

This country profile was compiled by the OECD Secretariat and reflects information available as of March 2015. Further information and analysis can be found in the publication: OECD (2015) *Water Resources Allocation: Sharing Risks and Opportunities*, OECD Studies on Water, OECD Publishing. Country profiles for all of the 37 allocation regimes in 27 OECD and key partner countries surveyed for this project are available for download at: <http://www.oecd.org/fr/publications/water-resources-allocation-9789264229631-en.htm>.

CHINA (PEOPLE'S REPUBLIC OF)

Overview and highlights

In the People's Republic of China (hereafter "China"), surface and ground water are publicly owned. A comprehensive water abstraction permit system is in place. Some of the latest reforms¹ include:

- The new Water Law of China (2002), which improved the water allocation system;
- The "Interim Measures for Water Allocation" (2008), that promoted water allocation based on integrated water resources planning; and
- The State Council of China's "Performance Assessment Methods for the Implementation of the Most Stringent Water Resources Management System" (2013), to established the "red line" for controlling water use efficiency, water resources development and utilization, and capping the total amount of water consumption nationwide at 700 billion cubic meters by 2030.

Key characteristics of the prevailing allocation regime in the **Yellow River Basin** include:

- Water resources are considered neither over-allocated nor over-used;
- A pre-defined set of priority uses has been established, although it is subject to be changed by provinces, autonomous regions and municipalities directly under the central government, per local circumstances;
- Based on real-time hydrological information, precipitation, drought situation, soil moisture, reservoir storage and water consumption, the Yellow River Conservancy Commission (YRCC) may adjust already issued monthly and ten-day water regulation plans and command real-time regulation instructions;
- Water entitlements granted to individuals or to a group of persons/ organisation/city, remaining in place for the period they were issued for, regardless of actual use;
- Several requirements need to be fulfilled before a new entitlement can be granted, including an assessment of third party impacts, an environmental impact assessment (EIA) and an existing user(s) forgoing use;
- Recent successful pilot projects of water rights transfer have been implemented include two autonomous regions;
- Abstraction charges are determined by fee standards and actual quantity of water abstracted in the region of access, except for hydropower. In some areas, pricing arrangements reflect water scarcity to some extent through price-based management.

Legal and institutional setting for water allocation

Institution	Scale	Main Responsibilities
Ministry of Water Resources	National	Policy, planning, issuing entitlements, monitoring and enforcement.
River Basin Commission	River Basin	Planning, monitoring and enforcement.

Legal context for water allocation: Roman/ Statutory Law.

Legal definition of ownership of water resources: surface and ground water are publicly owned.

¹ For information on China's most relevant documents outlining the nature of the reforms under consideration please refer to: <http://www.mwr.gov.cn/english/> or http://www.gov.cn/zwqk/2013-01/06/content_2305762.htm.

Tracking water scarcity

A mapping exercise has been done to identify areas where water scarcity is becoming a problem. The most recent references include: the Survey and Evaluation of Water Resources Development and Utilization in China and the China Census for Water.

Allocation Regime Example: The Yellow River Basin

Physical features of the water resource

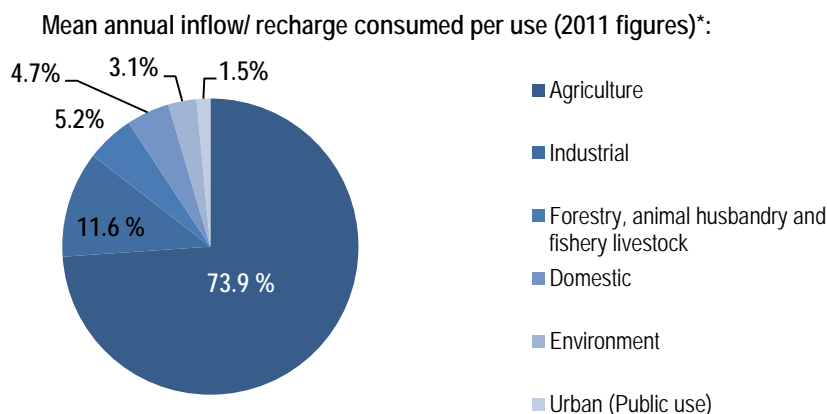
With a total length of 5 464 km, the Yellow River main stream flows through 9 provinces and finally empties into the Bohai Sea. An important water source for northwest and north China, it also supplies water for certain areas outside the Basin. With only 2% of the combined river runoff in China, it supports 12% of China's population (162.7 million, of which 113.7 million people live in the Basin and 49 million people live outside the Basin on farmland irrigated by the Yellow River). The river also supports 17% of China's arable land and 74 large and medium sized cities. There are 196 large and medium-sized reservoirs, 29 large reservoirs.

Water resources are scarce and vary greatly between dry and wet seasons. Per capita share of water in the Basin is only 22% of the national average. Average river runoff is about 53.5 billion cm³. In 2011, the total volume of the Yellow River water entering the Bohai sea was 17.87 billion cm³. The Yellow River runoff comes mainly from surface and groundwater fed by rainfall in the upper and middle reaches. The reduction of precipitation in the Basin has directly reduced river runoff.

The Yellow River is a heavily sedimented river, with most sand in the downstream areas. The middle-stream of the Yellow River flows through the Loess Plateau, where there is a concentration of storm rainfall. The Loess Plateau is located at the junction of the first and second tiers of China's cascading topography with a sharp decline in altitude. Therefore, the loose nature of the loess soil is easy to be washed away by water. All these factors have exacerbated soil erosion in the Basin.

The **flow rate is managed or controlled** fully, as water systems are completely regulated.

There is **significant non-consumptive** use in hydro power. The Xiaolangdi Hydropower Station has an installed capacity of 1.8 million kilowatts with annual electricity output of 5.1 billion kwh. The Longyangxia Hydropower Station has an installed capacity of 1.28 million kilowatts with annual electricity output of 2.36 billion kwh.



*These ratios are measured against total water use/ and water abstraction, rather than total river runoff.

Defining the available resource pool

Are limits defined on consumptive use? Yes.

- In the volume of water that can be abstracted linked to a river basin management plan, a guiding document formulated by the Yellow River Water Resources Commission.

Are environmental-flows clearly defined? Yes.

- According to Interim Implementation Rules for Yellow River Water Dispatching and Allocations, the warning-level river flow against the drying out of downstream river course shall not fall below 200 cm³/sec at Xiaheyan hydrological stations or below 30 m³/s at Lijin hydrological station. There are eight other stations in between them with corresponding warning-level river flows.
- Freshwater biodiversity is also considered by ensuring basic river flow in order to meet water quality requirements and downstream flow, as spawning grounds for many valuable fish species and a passage for migratory fish.
- Terrestrial biodiversity is addressed by ensuring basic water supply for reproduction and metabolism of the main species and biological communities in the estuarine areas. There are 265 kinds of birds in the Yellow River Delta Nature Reserve, including many under first-class national protection.²

What is the status of resource pool? Neither over-allocated nor over-used. However, in recent years, over abstraction has occurred in several provinces and administrative regions.

Are there arrangements to deal with impacts of climate change? Yes.

- Emergency Plans for Drought Relief in the Yellow River Basin (Trial) was released by Yellow River Conservancy Commission (YRCC).

Factors taken into account in the definition of the available resource pool

Factor	Taken into account?	If taken into account, how?
Non-consumptive uses (e.g. navigation, hydroelectricity)	✓	Based on real-time hydrological information, precipitation, drought situation, soil moisture, reservoir storage and water consumption, the YRCC may adjust already issued monthly and ten-day water regulation plans and command real-time regulation instructions.
Base flow requirements	✓	Considered in an integrated manner in domestic, industrial and ecological water use.
Return flows (how much water should be returned to the resource pool, after use)	✓	Amounts returned after use in irrigation districts along the mainstream of the Yellow River are monitored at a river cross section between two provinces.
Inter-annual and inter-seasonal variability	✓	Yellow River water regulation integrates annual water allocation plan and monthly, ten-day water regulation plan, as well as real-time water regulation instructions. Yellow River water regulation cycle is from 1 July to 30 June of the next year.
Connectivity with other water bodies	✓	Inter-river water diversion proposals are under study.
Climate change	✓	Annual water regulation plan will be formulated based on water forecasting for the next year.

² Birds under first-class national protection include: the White Stork, Chinese merganser, white-tailed sea eagle, golden eagle, red-crowned crane, hooded crane, and Dabao. Birds under second-class national protection include: cormorants, swans, crane, white-tailed birds.

Entitlements to use water

Definition of entitlements	Characteristics of entitlements
<p>Are entitlements legally defined? Yes.</p> <p>Are private entitlements defined? Yes, as individual entitlements (to an individual person) or as a collective entitlement (to a group of persons/ organisation/city). Collective entitlements are assigned to an institution representing water users (e.g. WUAs). Irrigation districts and public water companies access water to consume by paying a fee. In some irrigation districts authorities assign water abstraction rights to clients under a permit system.</p> <p>Nature of entitlement: Defined as the purpose that water may be used for; maximum volume that may be taken in a nominated period; and, as a proportion of any water allocated to a defined resource pool. Entitlements are unbundled from property titles assigned according to a system of prior appropriation, where reliability is a function of the year when the entitlement was first issued.</p> <p>Period granted for: A term of a given number of years (e.g. 5-10) with the expectation of renewal.</p> <p>Return flow obligations: clearly specified on water abstraction permits in terms of location, manner and volume of water to be returned.</p>	<p>If the entitlement is not used in a given period it remains in place for the period it is issued for.</p> <p>Are entitlements differentiated based on the level of security of supply (or risk of shortage)? Yes. The approval authority of water permits can restrict the volume of annual water abstraction due to, (1) natural causes; (2) serious impact on utilizing water from ecological and environmental zones; (3) groundwater over-exploitation and development; (4) other, such as major droughts.</p> <p>Is there a possibility to trade, lease or transfer entitlements? Yes. YRCC has not yet developed uniform water rights trading regulations, but some local governments are carrying out pilot projects. In 2003, pilot projects of water rights transfer were implemented in Ningxia and the Inner Mongolia Autonomous Region³. Water-saving renovations in irrigation districts were funded by new industrial projects, reducing water losses and transferring the water saved to new industrial projects for payment. Thus far, 39 water transfer projects have been approved, with 337 million m³ of water transferred. With no increase in total water consumption, newly-added water demand for socio-economic development is satisfied, thus promoting industrial restructuring and the transformation of economic development pattern.</p> <p>Are allocations (the amount that can be taken at any point in time) managed separately from entitlements? No.</p> <p>Is allocation trading allowed? n/a.</p> <p>Can entitlements function as a financial instrument? No.</p>

³ The Dalat power plant of Ordos City, Inner Mongolia, was the first pilot project of water rights transfer in the Yellow River Basin. When its expansion project was launched, it invested 120 million yuan to help farmers build 45 km of irrigation channels. In this way, it "purchased" more than 20 million cubic meters of water quota per year. Constrained by Yellow River allocation plans, some provinces (regions) transfer surplus water saved in the agricultural sector to industrial projects on a payment basis in order to co-ordinate local economic development.

Type of users not required to hold a water entitlement to abstract water: according to "Regulations on Water Permits and Water Fee Collection Management" of China a water abstraction permit is not required for: (1) rural collective economic organisations and their members who use water in collectively-owned pools and reservoirs; (2) abstraction of a small amount of water for domestic use, such as rearing livestock in a sporadic way or poultry in captivity; (3) temporary emergency water abstraction or water drainage for the safety of construction projects and the safety of production in mines and other underground works; (4) temporary emergency water abstraction to eliminate a threat to public safety or public interests; (5) temporary emergency water abstraction for drought relief and ecological and environmental purposes. The estimation of the percentage of total water uses related to these groups of users is uncertain.

Requirements to obtain a new entitlement or to increase the size of an existing entitlement: conditional on assessment of third party impacts, environmental impact assessment (EIA) and existing user(s) forgoing use.

Pre-defined priority classes: the "Regulations on Water Permits and Water Fee Collection Management" of China (art. 5) stipulates the development and utilisation of water resources should first satisfy domestic water use by urban and rural residents and, at the same time, give consideration to agricultural, industrial and ecological use, as well as shipping management. However, people's governments of provinces, autonomous regions and municipalities directly under the central government can prioritise these uses within the same river basin or administrative region in light of actual local situation.

Abstraction charges

User category	Abstraction charge?	Basis for charge	Reflects water scarcity?
Agriculture	✓	Determined by fee standards and actual quantity of water abstracted in the region of access.	✓
Domestic	✓		✓
Industrial	✓		✓
Energy production (not including hydro power)	✓		✓
Hydro power	✓	Hydropower stations and thermal power plants using tubular cooling system, based by actual power output and prevailing fee standard in the region of water access.	✓
Other. Specify:			

How pricing arrangements reflect scarcity: To some extent, price-based management reflects scarcity. In the Hetao irrigation district in Inner Mongolia Autonomous Region, for example, since the adjustment of water tariffs started, local farmers' awareness of water conservation has been growing, resulting in water savings. Currently, Hohhot city in Inner Mongolia Autonomous Region is also actively promoting a block tariff system for water.

Dealing with exceptional circumstances

Distinction between the allocation regimes used in "normal" and extreme/severe water shortage times? Yes.

How is the amount of water made available for allocation adjusted: with reference to Ordinance on Yellow River Water Regulation, Annual Yellow River Water Regulation Plan as well as the approved Yellow River water allocation plan and annual forecasting of river inflow and reservoirs storage. The operational water regulation plan is formulated by balancing the recommended annual water use plan (submitted by the demand side) and the recommended reservoir operation plan (submitted by the supply side). The plan is developed in accordance with the principle of "increasing water supply in wet years and reducing water supply in dry years with the same proportion, practicing multi-year reservoirs regulation so as to store water in wet year and supply water in dry years". Based on the approved annual water allocation planning, monthly reporting of water use plan recommendations, and reservoir operation plan, the

YRCC will formulate and issue a monthly water regulation program. During the peak period of water consumption, YRCC will develop and release a ten-day water regulation program according to the actual need. The YRCC can adjust the monthly and ten-day water regulation programs already issued and release real-time regulation instructions based on real-time hydrology, rainfall, drought, soil moisture, reservoir storage and water use.

Definition of "exceptional" circumstances: include droughts and water pollution incidents. According to the Ordinance of Drought Relief of the People's Republic of China, drought refers to inadequate water supply due to reduced precipitation and engineering-related water shortages that threaten life, production and ecology.

Legal bodies declaring the onset of "exceptional" circumstances: Office of State Flood Control and Drought Relief Headquarters and the Ministry of Water Resources. When a major drought occurs, authorities that approve abstraction permits may place emergency restrictions on water abstraction. The YRCC shall organise and implement emergency dispatching and the local people's governments or river basin commission can formulate emergency water regulation plans and carry out unified water regulation of water storage in reservoirs, hydropower stations, dams, and lakes within their jurisdiction, following the approved drought relief preparedness plan. Stakeholders are involved in the process of defining "exception circumstances" via the Ministry of Water Resources, Yellow River Conservancy Commission, relevant provincial governments, provincial water resources departments, and reservoir management authorities.

Monitoring and enforcement

Responsible authority: Yellow River Conservancy Commission.

Types of withdrawals monitored: agriculture, domestic, industrial, energy production, environment and transfer to the sea or another system.

Monitoring mechanisms: agriculture: metering; industrial and energy production: hydrological monitoring; environment and transfer to the sea or another system: monitoring by relevant instrumentation.

Sanctions: according to the Regulations on Water Abstraction Permits and Water Fee Collection Management (art. 43), water abstracting organisations or individuals who fail to install metering facilities or have meters that do not function properly, are requested to install, replace or repair them. Upon failure to meet these requirements, a water fee is calculated based on the maximum daily water abstraction. They will be penalized with a fine from 5 000 RMB yuan to 20 000 RMB yuan. For serious violations, water abstraction permits can be cancelled.

Conflict resolution mechanisms? Yes, through the water use conciliation (River Law, art. 38-43).