



DIRECTIONS IN DEVELOPMENT
Countries and Regions

Toward Integrated Water Resources Management in Armenia

Winston Yu, Rita E. Cestti, and Ju Young Lee



WORLD BANK GROUP

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Toward Integrated Water Resources Management in Armenia

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Abbreviations, Currency, and Measurements

Abbreviations

ADB	Asian Development Bank
AFD	French Agency for Development
AMD	Armenian dram
ASHMS	Armenian State Hydrometeorological and Monitoring Service
BMO	basin management organization
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EDB	Eurasian Development Bank
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
GEF	Global Environment Facility
GIZ	German Agency for International Cooperation
IFC	International Finance Corporation
IWRM	integrated water resources management
JICA	Japan International Cooperation Agency
KF	Kuwait Fund for Arab Economic Development
KfW	KfW Development Bank
MCC	Millennium Challenge Corporation
OECD	Organisation for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
RBMP	river basin management plan
SEI	State Environmental Inspectorate
Sida	Swedish International Development Cooperation Authority
SWCIS	State Water Cadastre Information System
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
USAID	United States Agency for International Development
WRMA	Water Resources Management Agency

Currency Equivalents

(Exchange rate effective as of August 13, 2014)

US\$1.00 = 415 AMD

AMD 1.00 = US\$0.0024

Weights and Measures

Metric system

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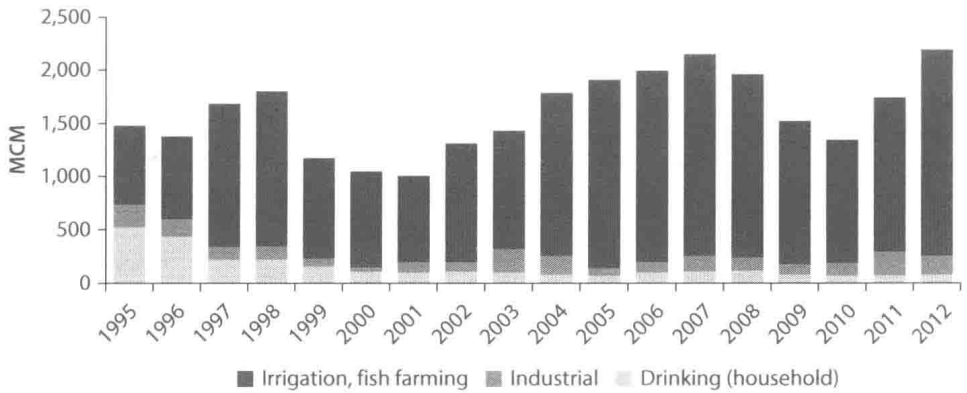
Overview

Integrated Water Resources Management Diagnostic

The proper management of water resources plays a key role in the socioeconomic development of Armenia. On average, Armenia has sufficient water resources. Taking into account all available water resources in the country, Armenia has sufficient resources to supply approximately 3,100 cubic meters per capita per year—well above the typically cited Falkenmark water stress indicator of 1,700 cubic meters per capita per year. These water resources are not evenly divided in space and time with significant seasonal and annual variability in river runoff. In order to address temporal variations in river runoff, the country has built 87 dams with a total capacity of 1.4 billion cubic meters. Most of these dams are single purpose, mainly for irrigation. Armenia also has considerable groundwater resources, which play an important role in the overall water balance. About 96 percent of the water used for drinking purposes and about 40 percent of water abstracted in the country comes from groundwater. Irrigation remains the largest consumptive user (figure O.1).

Agriculture in Armenia is heavily dependent on irrigation. More than 80 percent of the gross crop output is produced on irrigated lands. Returns are higher on irrigated lands. Water user associations play an important role in agricultural water management. Currently, there are 42 water user associations responsible for about 195,000 hectares (out of a total of 208,000 hectares of irrigable lands in Armenia). Since water user associations became operational, water supply has improved, the collection of water fees has increased, and there is an increasing conversion from low-value crops (e.g., wheat) to higher value crops (e.g., fruits and vegetables) (table O.1). However, water user associations are not yet financially sustainable and continue to depend on State subsidies. Finally, agricultural water management is still subject to various inefficiencies. This includes the widespread use of high-lift pump irrigation systems built during Soviet times but are now uneconomical due to high energy costs.

Domestic water consumption, which used to be the second-largest water user after irrigation, sharply decreased in the 1990s (figure O.2). This dramatic drop is attributed to the introduction of water metering and a volumetric billing system.

Figure O.1 Water Consumption by Sector, 1995–2012

Source: National Statistical Service of Armenia.

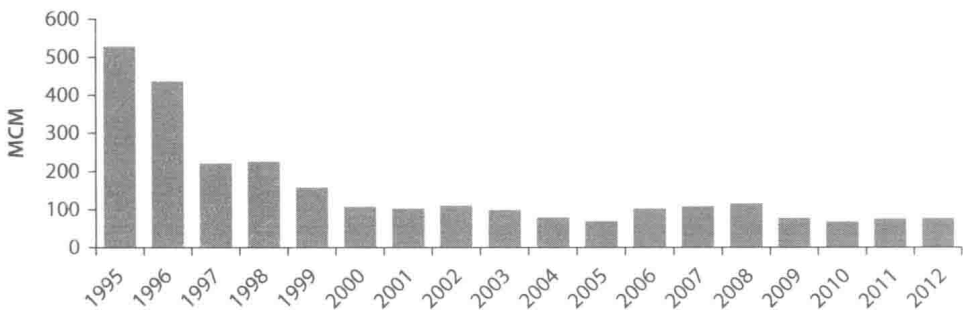
Note: MCM = million cubic meters.

Table O.1 Improvements after the Operationalization of Water User Associations, 2004–2013

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Irrigated area (ha)	113,366	125,648	123,298	125,632	128,860	128,076	129,194	129,406	130,180	130,524
Collection (billion AMD)	2.51	2.89	2.95	3.10	3.44	3.22	3.56	3.77	4.03	4.44
Collection rate (%)	56	66	69	73	68	87	82	83	78	86
High-value crops (%)	65	71	74	78	79	79	80	84	87	88

Source: Project implementation unit data.

Note: AMD = Armenian drams. A billion is 1,000 million.

Figure O.2 Water Consumption for Domestic, 1995–2012

Source: National Statistical Service of Armenia.

Note: MCM = million cubic meters.

Over the past decade, water supply in Armenia has greatly improved with the increased use of public-private partnerships. This has shown success, particularly with improving water supply duration, water meter installment, and collection efficiency. Compliance with water quality requirements has also improved and energy consumption has, in most cases, been reduced. Although the collection rate is high, the tariff is still currently too low to provide sufficient funding to cover even routine operation and maintenance and investment costs. Moreover,