staff are assigned to I&D; however, the numbers and qualifications of staff often do not meet the required standards. These units are responsible for the preparation of investment proposals that have to include detailed designs and Bills of Quantities. It cannot be expected that all municipalities have the full range of experts needed within their organizations. The implementation of investments in existing irrigation systems is done by other directorates in the municipality, sometimes without involvement of the “enterprise,” and generally without prioritization or coordination from the agricultural departments. Request for investment is done by the I&D unit, mostly based on emergency needs, but it’s up to the Ministry of Agriculture to decide upon financing the needs, and the Ministry of Finance to make funds available. Also, it is not clear yet if the investment funds given to the municipalities are given for specific needs, or if it is just a total budget to be invested.

- Information systems need to be further developed and standardized, since irrigation control and reporting is generally weak, and most municipalities are struggling with a lack of skilled staff in the field.
- *Improving value chains.* This intervention area will support investment in crop value chains and increased marketing opportunities for irrigated crops by promoting partnerships with the private sector, agro-entrepreneurship, investments in greenhouses, and so on. Increasing the marketability of the country’s produce calls for improving competitiveness by enhancing the productivity, quality, and safety of the food production systems and value chains. Vulnerability to market price volatility could be reduced by improving storage and cooling facilities, as well as market information systems. Additional support for post-harvest processing in the form of sorting and packaging and processing for local consumption or local sales could also help. Surprisingly there seems to be little effort applied to developing food processing capacities. Overall, incentivizing farmers through creating market opportunities and supporting value chains is essential in order to realize the economic potential of investment in I&D infrastructure.

5.1.4 INTERVENTION AREA 4: SCALE UP PRIVATE OR FARMER-LED IRRIGATION, AND SUPPORT THE ASSOCIATED VALUE CHAINS.

The interventions in this area include enhancing the expansion of farmer-led irrigation development using innovative financing and business models. Individual irrigation

is developed only where it is financially viable, and is strongly focused on high-value crops. Although this is economically a very attractive option, it raises questions about the management of water resources. Government is always limited in the resources it can devote to I&D, and it will typically achieve the greatest results when it focuses on making markets work and providing public goods, while leaving individual investment and production decisions up to farmers and businesses.

Private irrigators tend to create higher levels of independence in water sourcing and irrigation with increased crop values. Increasingly they are using groundwater wells and drip irrigation systems for these crops. At present there are about 1,600 hectares of greenhouses in the country. For example, in Konispol municipality, farmers are growing tangerines on a large scale. They are investing in water security by creating their own independent irrigation systems of pumping stations to get water out of drains, and electricity lines to connect their pumping stations to the grid. They are suspicious of government intentions and do not rely on government services. It is clear that farmers are willing to pay for better service if it will result in better returns.

Gradually this momentum should be captured, and speeding it up could be contemplated. However, suitable approaches and instruments for both I&D system managers and water users need to be developed. Supporting private irrigation by simultaneously regulating the sector to be sustainable in its use of water resources is a promising pathway for supporting intensive commercial agriculture of high-value crops for both the domestic and international markets, mostly in the areas with higher intensity cultivation. This strategy aligns well with the government's plan of doubling its agricultural exports. Successful farmers generally have larger landholdings, and sell their goods at so-called collection points where middlemen buy the produce for export as well as for local market supply.

5.1.5 INTERVENTION AREA 5: ENCOURAGE GREEN AND ENVIRONMENTALLY SOUND FARMING AND IRRIGATION PRACTICES.

The main thrusts of this intervention area are: ensuring water and energy use efficiency and productivity; and safeguarding the quality of land and water resources. The specific measures include promoting sustainable methods for on-farm agriculture, including:

- Exploring digital solutions for the monitoring of water use;
- Reducing soil and river pollution from farm inputs;
- Promoting uptake of drip/sprinkler systems;

- Exploring the potential of wastewater reuse in irrigation;
- Solar groundwater pumps, and capacity building;
- Extension services for farmers, for promoting ecologically sound practices and value chains, including scaling agro-entrepreneurship around greenhouses and along ecological farming standards; and
- Development of small-scale agriculture integrated into an agro-eco tourism trajectory.

Regarding the quality of water and land resources, the following interventions are suggested:

- *Identification of the level of pollution from agriculture in surface and ground waters.*
This should include the study and identification of risk for surface water pollution from “hotspot” areas; identification of the level of pollution from agriculture in surface and groundwater; and investments in protection from agricultural pollutants.
- Restoration of natural riverbanks and wetlands.
- A pilot study on the metering of water use, including identification/mapping of illegal abstraction points; preparation of a registry of water abstractions, and so on.

The implementation of these comprehensive sets of interventions is expected to enhance green, climate resilient, competitive, and inclusive rural development in Albania.



BIBLIOGRAPHY

Bray, M., K. Legatt, M. Perry, and B. Speer. 2019. "Analyzing Local Attitudes and Experiences with Climate Impacts in Albania." *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)* Worcester Polytechnic Institute: Interactive Qualifying Project.

Castillo, G.E., R.E. Namara, H. M. Ravnborg, M.A. Hanjra, L. Smith, M. H. Hussein, C. Béné, S. Cook, D. Hirsch, P. Polak, D. Vallée, and B. van Koppen. 2007. "Reversing the Flow: Agricultural Water Management Pathways for Poverty Reduction." In: Molden, D. (ed.) *Comprehensive Assessment of Water Management in Agriculture, Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture*. London/Colombo: Earthscan/International Water Management Institute.

FAO. 2018. Comprehensive Analysis of Disaster Risk Reduction and Management System for Agriculture in Albania. Enhancement of Disaster Risk Reduction and Management capacities and mainstreaming Climate Change Adaptation Practices into the Agricultural Sector in the Western Balkans (TCP/RER/3504).

FAO/WB ALBANIA – Cooperative Program. 2019. Water Resources and Irrigation Management Project (WRIP), Draft Technical Report.

INSAT (Albania Institute of Statistics, 2020).

Izzi, G., J. Denison, and G.J. Veldwisch, eds. 2021. *The Farmer-led Irrigation Development Guide: A What, Why, and How-To for Intervention Design*. Washington, DC: World Bank.

Lankford, B., A. Closas, J. Dalton, E. L. Gunn, T. Hesse, J. W. Knox, S. van der Kooij, J. Lautze, D. Molden, S. Orr, et al. 2020. "A Scale-Based Framework to Understand the Promises, Pitfalls, and Paradoxes of Irrigation Efficiency to Meet Major Water Challenges." *Global Environmental Change*, Volume 65, November 2020: 102182.

Sinha, R., M. Gilmont, R. Hope, and S. Dadson. 2018. "Understanding the Effectiveness of Investments in Irrigation System Modernization: Evidence from Madhya Pradesh, India." *International Journal of Water Resources Development* 35 (5): 847-870.

World Bank. 2021. "Water and Agriculture in the Western Balkans: A Broad Sector Rethink." Technical background report.

World Bank. 2019. Albania Systematic Country Diagnostic Report, 2019 Update. Report No: 147451-AL.

