

HYDRO-ECONOMIC MODELS

MODÈLES HYDRO-ÉCONOMIQUES

IMPLEMENTATION **MISE EN ŒUVRE**

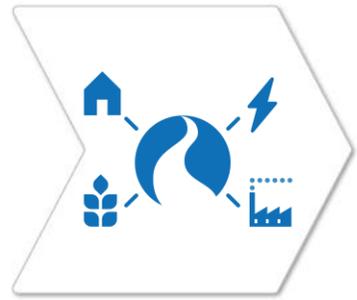
PROF. DANIEL P. LOUCKS

CORNELL UNIVERSITY, USA

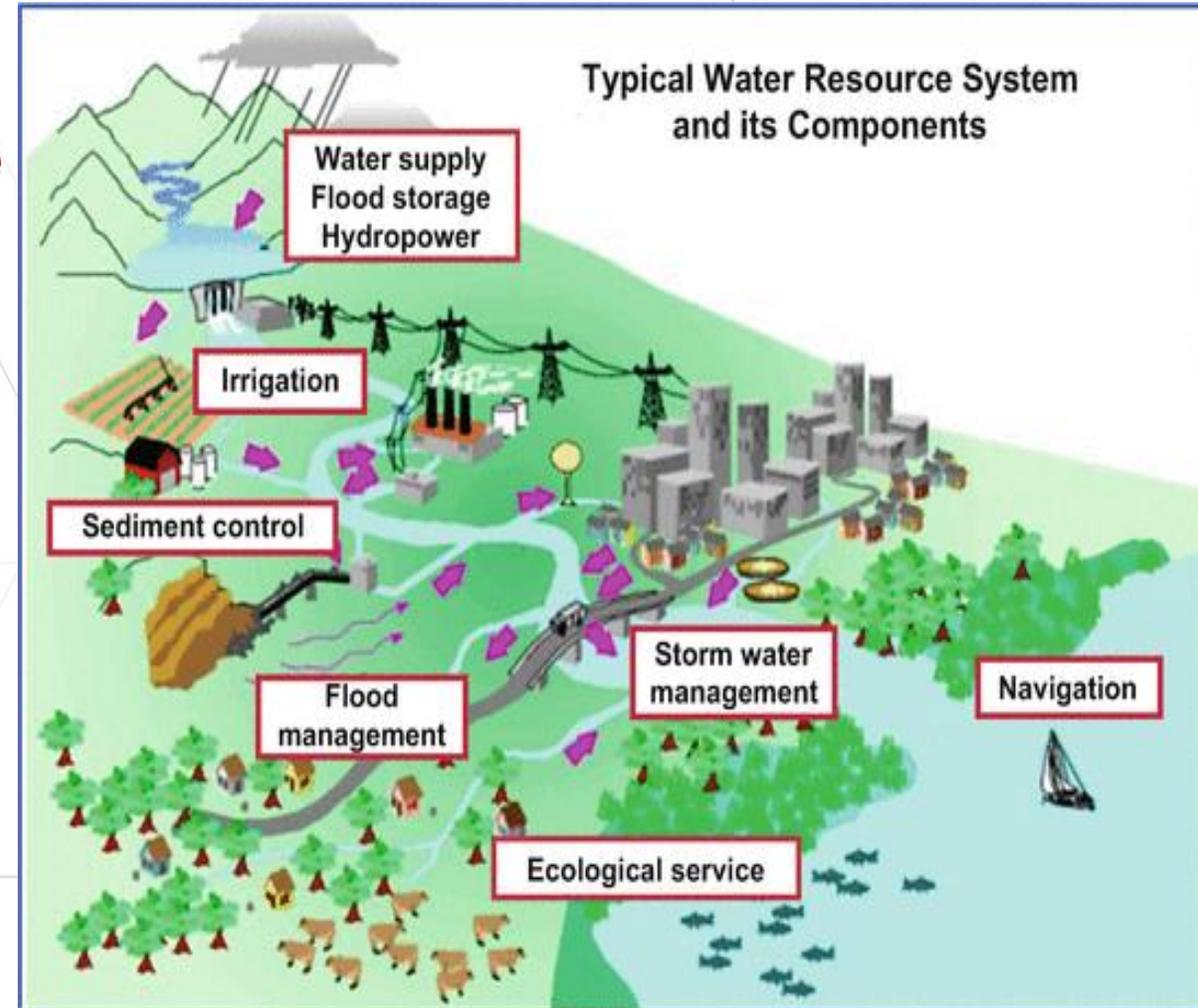
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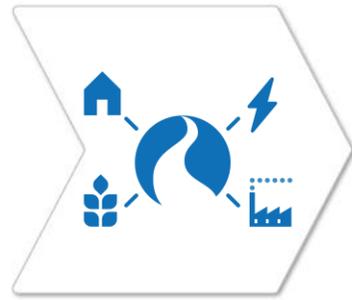
HEM MODELS



- **Generic** **Générique**
- **Site-specific** **Spécifique au site**
- **Objectives** **Objectifs, buts**
- **Optimization** **Optimisation**
- **Simulation** **Simulation**
- **Shared vision** **Vision partagée**
- **Purpose** **Objectif**
- **Applications** **Applications**



GENERIC ?

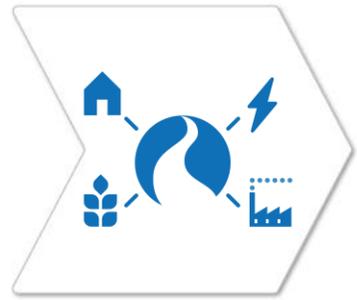


Computer software or programs that can be applied without programming.

Logiciels ou programmes informatiques pouvant être appliqués sans programmation.



GENERIC



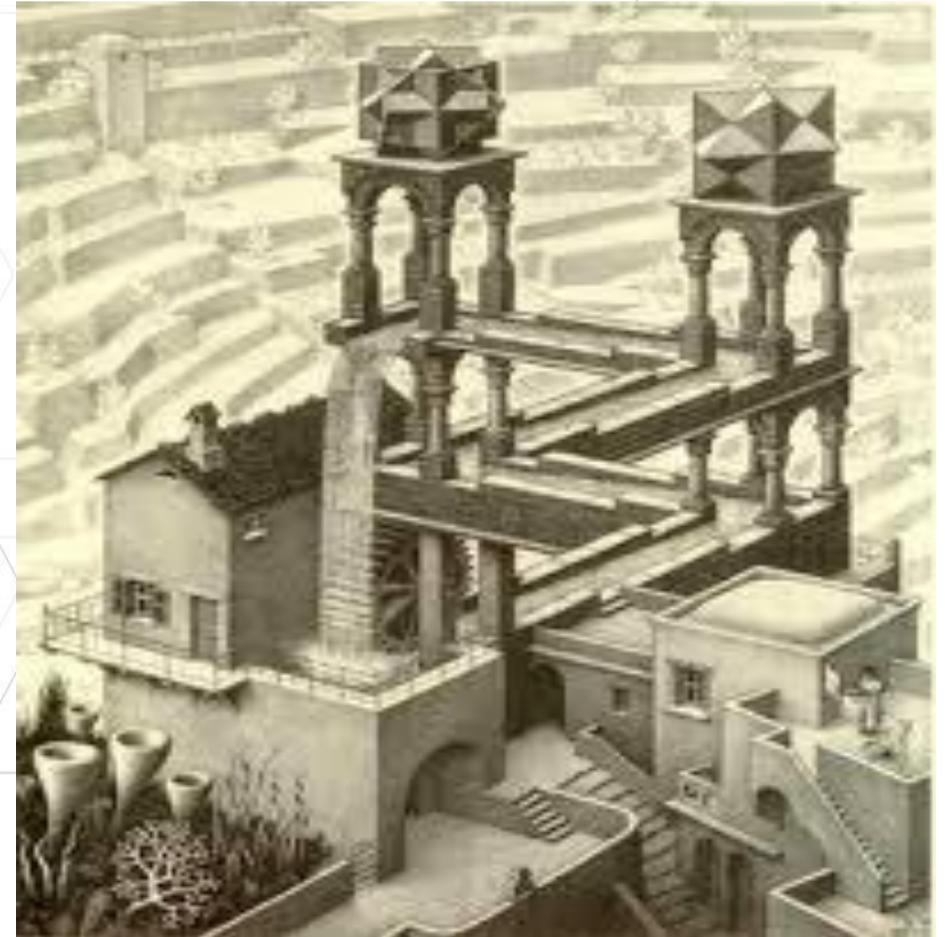
Caution: Prudence

- Transparency

Transparence

- Assumptions?

Hypothèses



GENERIC



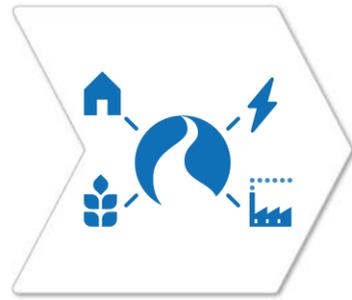
Caution: Prudence

- Training

Formation



GENERIC HEM MODELS - Examples



• Hydrologic Systems. **Systèmes hydrologiques**

- Storm Water Management Model (SWMM) USEPA's
- RiverWare CADSWES.Colorado.edu
- WEAP ("Water Evaluation And Planning" system) SEI
- MODSIM-DSS Colorado State University
- RIBASIM (River BASin SIMulation) Deltares
- MIKE HYDRO Basin DHI
- ResSim HEC USACE
- AQUATOOL Universitat Politècnica de València

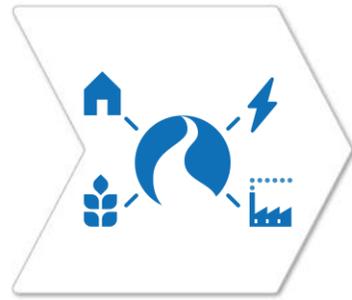


Figure 3. Africa's 63 International River Basins (UNEP, 2002)

• Groundwater Systems. **Systèmes d'eaux souterraines**

- MODFLOW USGS
- FEFLOW DHI

GENERIC HEM MODELS - Examples

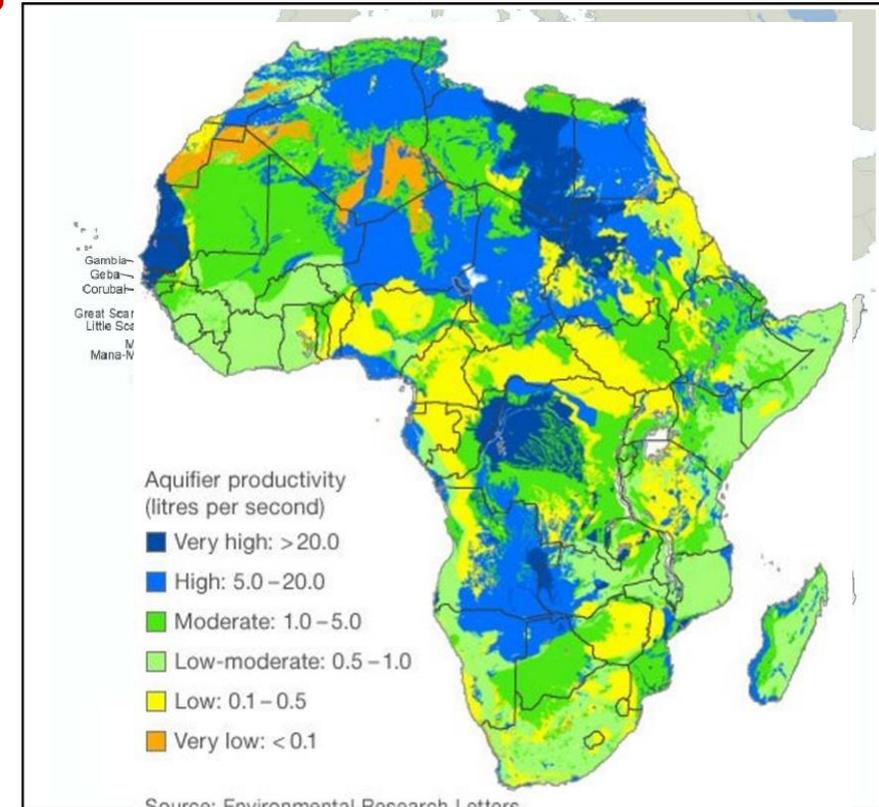


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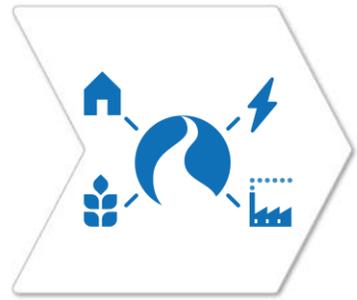
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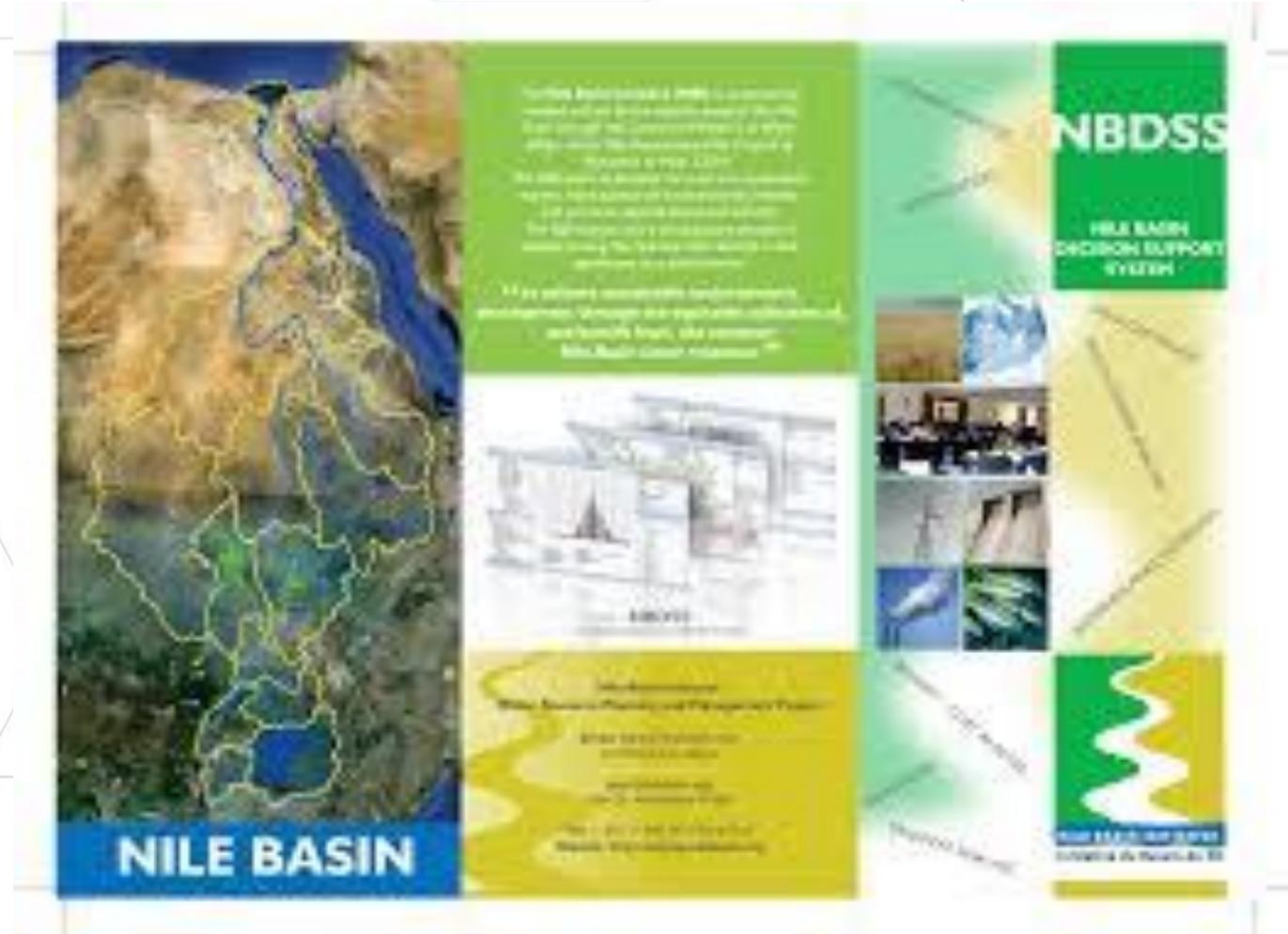
Source: Environmental Research Letters
Figure 3. Africa's 65 international river basins (UNEP, 2002)

SITE-SPECIFIC HEM

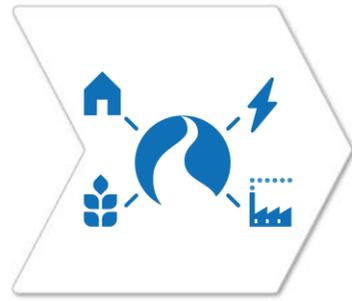


Example:

Nile Basin DSS



SITE-SPECIFIC HEM



Caution: Prudence

- Trust – Acceptance

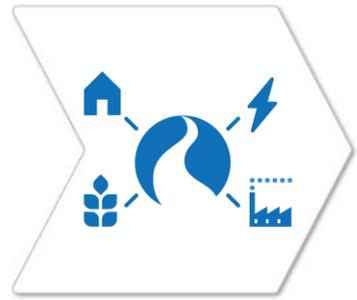
Confiance - Acceptation

- Assumptions?

Hypothèses



MODEL OBJECTIVES

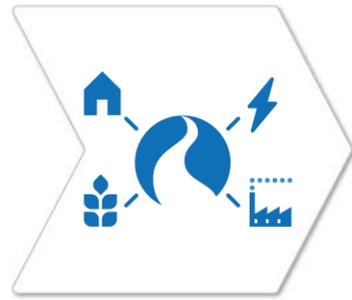


Performance indicators. Des indicateurs de performance

- **physical,** physique
- **economic,** économique
- **ecological,** écologique
- **Environmental** environnemental
- **human health,** santé humaine
- **social.** social



OPTIMIZATION - SIMULATION



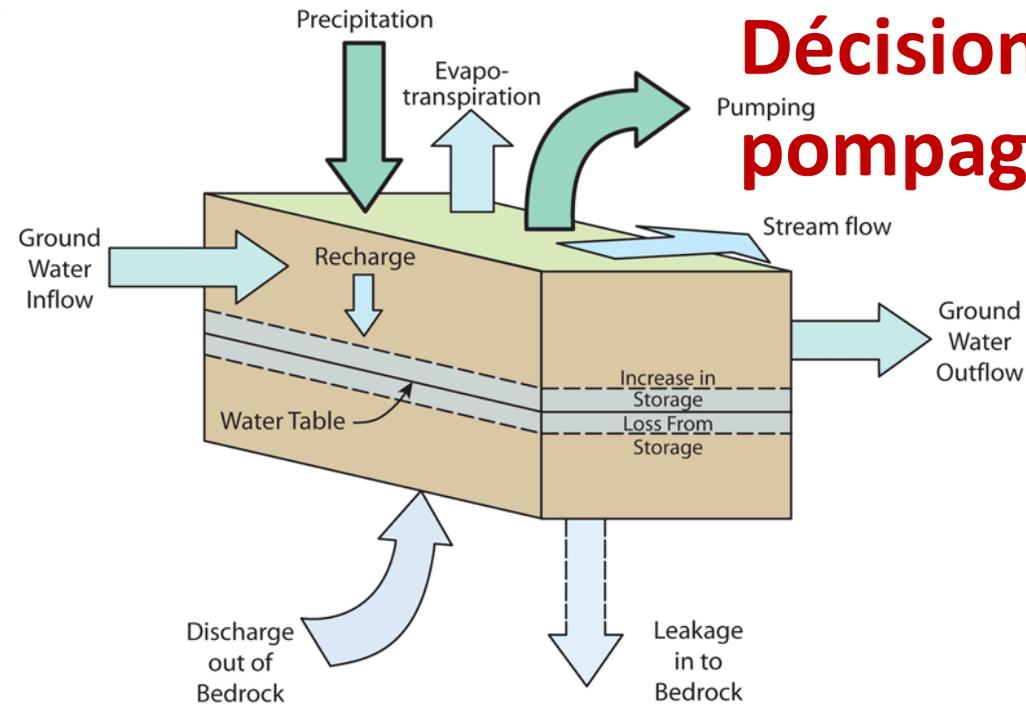
Decisions:

- “What if?”

"Et qu'est-ce qui se passerait si?"

- “What should?”

"Qu'est-ce qui devrait être fait?"

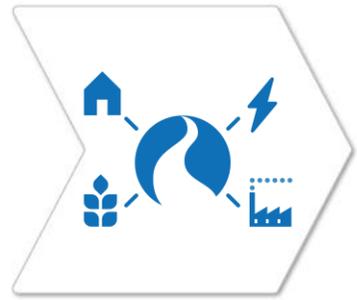


Pumping Decision:

Décision de pompage:

Pumping

SHARED VISION

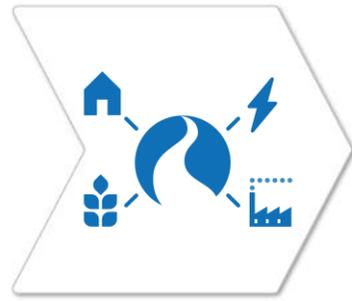


Stakeholder Involvement.

**Implication des parties
prenantes**

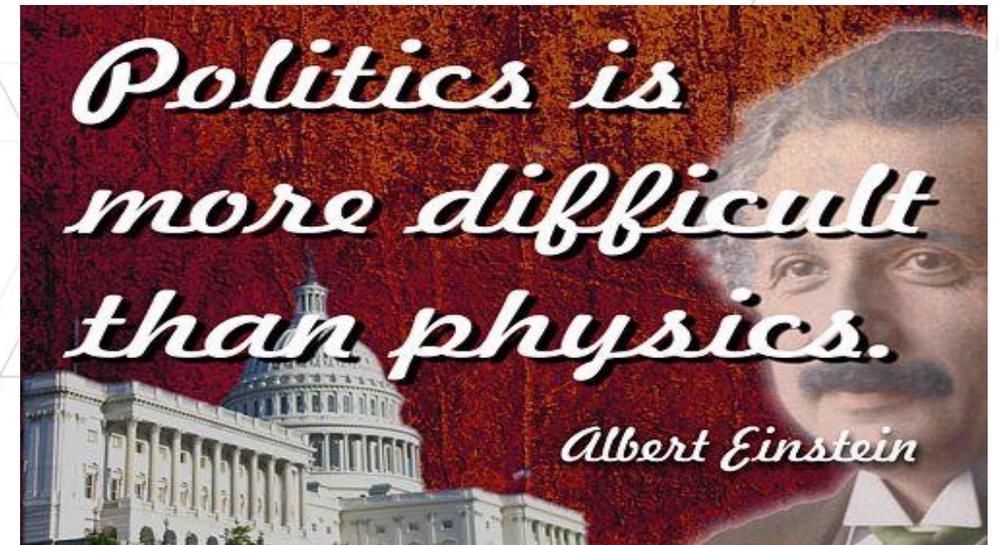


WHY HYDRO-ECONOMIC MODELS ? POURQUOI?



- Informing a political decision making process.
- Apporter des renseignements à un processus de prise de décision politique.

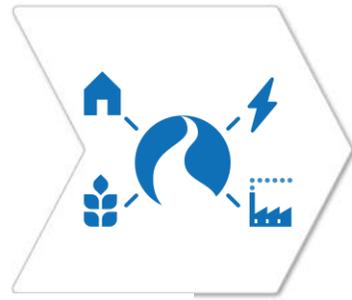
La politique est plus difficile que la physique



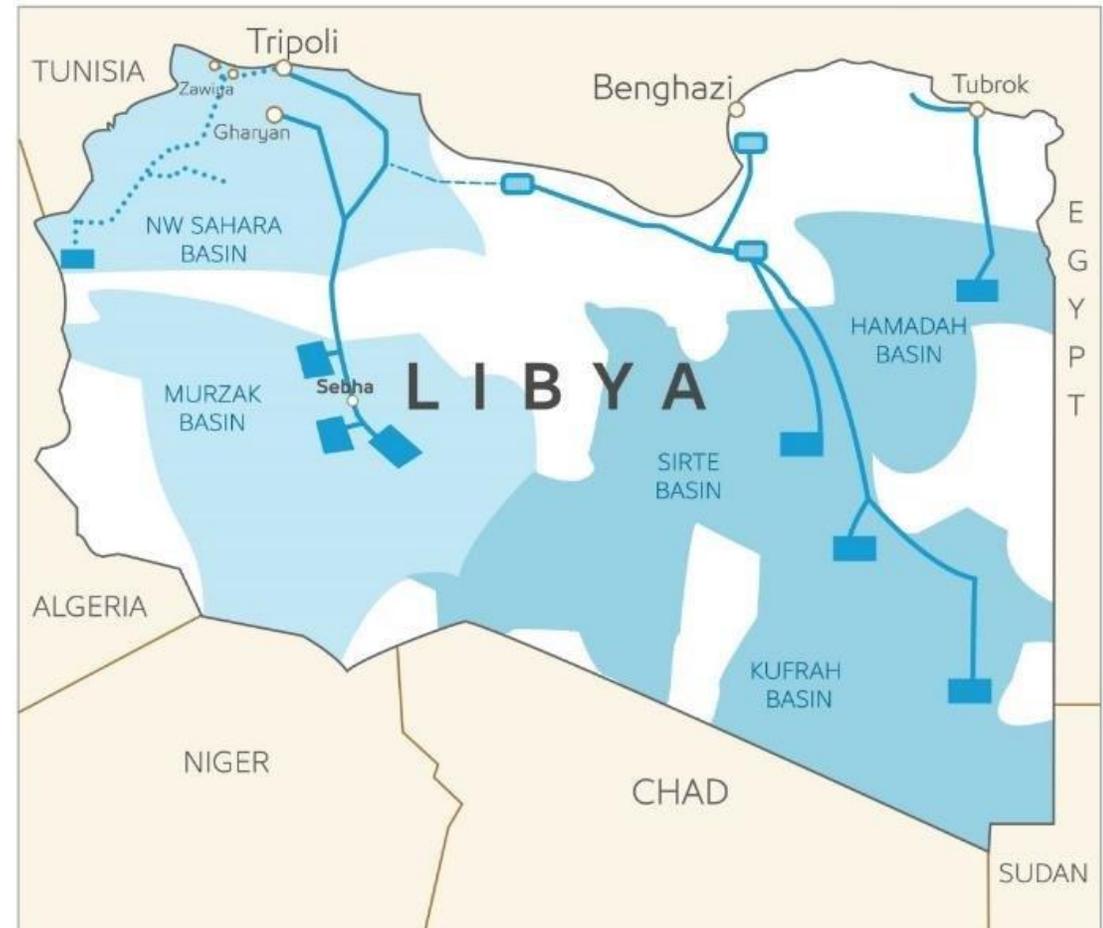
HYDRO-ECONOMIC MODELS - Applications



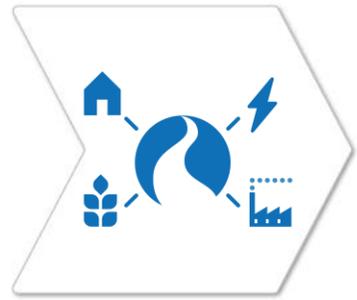
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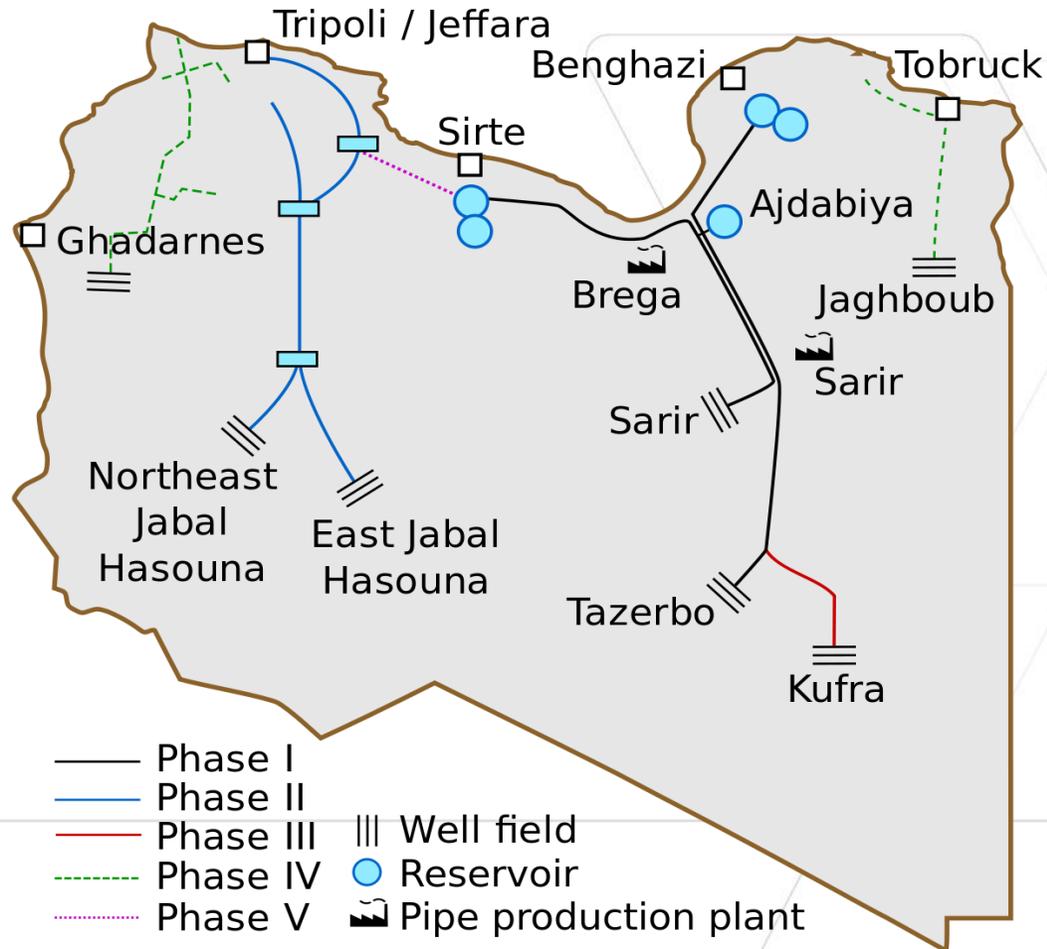
Libya GMMR **Libye grande rivière**



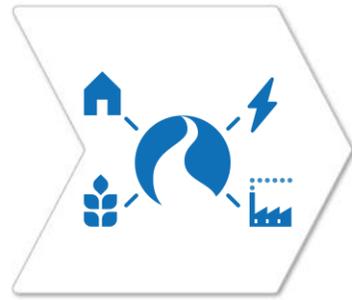
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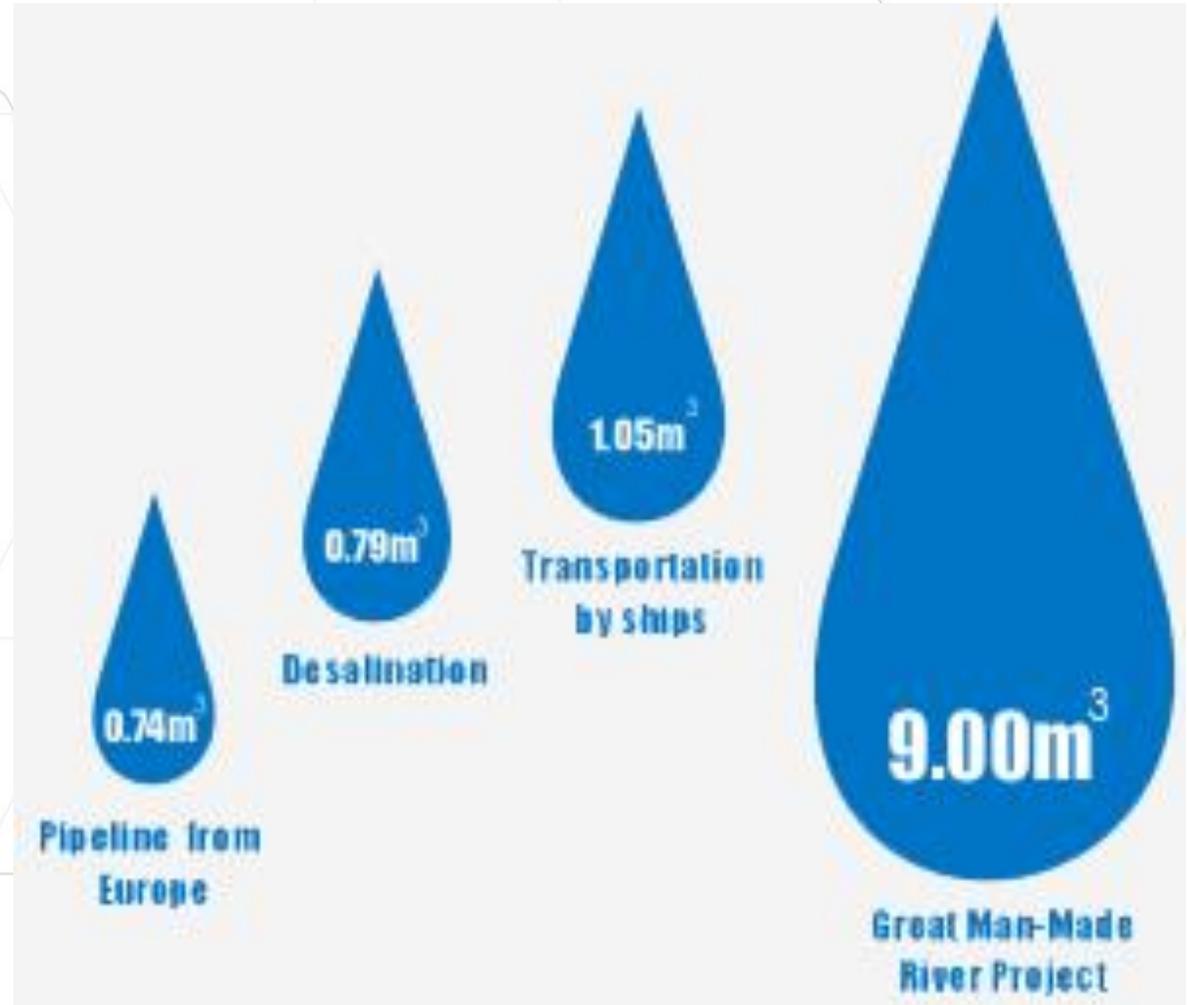
Libya GMMR



HYDRO-ECONOMIC MODELS - Applications



Libya GMMR



HYDRO-ECONOMIC MODELS - Applications



Algeria *la sécurité alimentaire*



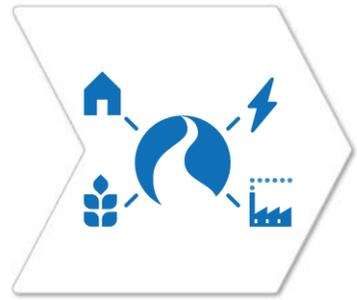
HYDRO-ECONOMIC MODELS - Applications



Algeria



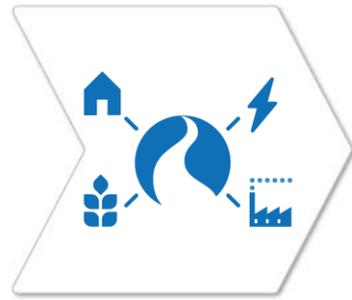
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Algeria

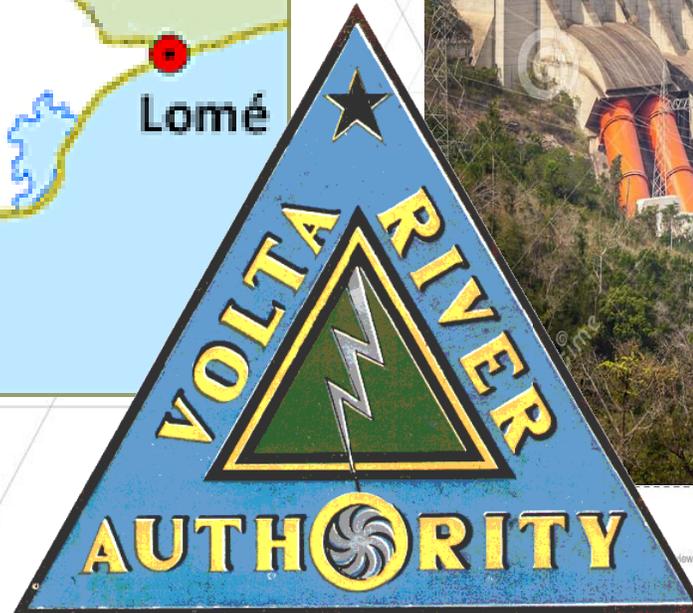
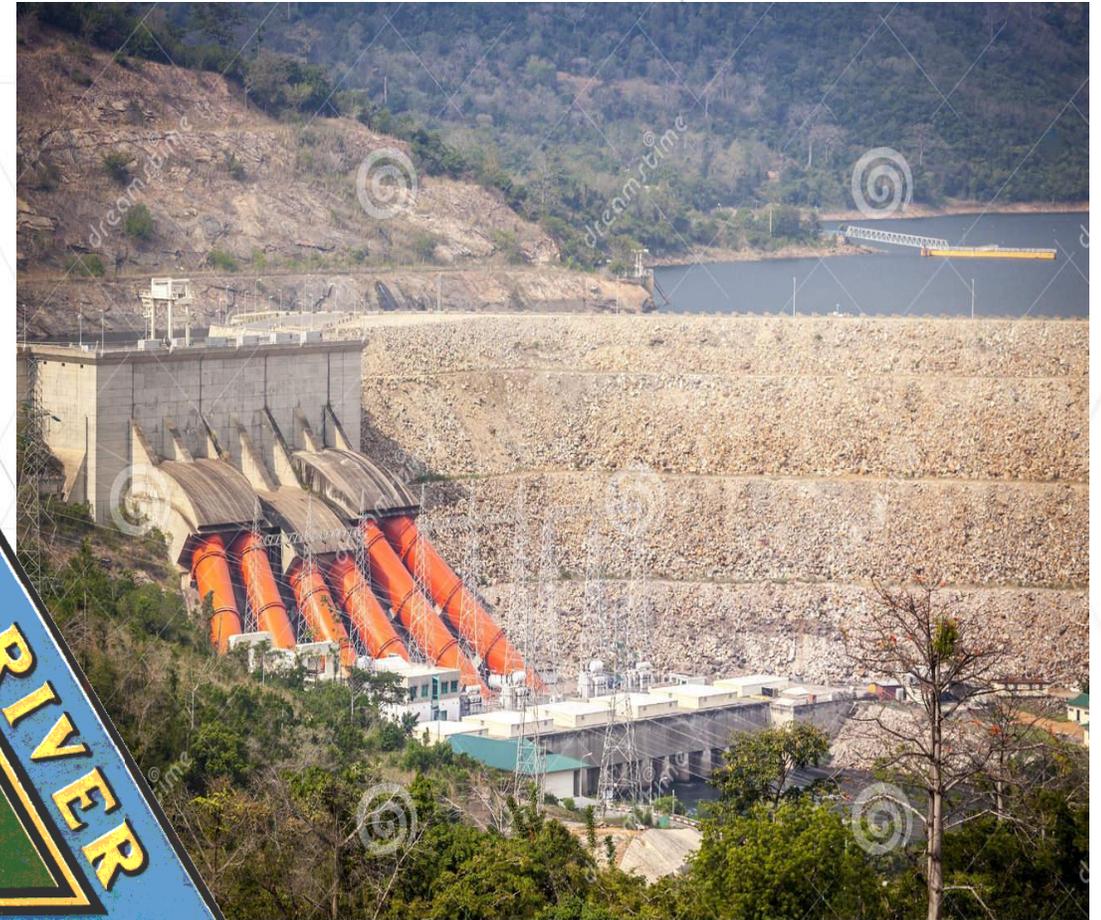


HYDRO-ECONOMIC MODELS - Applications



Volta Dam Reoperation, Ghana

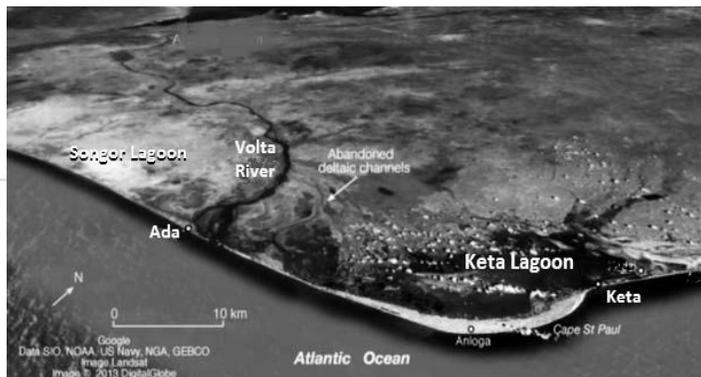
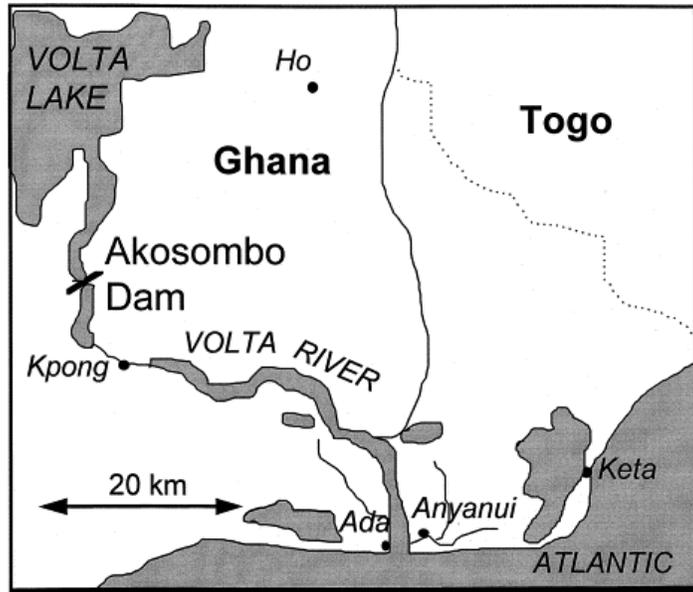
Rivière et estuaire de la Volta



HYDRO-ECONOMIC MODELS - Applications



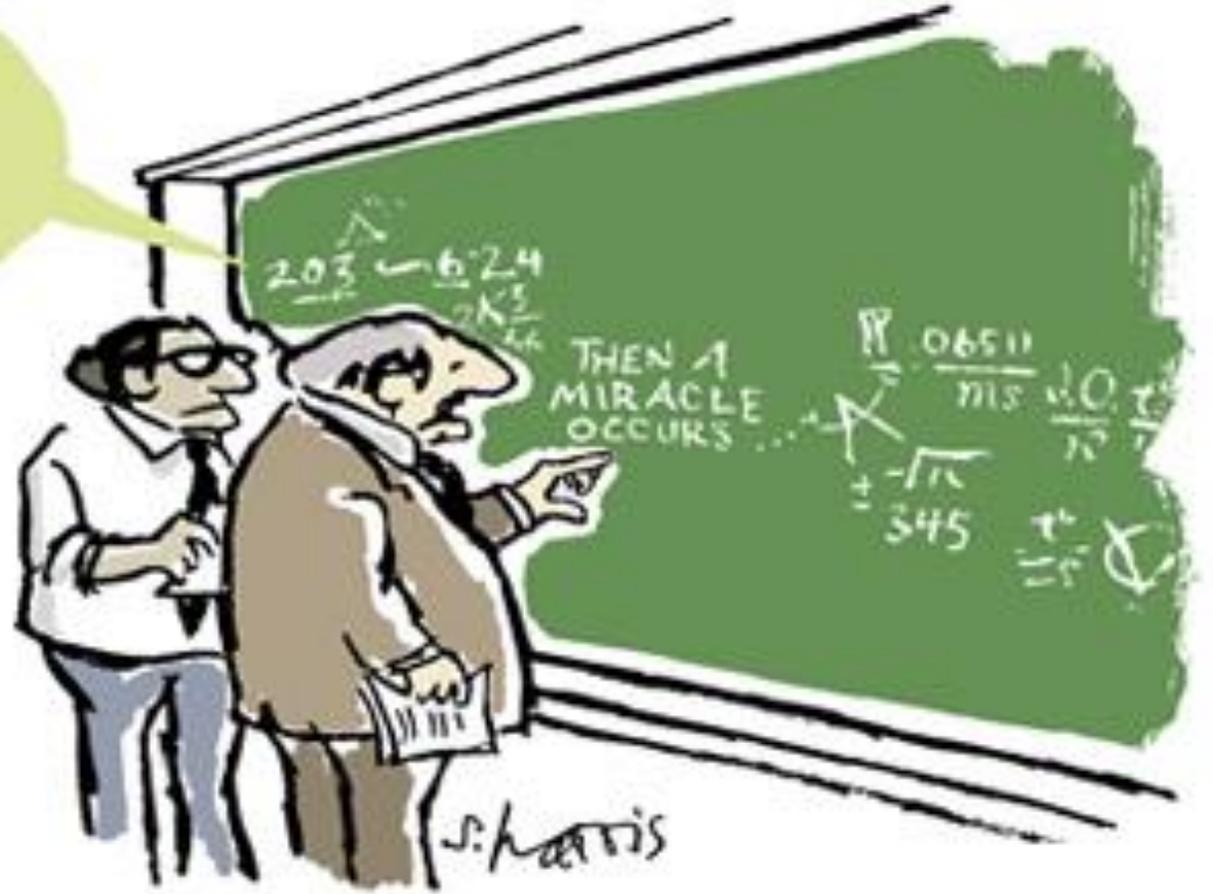
Volta River and Estuary



HYDRO-ECONOMIC MODELS - Conclusion



I THINK YOU SHOULD BE MORE SPECIFIC HERE IN STEP TWO



Models change over time

Les modèles changent avec le temps



HYDRO-ECONOMIC MODELS - Conclusion



“All models are wrong, but some are useful.”

George Box

**Tous les modèles sont faux,
mais certains sont utiles**

MERCI

THANK YOU



Food and Agriculture Organization
of the United Nations



HYDRO-ECONOMIC MODELS

IMPLEMENTATION

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ITALIAN AGENCY
FOR DEVELOPMENT
COOPERATION