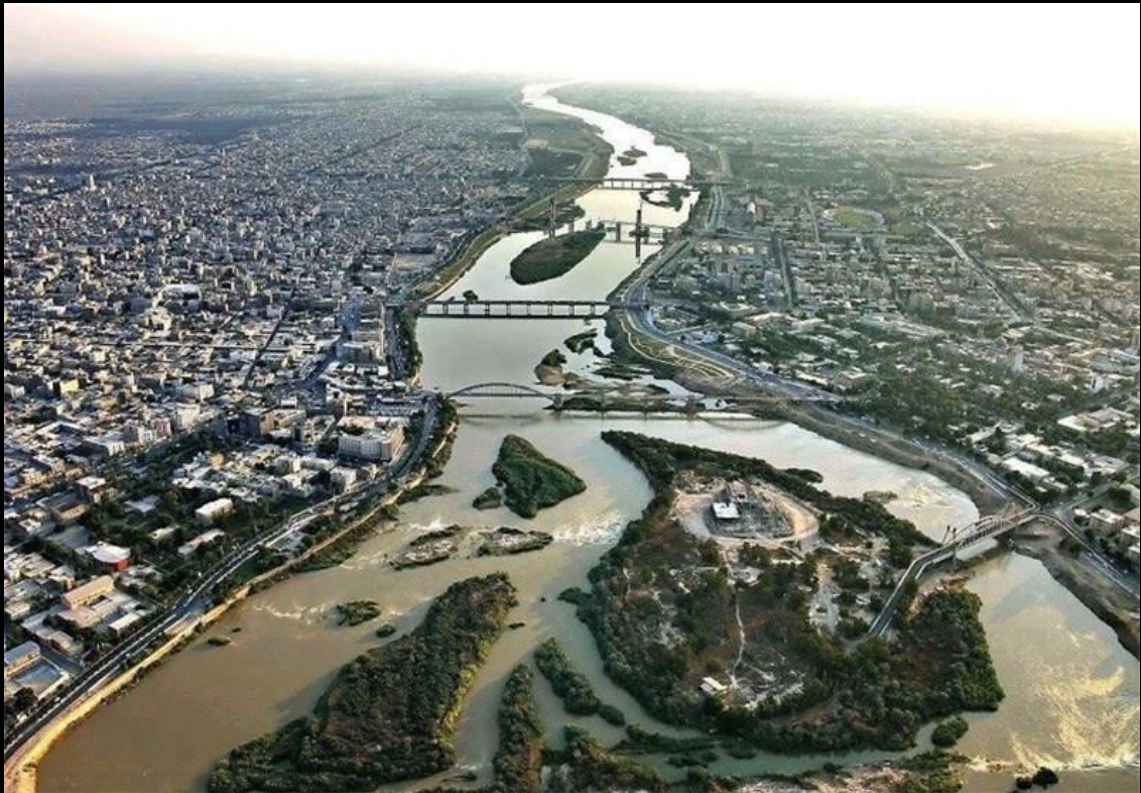


Karun River – Iran



May 2016
Sepideh Nayemi
International cooperation coordinator
Geneva Water Bureau- (Direction générale de l'eau)- DETA



Department of Environment, Transport and Agriculture



ქართველი
Georgia

Caspian Sea

Հայաստան
Armenia

Azərbaycan
Azerbaijan

Surface : 1'648'195 km²
Altitude : 28 to 5'610 m
Climate : humid to hyper arid
Precipitation : < 50 to > 1'500 mm / year
Average temperature: de 9 to 30 degree

Türkmenistan
Turkmenistan

Тоҷикистон
Tajikistan

العراق
Iraq

افغانستان
Afghanistan

ایران
Iran

پاکستان
Pakistan

الكويت
Kuwait

Persian Gulf
البحرين
Bahrain

قطر
Qatar

الإمارات
العربية
United Arab Emirates

Gulf of Oman





Vertebrates: 1,115 species

- 524 species of birds
- 226 species of reptiles
- 174 species of inland fishes
- 168 Species of mammals
- 22 species of amphibians



1,810
endemic plant species



Endemic vertebrates of Iran



6-7 species



Reptiles: 15 species
Amphibian: 6 species



1 species



12 species

Population : 80'000'000 inhabitants

1000 cities 8 > 1'000'000 inhab.

Teheran : 9'000'000 inhabitants

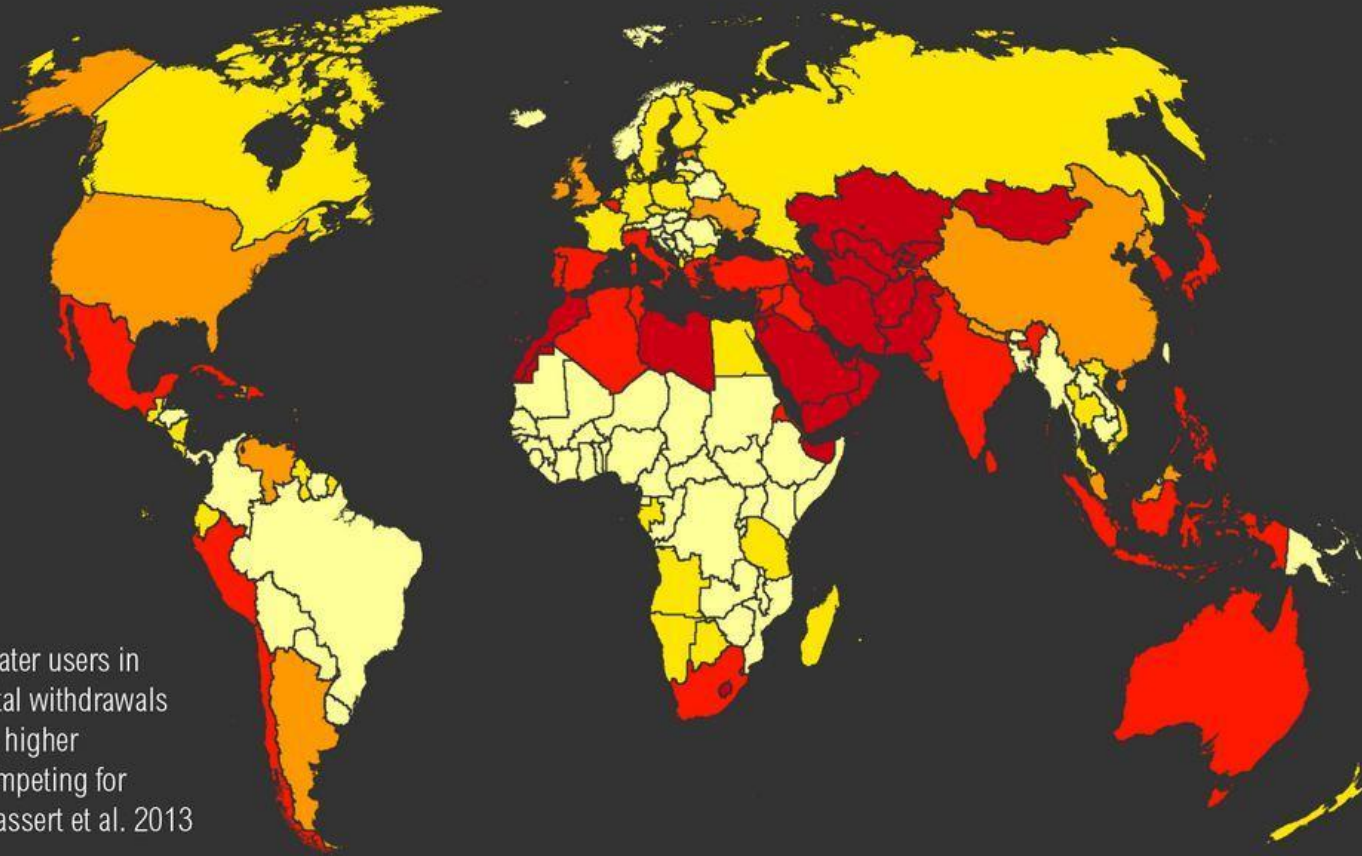


WATER STRESS BY COUNTRY

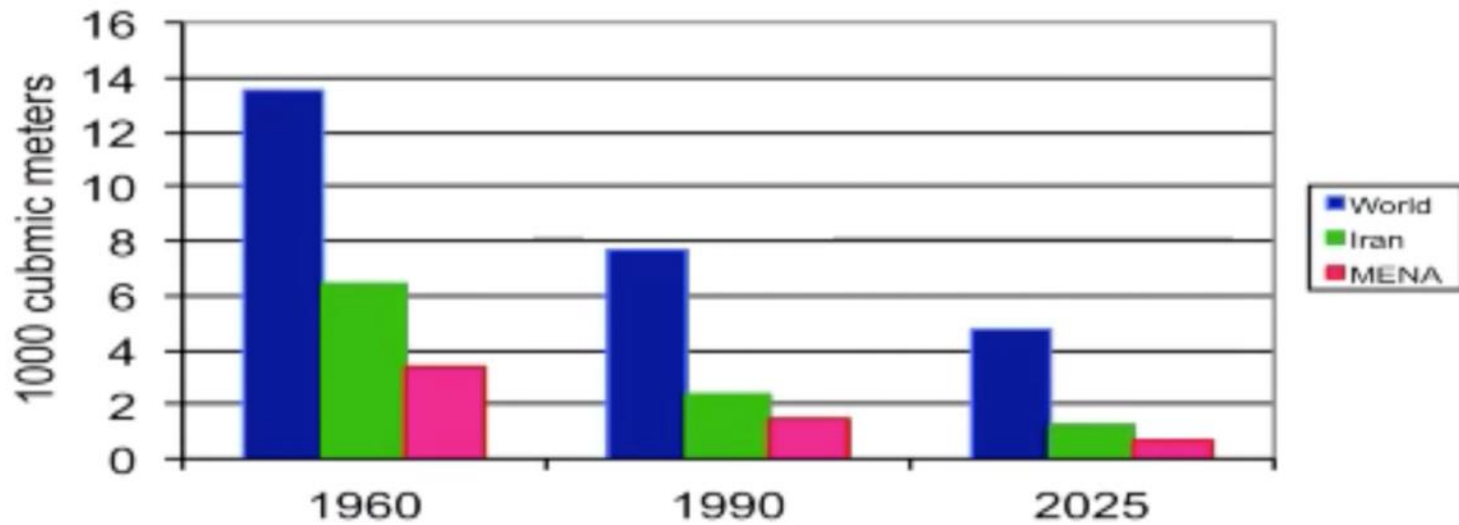
ratio of withdrawals to supply

- Low stress (< 10%)
- Low to medium stress (10-20%)
- Medium to high stress (20-40%)
- High stress (40-80%)
- Extremely high stress (> 80%)

This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013



Available Water per Capita



HEESA Hydro-Environment & Energy System Analyse Research Group

Why water crises in Iran

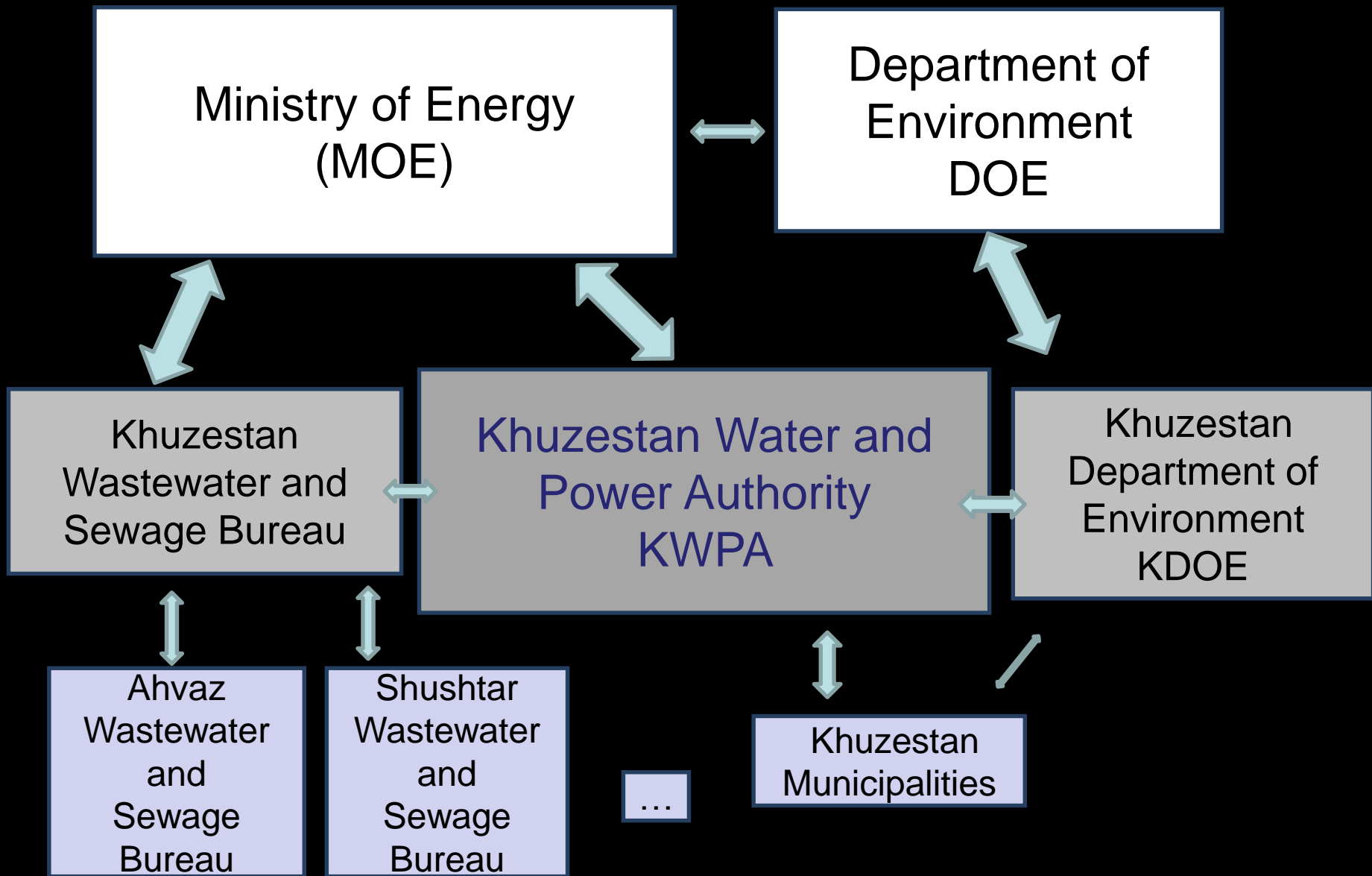
Population growth

Agriculture

- 13% of GDP
- 15% of total area
- 23% of the jobs
- 90% of the water consumption

Mismanagement of water resources

Climate change?



Karun Mission: 6 - 13 November 2015

Organisation :

- UNDP – Iran
- Khuzestan Water and Power Authority (Host)

Objectif :

- Evaluation of the present situation of Karun and the drives causing its problems, (qualitative approach based on 4 days field visit and exchange with local experts.
- Sharing Geneva canton's experience and best practice to contribute to the restoration of Karun.
- Recommendation of pilot projects to the local Government

Karun river:

The largest river basin in Iran

Length: 950 km

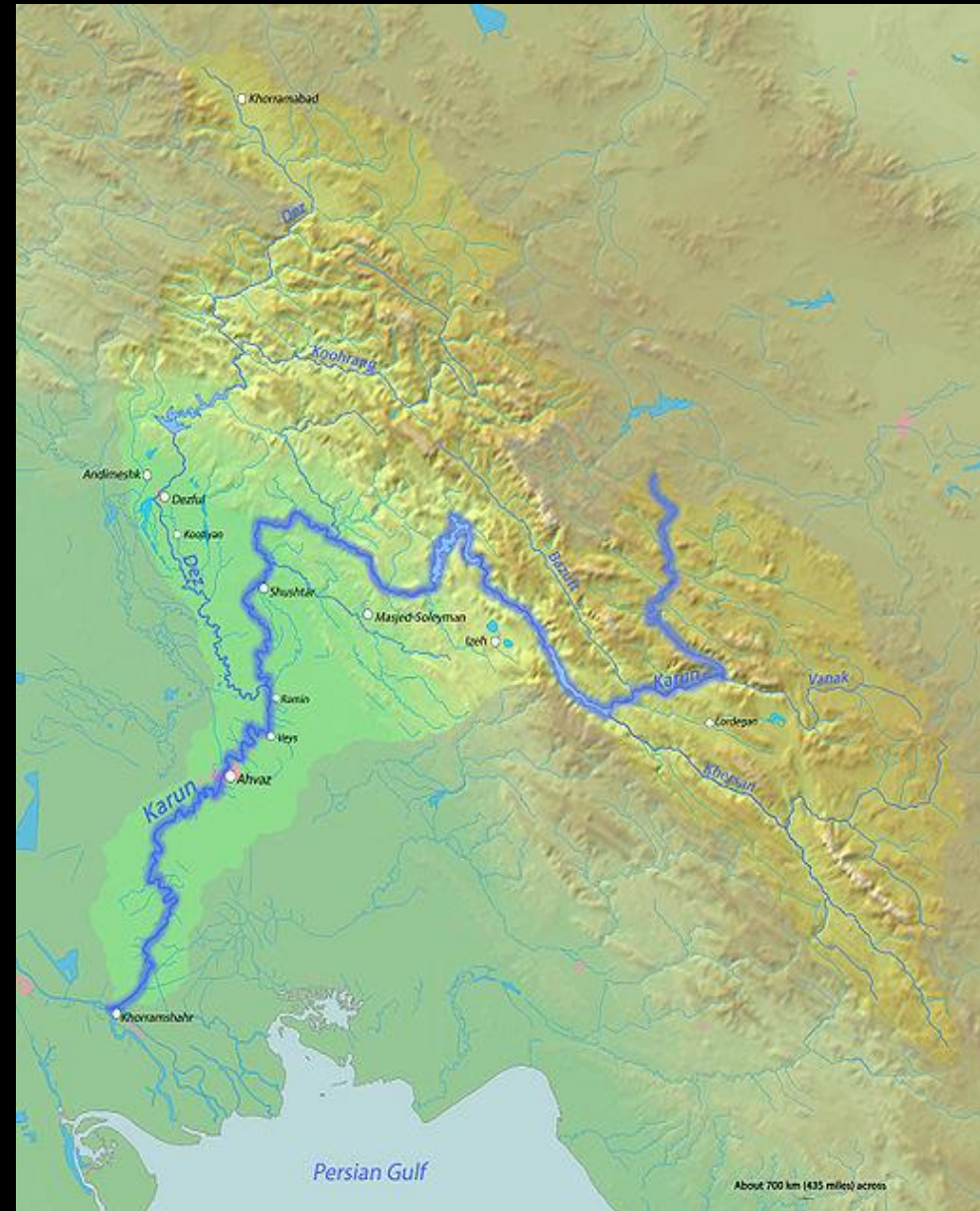
Debit: 575 m³/s

Basin surface: approximately 62'718 km²

3 provinces Khuzestan downstream
(4 millions inhabitants)

Value:

Environmental
Economic
Cultural
Wealth



IRAN (Persia)



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

River Functions

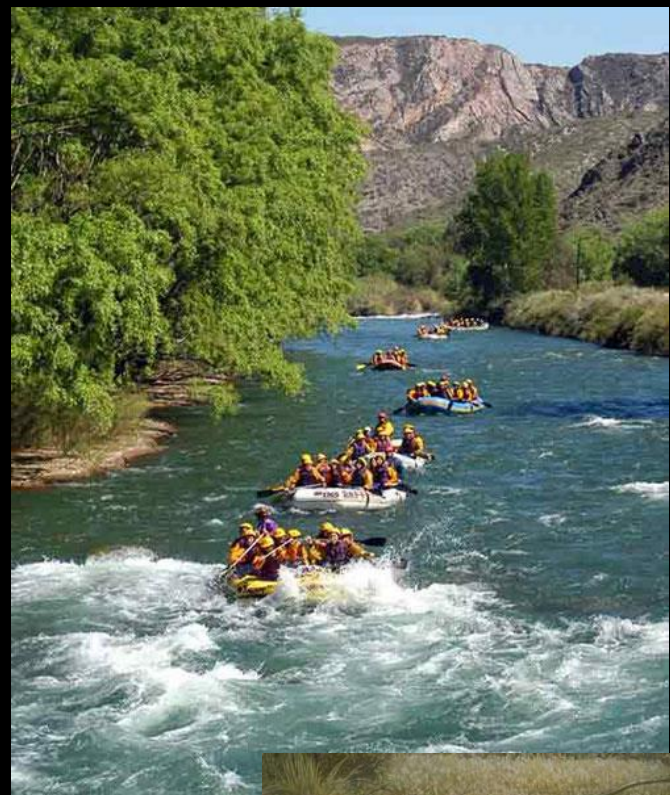
- **Drinking water**
- **Electricity** : several dams, including the largest of the Middle East, capacity 2000 MW
- **Agriculture**: Traditionally Okra and dates, today sugarcane, more than thousands of hectares
- **Industry**: fiberboard manufacturing, industrial alcohol, animal feed, sugarcane processing (industrial area of 70,000 hectares south of Ahvaz)



River Functions :

Cultural and natural heritage in connection with wetlands (ex. Shadegan wetland)

Fishing

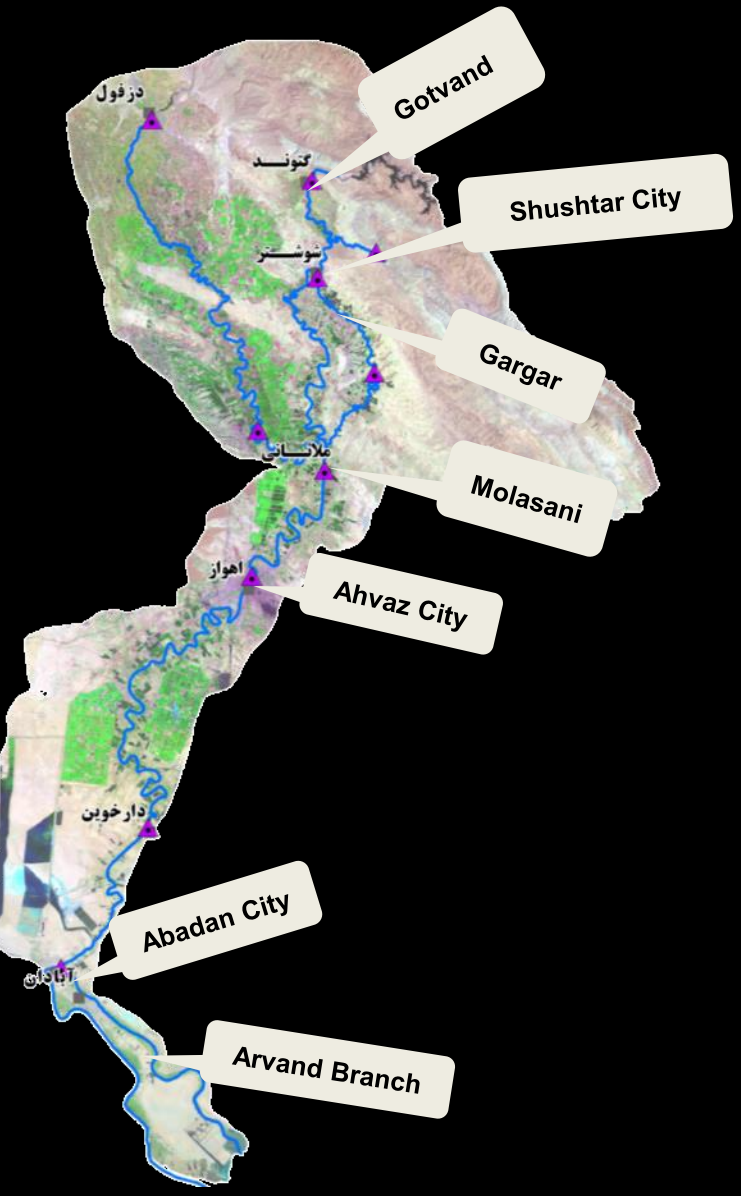


FARS

Photo : Javid Tafazoli

FARS NEWS AGENCY

Field visit: 13 sites



Gotvand Dam

Largest dam of Iran

Height : 182 m

Volume : 28,500,000 m³

Reservoir capacity: 5,1 milliards

Production capacity: 2'000 MW

Problem : Salinity



Shoteit Band-e Mizan upstream

- Habitat diversity
- Rare species
- Remarkable landscapes

Problems:

- Risk of anthropogenic pressure and degradation of river banks and bed



Gargar UNESCO hydraulic system and downstream sector



- Cultural heritage
- Remarkable landscape
- Diversity of fauna and flora
- Interesting river structure

Problems :

- Waste discharge on the banks
- Erosion and embankments
- Domestic wastewater



Band-e Ghir (Dez, Shoteit and GarGar Junction)



- Remarquable habitats including reed bed

Problems

- Waste dumping on the banks



Molasani Floating Bridge and Hydrometric Station

- Large reed bed

Problems : (left bank)

- Waste dumping
- Erosion
- Domestic wastewater



Zergan Construction Waste Discharge Area and Waste Water Outlet

Anthropic pressure!



Zeitoun pumping station



Problem : sedimentation of the water pumping station



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Ahvaz Kianpars beach

- Embankment and degradation of the river banks



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Ahvaz Karun's 5th Bridge

- Banks artificialisation
- Water pumping station next to the domestic wastewater discharge
- Destruction of the islets of reed bed inside the river bed



Aquaculture site

- Functional and well maintained system

Problems:

- Water demanding
- Potential source of pollution
- Source of river salinity



Sugarcane field

Problems:

- Use of large quantities of water
- Source of pollution
- Source of river salinity
- Not economically profitable



Palm Grove

Traditional culture matching with the environmental conditions of the region

Date cultivation affected by river salinity



Diagnosis and recommendations

Ecological value

- River space
- Natural sectors with habitat diversity
- Threatened and endemic species



Recommandations



- **Protection**
- **Promotion**
- **Education**



Water Quality

Control of water quality = Karun's priority problem

- Discharge of untreated domestic sewage and other effluents linked to human activities (agricultural, industrial, ...) to the river
- Open air dumps of waste on the banks of the river (diffuse pollution)



Water Quality



Recommendations



- Establishing or applying the legal frame for water quality management (definition of the standards and limits for chemical and physical parameters in the river)
- Establishing or applying waste management (avoiding waste discharge on the banks)
- Identification of different pollution sources (wastewater network, punctual effluent, diffused pollutions due to anthropic activities)

Water Quality



Recommendations



- Controls, monitoring for water quality diagnostic
- Planning of infrastructure for wastewater evacuation and treatment
- Projects and actions for implementation of collection sewage network and construction of wastewater treatment plants.

Water Salinity

- Human activities :
Sugarcane monoculture
Fish farming
Dam Gotvand
- Tides of the Persian Gulf in the river



Water Salinity

Recommendations



- Establishment of a sustainable and integrated management of salinity:
- Adaptation of agricultural practices in the region (crop diversification)
- Monitoring of effluent (aquaculture, agriculture)



Water Quantity– Resource

- Karun = important resource for the whole river basin and its population
- Multi and non controlled uses -> scarcity -> potential conflicts
- Lack of an integrated and sustainable management of water resources
- Decrease of Karuns' debit
- Artificial river flow because of dams

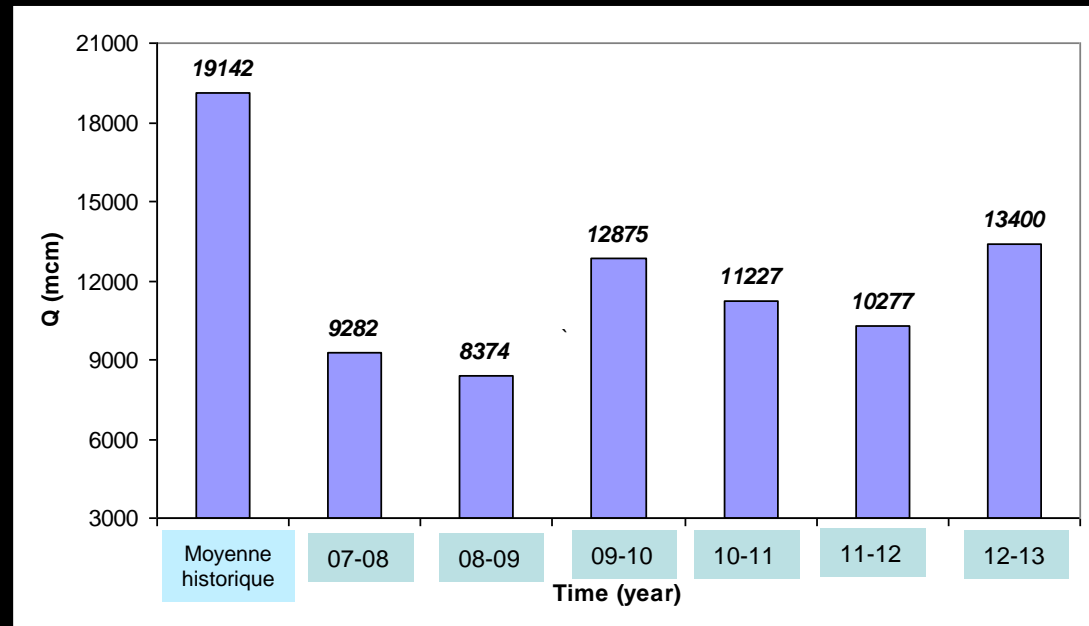
Guardian April 16 / 2015



خطر عرق شدن
شناکردن ممنوع

"The drying out of rivers and wetlands in Khuzestan has changed the regional landscape in a way war never did ..."

Karun's water volume evolution over the past decade



Water Quantity– Ressonance

→ Recommendations

Water resource assessment:

- Assess and quantify all water uses in Karun watershed
- Establish and apply a policy of sustainable water use with an integrated water quantity management in the watershed

Define and implement an adequate flow management pattern:

- Monitor sedimentation process in Karun River
- Ensure frequency of morphogenic floods
 - o Define and ensure minimum flow



River Morphology

- Many natural sectors
- River space

- but
- General tendency to degrade river bed and banks
 - Urban waste
 - Embankment



River Morphology

➔ Recommendations



- Conservation of the diversity of river bed and banks
- Promotion of river renaturation:
 - Restoration of river quality and morphology diversity (bed and bank)
 - Use of bioengineering for bank stabilization
- Valuation of landscape
- Creation of leisure area

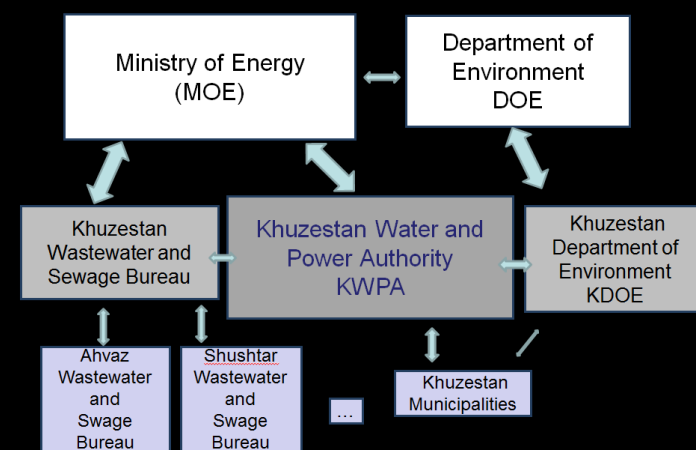


Gouvernance- Administrative structure

- Administrative structures
→ Well structured and identified

But

- Disintegrated water management
- Lack of long term vision
- Lack of communication between different entities



Recommendations

- • Setting objectives and priorities for the watershed
- • Integrated water management

Technical expertise

- High scientific level and technological expertise
- Many data little used / organized

Pilot Projects

Gargar UNESCO hydraulic system and downstream sector

Quality :

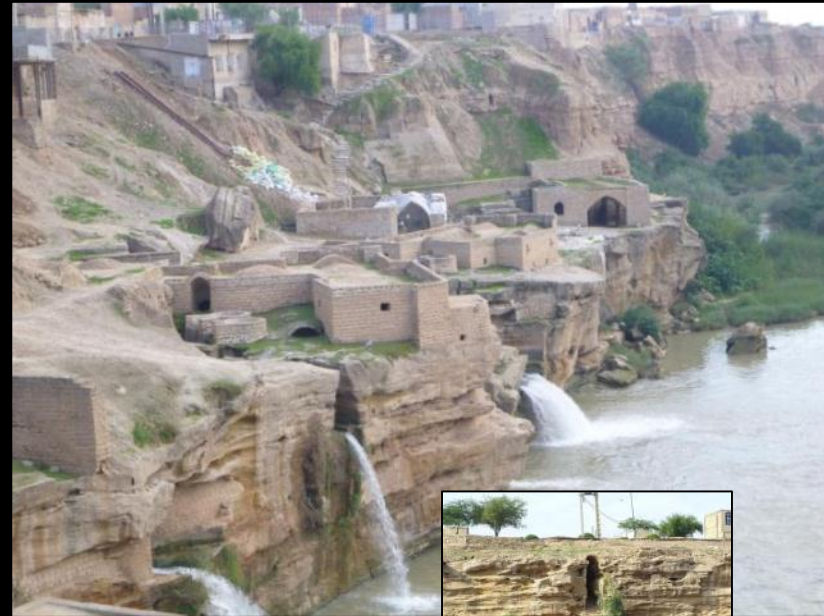
- Sewage managemenet system
- Urban waste managment

River morphology

- Removal of the waste from the bank
- Bioengineering protection of the banks
- Valuation of riverine vegetation

Public awarness

- Production of awarness material
- Valuation of historical corridors



Ahvaz Karun's 5th Bridge

Quality :

- Sewage managemenet system

River morphology

- River renaturation
- Creation of a leisure area

Public awariness

- Production of awariness material



Next steps

- Validation of the report by KWPA
- Final selection of the pilot project
- New collaboration frame (UNDP)
- Project and implementation



Private companies and sector based needs

- Water saving tools in agriculture
- Technical support for wastewater treatment plants
- Urbanwaste management (north of Iran)
- Water quality of the drinking water supply
- Water desalinization

