ACEQUIAS AND THE FUTURE OF RESILIENCE IN GLOBAL PERSPECTIVE
Las Cruces, New Mexico

Is the crafting of self-governing irrigation institutions in the XXth century following Elinor Ostrom’s principles still relevant in the beginning of the XXI Century?

Thierry Ruf
IRD Umr GRED
Montpellier - France
Dossier « Le champ des commons en question : perspectives croisées » - Le façonnage des institutions d'irrigation au XXe siècle, selon les principes d'Elinor Ostrom, est-il encore pertinent en 2010 ?

Is the crafting of self-governing irrigation institutions in the XXth century following Elinor Ostrom’s principles still relevant in 2010?

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1. Irrigation development - some theoretical frameworks
2. Some case studies
3. What we may learn from the “commons” approach through larger scale in history and experiences in the XXIth century
1. Irrigation development - some theoretical framework

History of irrigation: comparisons all over the world
Five water management paradigms - 1850 - 2000

1. Pre-modern
   - Hydraulic mission

2. Industrial modernity
   - Modernity inspired by the Enlightenment, science, capitalism and the belief that Nature could be controlled

3. Reflexive modernity
   - The trajectory of reflexive modernity in the North
   - Green movement in the North

4. Trajectory of reflexive modernity in the North

5. Old water users' communities...

Source: Allan 2000
"Oriental Despotism"
Karl Wittfogel, 1957

Crafting institutions for self-governing irrigation systems
ICI Oress, Institute for contemporary studies,
San Francisco, 111p.

Global Water partnership literature
Since 1992
(Without main author)

Dublin-Rio Principles

Principle 1
Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
Hydraulic centralism

Six Principles

W1: The hydraulic authorities are despotic forces
W2: The environment of the hydraulic society means cooperation and authority
W3: The hydraulic agriculture has an absolute superiority
W4: The State is stronger than the society
W5: The despotic Power is absolute and not benefactor
W6: Total terror, total submission, total solitude
Neoliberal principles

Four Principles

NP1: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

NP2: Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

NP3: Women play a central part in the provision, management and safeguarding of water.

NP4: Water is a public good and has a social and economic value in all its competing uses.
Crafting the commons

Eight Principles

O1: Clear and defined limits
O2: Proportional advantage in regards of the collective efforts
O3: Procedures to make collective choices
O4: Supervision and watchfulness
O5: Differentiated and gradual sanctions
O6: Conflict resolution mechanisms
O7: Recognition by the State the right to organize
O8: Multilevel systems

Case analysis tools, used as an universal framework but there are also some limits and some improvements
Going forward… In 2010 the scientific community of Montpellier received Elinor Ostrom, nobel price 2009 of economy for her work on the commons… and particularly on irrigation communities.
Number of water users’ communities in the region of Montpellier

Commons
in some parts
and others institutions, public or private ones, in others parts
Going forward… a theoretical model of development of schemes in a river basin

Mega-basin
Meso basin
Local basin
Going forward… a theoretical model of development of schemes in a river basin.

First users
First populations
Going forward... a theoretical model of development of schemes in a river basin

Economic increase
Social development
... With arbitrage for Using lands and Kinds of water
Going forward… a theoretical model of development of schemes in a river basin

An industrial development
And an institutionnal renovation
Linked to the urban increase
Going forward…
a theoretical model of
development of schemes in a river basin

Diversity of Local Systems of resources and management
Going forward…
a theoretical model of development of schemes in a river basin

And pressures
On the resources
And promotion
Of huge transfer
Of water between
From « looser » Basins
To « Winner » basins
Going forward…working on conflicts and crisis

Global Irrigation Management Problems

Crisis

- Water scarcity
- Failures in sustainability
- Environmental problems and others users

Institutional Conflicts

State perspective
- Policy reforms
- Bureaucracy
- Old hydraulic history

Local Users’ Community
- Local democracy
- New users

Market influences
- New technologies
- Globalization
## Coexistence of several crisis in the beginning of the 21th Century (and links between them)

### Comparison of the three great types of Management of the irrigation in the world

<table>
<thead>
<tr>
<th>Type</th>
<th>Administrative Management by the State</th>
<th>Community Management</th>
<th>Industrial and Private Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water rights</td>
<td>water rights not clearly defined, sometimes precarious Land rights.</td>
<td>designed water rights for members of the community of irrigators</td>
<td>water rights abolished or without object, water considered as a tradable good</td>
</tr>
<tr>
<td>Payment of the water</td>
<td>fees by hectare (sometimes, share fixes crop) or indirect payment of the water through the economy of the State</td>
<td>contributions by quotas in money or in work (conditions of the exercise of water rights)</td>
<td>payment by free subscription and consumption</td>
</tr>
<tr>
<td>Regular problematics</td>
<td>bureaucratic and financial crisis</td>
<td>gap between rules and practices</td>
<td>accelerated economic and social stratification, exclusion of the poorest</td>
</tr>
<tr>
<td>Current dynamics</td>
<td>experience of participatory management of the irrigation</td>
<td>needs to renew local institutions</td>
<td>risks of regression of irrigation (by lack of subscription)</td>
</tr>
</tbody>
</table>
Going forward: research on Water management and archives of communities (a still useful argument in water debates in France)
From archives in field conditions to the historical writers on the three main models of water management

ex: Latin agronomists water for the *roman Villa* (besides the urban needs)
Ex: Arabic water and agriculture knowledge for villages development
VOLVO EN ESPAGNE,

MÉMOIRE SUR
LES COURS D'EAU ET
LES CANAUX D'ARROSAGE DES PYRÉNÉES-ORIENTALES,

PAR M. JAUBERT DE PASSA,
Counselor of the Prefecture of the Pyrenees-Orientales

PRÉCÉDÉ
DE UN RAPPORT FAIT SUR CE MÉMOIRE, À LA SOCIÉTÉ ROYALE ET CENTRALE D'AGRICULTURE,

PAR UNE COMMISSION COMPOSÉE DE MM. LE CHEVALIER CHALAN, LE BARON DE CHABEAU, LE COMTE DE DURAS, LE BARON PETIT DE BEAUVERGER, LE CHEVALIER TISSOT, YVART, ET LE VICOMTE HÉRÉCART DE TAURY, RAPPORTEUR.

PARIS,
CHEZ MADAME HUZARD, LIBRAIRE,

JANVIER 1851.

A PARIS,
DE L'IMPRIMERIE DE MADAME HUZARD,
(Rue de l'Épicerie-Saint-André-des-Arts, n° 7.

JANVIER 1851.

FRANÇOIS-JAUBERT DE PASSA

UN VISIONNAIRE DE CHEZ NOUS

"l'irrigation est une pratique aussi intéressante dans ses effets que volatile dans ses causes."
William Tatham (End of 18th Century)

An atypical English engineer fighting for American Independence and responsible for irrigation development in Virginia and Carolina… defending communities against State (with the french reference to Cevennes moutains and irrigators communities).

French version published in Paris in 1803 of:
National irrigation or, The various methods of watering meadows; affording means to increase the population, wealth, and revenue of the kingdom, by an agricultural, commercial and general economy in the use of water.
Published 1801 by Printed for J. and T. Carpenter in London
going forward with a model of relationships and interdependence

SOCIAL COMPROMISE between sectors

"Public" "Private" "Communitary"

Rural Communities

Local Collectivities

intermediates sectors

diversity of types of collectivities for resources management (territorial, social, economic)

Equity (Labour, access to resources)

Efficiency (Capital, maintenance)

Planning axis

Privative axis

diversity of local administrations, of visions on resources management, relating to the public domain (territories, natural resources, political resources)

State Services

Agricultural services

administrative local compromise

fiscal services

environment services

democratic axis

Administrative local compromise

private holdings in water sector

Traders inputs and products

local interest compromise

Manufacturers

diversity of economic units and of their influence on resources management (capital, knowledge, labour)

Area of Compromise
2. Some case studies
Répartition des zones sous irrigation dans le monde, 2000

Note: L'irrigation est concentrée dans les zones arides et semi-arides, dans lesquelles elle représente une part considérable des terres d'assolement, et dans les zones intertropicales humides de l'Asie du Sud-Est, où elle permet de passer de une à deux et même parfois à trois récoltes de riz par an.


Zone sous irrigation en pourcentage de terres immergées

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Color</th>
</tr>
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<tbody>
<tr>
<td>0 - 5 %</td>
<td>Light Yellow</td>
</tr>
<tr>
<td>5 - 10 %</td>
<td>Yellow</td>
</tr>
<tr>
<td>10 - 20 %</td>
<td>Orange</td>
</tr>
<tr>
<td>20 - 40 %</td>
<td>Brown</td>
</tr>
<tr>
<td>40 - 100 %</td>
<td>Dark Red</td>
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Légende:
- Données inconnues.
- 0 - 5 %
- 5 - 10 %
- 10 - 20 %
- 20 - 40 %
- 40 - 100 %
Building Land patterns and water tenure
Inventory of irrigated systems of the basin of río Ambato

Agroclimatic levels
Inventory of irrigated systems of the basin of río Ambato

Communities based management systems and State main schemes
Santa Rosa Pilahuín

communities
looking for legitimacy
Tungurahua, Bassin du río Ambato,
archives de Ambato, litiges sur les canaux de la rive gauche
Colonial times (1912-1955), discrimination and control of water management
Levendad

Légende

Nombre de fuits ........................................ 599
Profondeur du fuit initial ................................ 50 m

Longueur en ligne droite du tracé du levendad ........................................ 6300 m environ
Longueur totale ........................................ 6500 m environ

25 septembre 1917
Surface irrigation systems,
inheritance of last centuries
With rewriting water rights in
colonial period
After independance (1955)
The model of the “Grande hydraulique” through State regional agencies
A State vision of a modern water transfer, the « canal de rocade »

- Oued (Rivière)
- Canal Ancien
- Canal moderne
- Barrage
- Ville
Pumping station in Haouz of Marrakech
(map of the ABHT)
Contrasted areas
Cartography
Irrigated zones connected to different schemes
SIFFA
(Margat, 1962)
Schéma simplifié d'une khettara
Water come back!
Note: L'irrigation est concentrée dans les zones arides et semi-arides, dans lesquelles elle représente une part considérable des terres d'assolement, et dans les zones intertropicales humides de l'Asie du Sud-Est, où elle permet de passer de une à deux et même parfois à trois récoltes de riz par an.

Source: Siebert et al., 2005; FAO/Aquastat, 2005.

Zone sous irrigation en pourcentage de terres immergées

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</tr>
</thead>
<tbody>
<tr>
<td>Couleur</td>
<td>&lt;0.1</td>
<td>0.1 - 1</td>
<td>1 - 5</td>
<td>5 - 10</td>
<td>10 - 20</td>
<td>20 - 35</td>
</tr>
</tbody>
</table>
L’étang de Montady
Carte 18e Garipuy 1774
Le relief figuré montre le système d’écoulement des eaux d’une cuvette à l’autre.
Réseau d’assainissement primitif

Interprétation de la carte de 1735
1736 (archives communales)
Thierry Ruf, IRD Supagro IRC
Document de travail
Interprétation de la carte de 1735
1736 (archives communales)
Thierry Ruf, IRD Supagro IRC
Document de travail

- Ruisseaux déversant dans l'étang
- Chemins
- Fossés principaux connus
- Fossés secondaires associés à un ouvrage en amont (périphérie)
- Limites de pointes (et éventuellement fossés de drainage)
- Grand cercle de l'étang (disparu en grande partie)
- Points marqués interprétés comme des ouvrages hydrauliques sur le grand cercle

Montady
Bousquet
Estang de Montady
Estang de Colombiers
Redondel
Soustre
Colombiers
Pech d'Enserune
Canal du Midi
Galerie
Working in cooperation, sharing experiences, and visions: a common construction.
3- What we may learn from the “commons” approach through larger scale in history and experiences in the XXIth century

“Territorial”

“Historical”

“social and institutional”

“agricultural and hydrological”
will allow us to read how systems of irrigation and drainage structure the landscape, and form a network whose meaning is not only technical and hydraulic but also social and political.
describes how these systems have been able to exist according to sequences that are related to cycles of schemes, management and crisis, new foundations, rehabilitation and new organisation.
• opens the ethnographic and socio-anthropological domain, especially important to understand irrigation techniques in the framework of social systems which are characterised by alliance or competition.
1. Water and land management has been long administered by the bureaucratic machine, often inspired by a certain despotism, the State now seeks to alleviate its intervention and recommends participatory processes.

2. Some models of community-based management dominate which include recognition of rights for members of the community. However, the rules for sharing are often contested and the practice tends to bypass them. It is necessary therefore to renew the institutional framework and to construct new common rules.

3. Elsewhere, forms of industrial management are developed, where a powerful operator becomes (by public delegation) a supplier of paid services to clients.
An agricultural systems understanding

- Agricultural systems approach through different levels (multiscales)
- Analysis of individual and collective organisation of production.
- Precisions on Water role in agricultural development.

An integration of knowledge for the actors of a sustainable management of irrigated systems
- Adapted to the different cases studies, especially due to the lack of trusty information, in order to describe water scenarios and events, including scarcity evaluation (a drought each five or ten years) and a water abundance (flood each ten years).
- An evaluation of increasing risks is expected, at least to compare how the water dynamics are defined and the evaluation are used by local actors for taking decisions on water allocation.
Conclusions, issues
1. CONTRADICTORY PRINCIPLES OVER CENTURIES: CENTRALISATION AND SUBSIDIARITY

The first principle: the water belongs to the common patrimony of the nation and, consequently, a balanced and global management has to be set to work so as to conciliate the needs of users, as well as those for natural preservation.

The second principle: subsidiarity stipulates that management of water has to be conducted in a decentralised, consultative and collective framework at the most appropriate level.
2. THE COMMITMENT AND THE DISENGAGEMENT OF THE STATE

This question can really only be understood at the local level! What does disengagement of the State mean if there is no commitment to local institutions – whether they are community institutions or private institutions?
3. THE COMPETITION BETWEEN AND WITHIN PHYSICAL AND SOCIO-POLITICAL BOUNDARIES

The hydraulic world gladly asserts that it produces water in the name of the nation, while the agricultural world asserts that it produces food for the nation. Furthermore, water management is developed within the boundaries of a watershed. Whilst agricultural practices are not confined to similar geographical boundaries.
4. ANTAGONISTIC MEANINGS OF THE "ECONOMY OF WATER"

The collection of money for irrigation water is a point of divergence between the different models. From the point of view of the local actors, the fee is perceived as:

I. a tax when the management model is the bureaucratic state.

II. a cost of production when the management model is private enterprise.

III. a contribution in the exercise of rights when the management model is the irrigation community.
5. DIFFERENCES IN KNOWLEDGE BETWEEN PEASANTS AND ENGINEERS

Engineers base their hydraulic rules on average water years, rather than minimal ones. State agency engineers often perceive the local practices as a "waste" of water, and thus a rhetoric is born based on a misinterpretation of the local rules. This reasoning justifies State appropriation of this "created" water. The state sees an opportunity to allocate the "created" water to new users.
6. CONFUSION OF ROLES MAINTAINED BY LEGAL FRAMEWORKS

Irrigation develops in a context of increasing scarcity of water and land. The consequence is that users have conflicts which must be resolved, and each society has their own criteria for doing so. Too often there is conflation of economic and conflict resolution roles at the higher reaches of administration.
7. THE NEED TO RENEW THE LEGAL FRAMEWORK

General laws have to become less hostile, more useful to community development. They have to allow the recognition of local property rights in resources, and to promote regimes of co-management. Populations have to hold a right of effective participation in the management of the resources on which they depend.
8. INSUFFICIENT ANALYSIS OF THE COLLECTIVE MANAGEMENT OF WATER

We need a better understanding of the economic and social conditions in:

I. the local rural society with its farmer groups;

II. the market with its different agents upstream and downstream of agricultural production, taking non-agricultural activities into account;

local services of public administration, some linked to national political power, others linked to local political forces.
9. THREE WAYS TO AVOID COLLECTIVE ACTION IN WATER MANAGEMENT

The first way is in the ambiguous attitudes of State services that are jealously protecting their own power.

The second way
Community management suffers from the separation of uses that were previously integrated, and also some disengagement of users who get livelihoods outside of community life.

The third way is ruptures in the local trades that are provoked by the widening of the market. Social relationships change and individualism develops.