


Historical Water sustainability in Iran: Lessons Learned

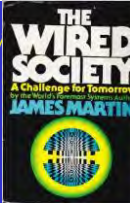
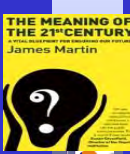
Kamran Emami
Kurit Kara
Consulting Engineers
Tehran, Iran



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The Meaning of the 21st Century

- We are at extraordinary crossroad of human history. Our action or failure to act during the next decades will determine the fate of the earth and the human civilization for centuries to come.
- This is a MAKE or BREAK century.


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Paper Main Conclusion:

- Water wisdom of the past is urgently and desperately needed for coping with water-related challenges of 21st century. And Iranian water heritage is of great value!

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The Great Challenges of 21st Century



Water would be the prime issue in 21st century

Engineers are the key players in the majority of the challenges



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Value Engineering, Creative Synergy and the Challenges of the Third Millennium

By : Kamran Emami




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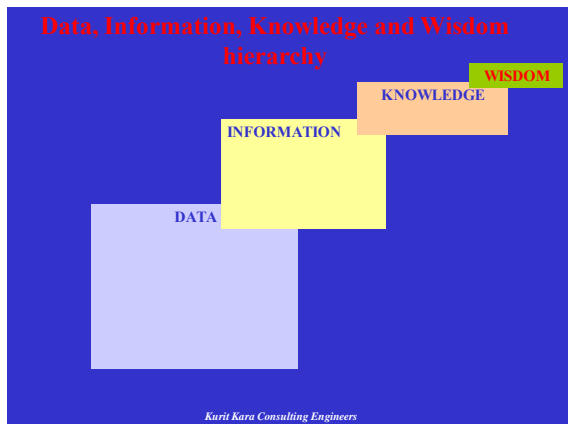
The rate of technological progress should outrun environmental damages



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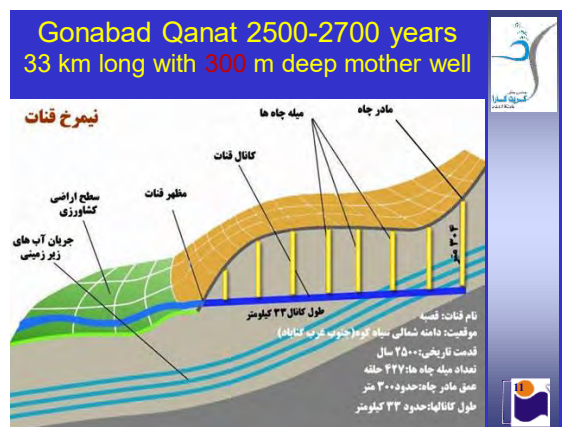
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Qanats

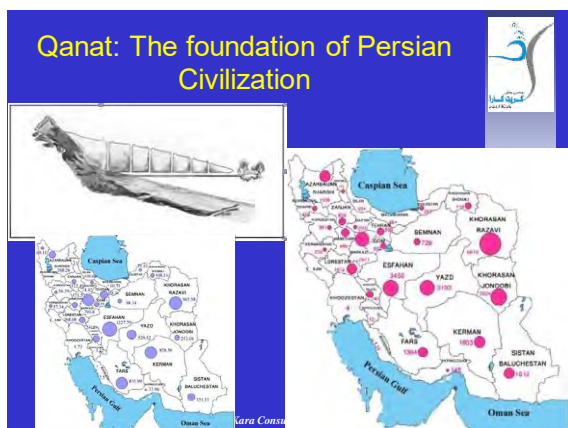
- Qanats are probably one of the greatest hydrologic achievements of the ancient world that has made sustainable development possible in many arid and semi arid regions.
- Iranian invented qanat and it's use spread to India, Arabia, Egypt, North Africa, Spain, Oman and other countries.

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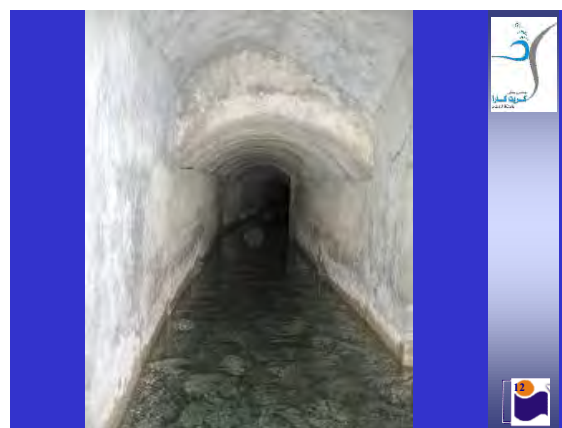
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This site were first added to the UNESCO's list of tentative World Heritage Sites in 2007, then officially inscribed in 2016 with several other quants under the World Heritage Site name of "The Persian Qanat"


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Shushtar Historical Hydraulic System (World heritage, 2200 years)







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Thousands of Persia Qanats are still in Operation as symbols of Sustainability



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More than 100 historical dam
21 of them large dams



LEGEND

- ▲ DAMS HIGHER THAN 15m
- DAMS AND WELLS LESS THAN 15m HIGH
- MAJOR CITIES

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Shushtar Historical Hydraulic System

- Rich in diversity of its uses (urban water supply, mills, irrigation, river transport, landscape and defensive system,)
- Rich in its diversity of civil engineering structures
- considered a Wonder of the World not only by the Persians but also by the Arab-Muslims at the peak of their civilization

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**IRANIAN WATER HERITAGE:
PAST WISDOM FOR FUTURE
CHALLENGES**

Lessons Learned:

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**Resilience is the key for coping with
Uncertain risks**

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**Creativity is a must when dealing with
very different adverse conditions**






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**Respecting the yields of the hydro systems
would ensure the long-term benefits**

What is particularly important about Qanats, is that the discharge from qanats "is fixed by nature". They can only provide water produced naturally. As a result, the aquifer is not depleted (36000 Qanats are in operation in Iran with total Annual discharge of 9000 McM).

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Good practice can be achieved before the development of the relevant theory

- Iranian used the synergy of science and art to compensate for lack of the technologies we enjoy today.
- Despite their handicaps and constraints, they were ingenious enough to devise their own techniques to harness the bounty of the Mother Nature..

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Function is the most important aspect

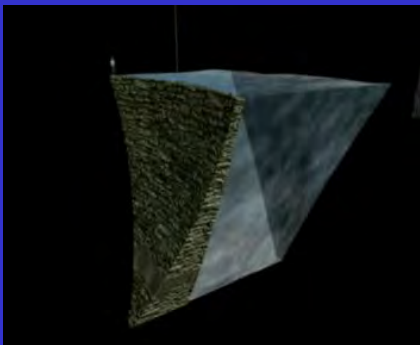


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Good practice can be achieved before the development of the relevant theory



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Monitoring and adaptations can ensure sustainability



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Function is the most important aspect

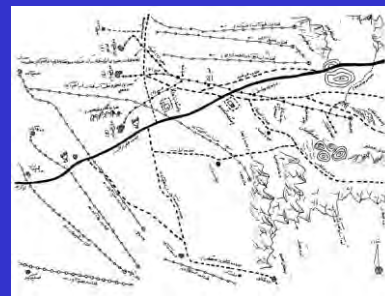


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Monitoring and adaptations (non-structural methods)



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A RICH WATER CULTURE IS PREREQUISITE TO SUCCESS

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