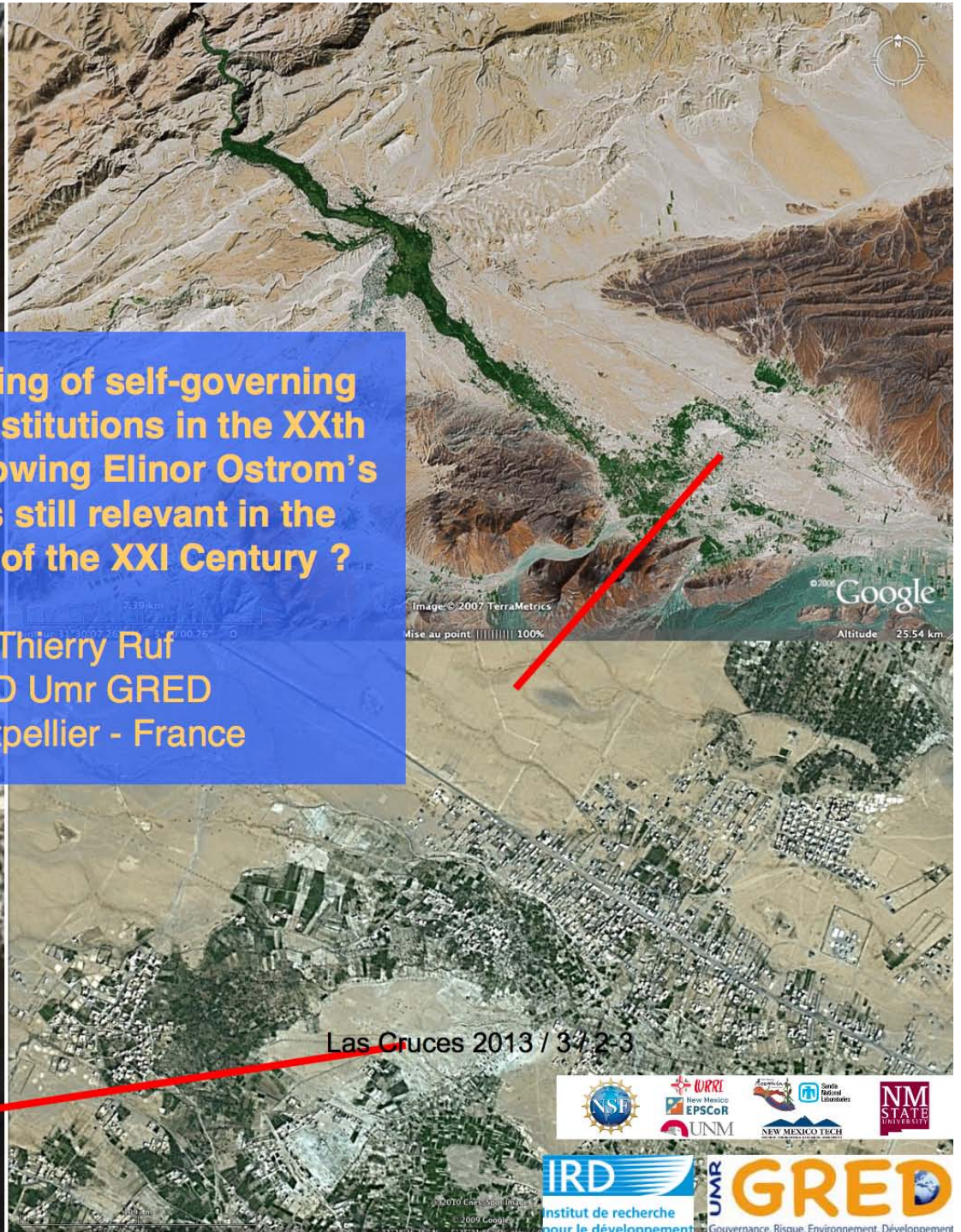


ACEQUIAS AND THE FUTURE OF RESILIENCE IN GLOBAL PERSPECTIVE

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



Las Cruces 2013 / 342-3



Issue	Nat. Sci. Soc. Volume 19, Number 4, octobre-décembre 2011 Dossier « Le champ des <i>commons</i> en question : perspectives croisées »
Page(s)	395 - 404
DOI	http://dx.doi.org/10.1051/nss/2011131
Published online	27 Mars 2012

Natures Sciences Sociétés 19, 395-404 (2011)

Dossier « Le champ des *commons* en question : perspectives croisées » - Le façonnage des institutions d'irrigation au XX^e 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?

Thierry Ruf

Géographe, IRD, UMR GRED, 34394 Montpellier cedex 5, France

Auteur correspondant : thierry.ruf@ird.fr

Reçu : 6 Janvier 2011

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Homepage

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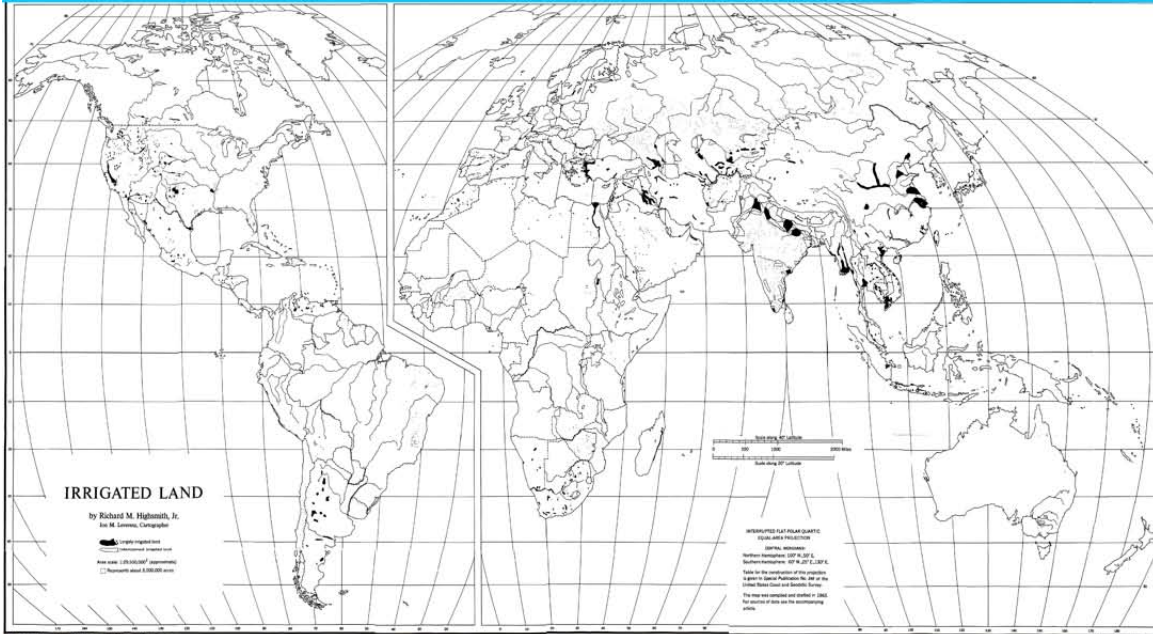
1. Irrigation development - some theoretical frameworks
2. Some case studies
3. What we may learn from the “commons” approach through larger scale in history and experiences in the XXIth century



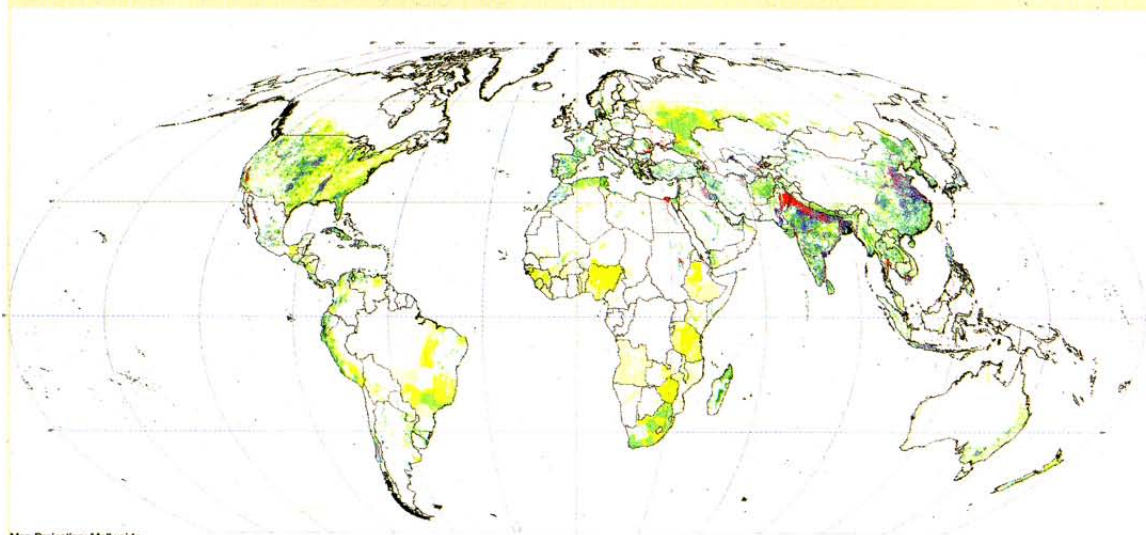
1.

Irrigation development - some theoretical framework

History of irrigation : comparisons all over the world



Répartition des zones sous irrigation dans le monde, 2000



Map Projection: Mollweide



Chine

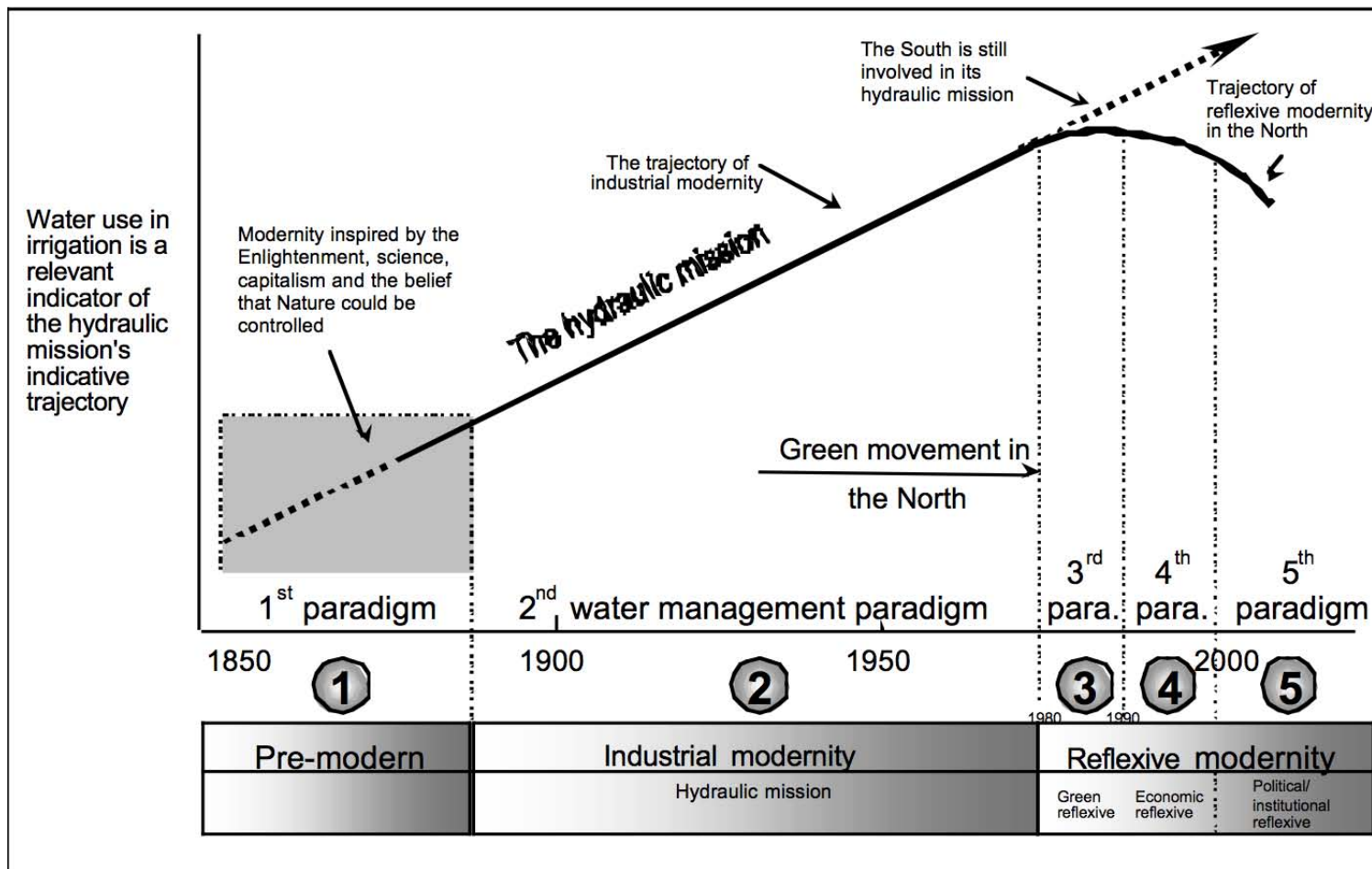


Maroc, Haut Atlas

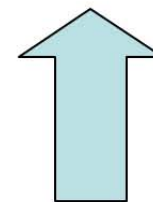




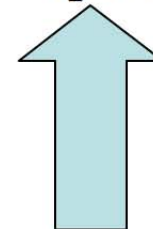
Five water management paradigms- 1850 - 2000



**Integrated
Water Resources
Management ?**



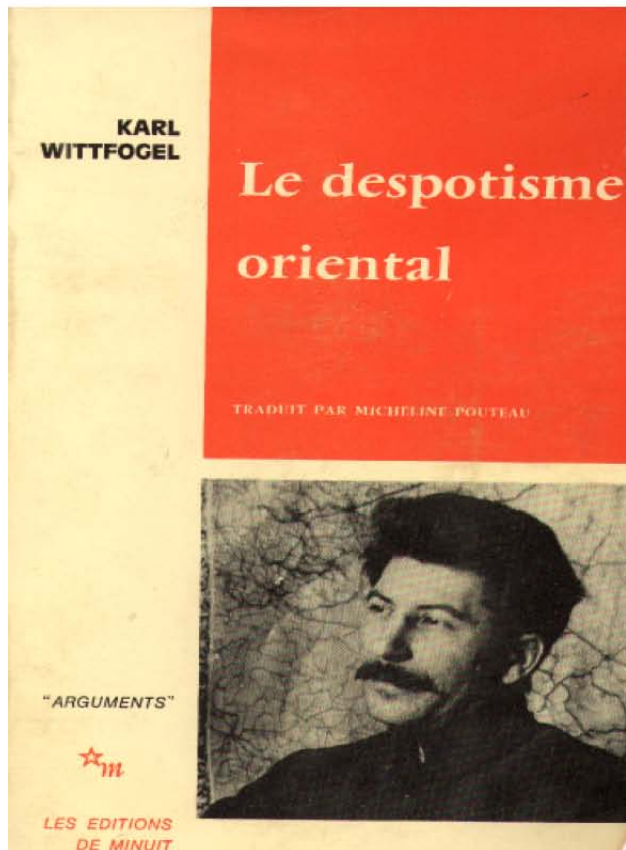
**State hydraulic
epics**



**Old water users'
communities...**

"Oriental Despotism"

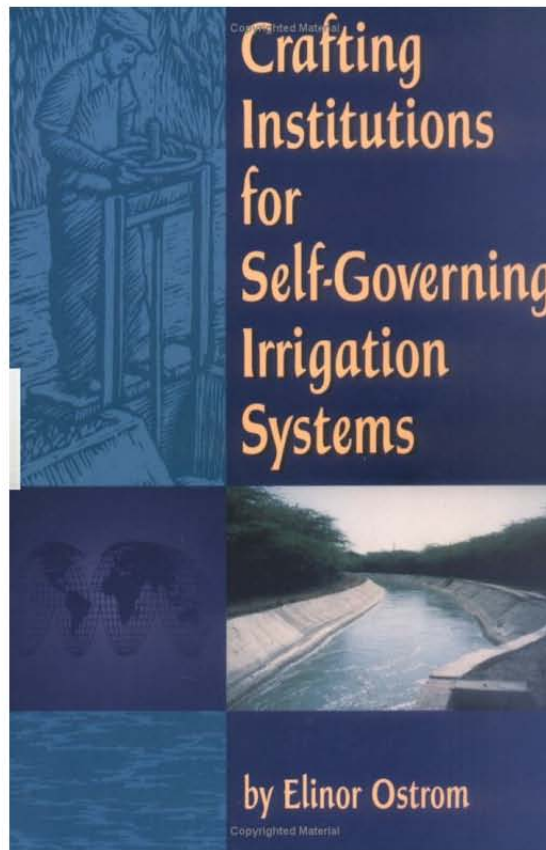
Karl Wittfogel, 1957



Crafting institutions for self-governing irrigation systems

Elinor Ostrom, 1992.

ICI Oress, Institute for
contemporary studies,
San Francisco, 111p.



Global Water partnership literature Since 1992 (Without main author)

Global Water Partnership
Towards a water secure world

English

THE CHALLENGE ABOUT GWP OUR APPROACH GWP IN ACTION GET INV

THE CHALLENGE

- What is Water Security?
- + The Urgency of Water Security
- Water Resources Management
- + What is IWRM?
- Dublin-Rio Principles
- Gender and IWRM
- Key IWRM concepts
- IWRM Pillars
- IWRM Application
- IWRM Components
- + IWRM Resources

Dublin-Rio Principles

Share: f t in

Annual report 2011

GWP in action
2011 Annual Report

IWRM strategies are based on the four Dublin Principles presented at the World Summit in Rio de Janeiro in 1992.

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

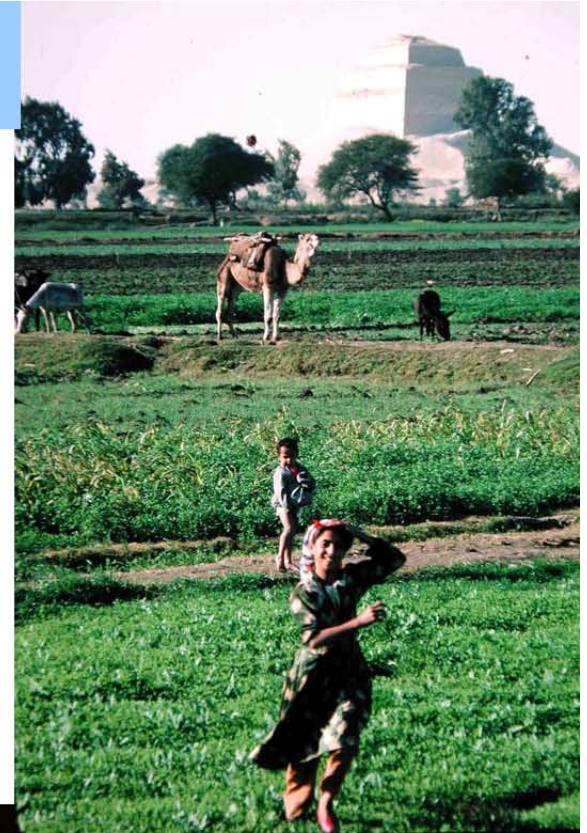
- NP1 : Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
- NP2 : Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.
- NP3 : Women play a central part in the 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: Proporcional 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

- If one need to apprehend strategic behaviors and power relations between actors, shouldn't we cross SES aggregate analysis with more comprehensive, actor-oriented approach of natural resources management?
- How to make choices to define the set of variables "outcomes" of a given SES?
- How can we discuss alternative framework that have been developed over time with regard to the "SES analysis framework"?
- How not to juxtapose results from various disciplines but really melt them to produce a genuine analysis of a given SES?

Agropolis
auditorium

AGRO



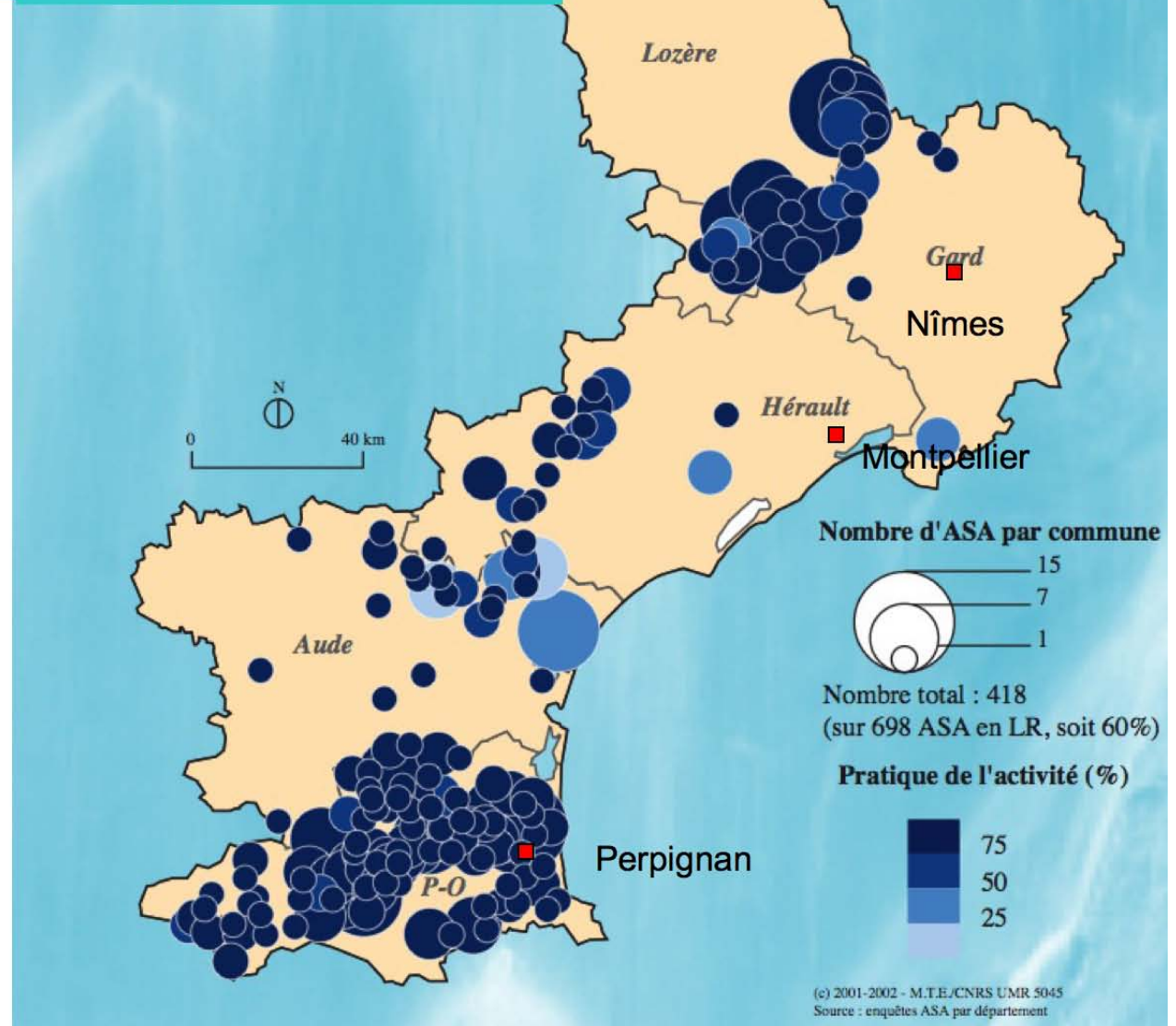
Water traditional institutions in Languedoc Roussillon

Number of water users' communities in the region of Montpellier

Commons

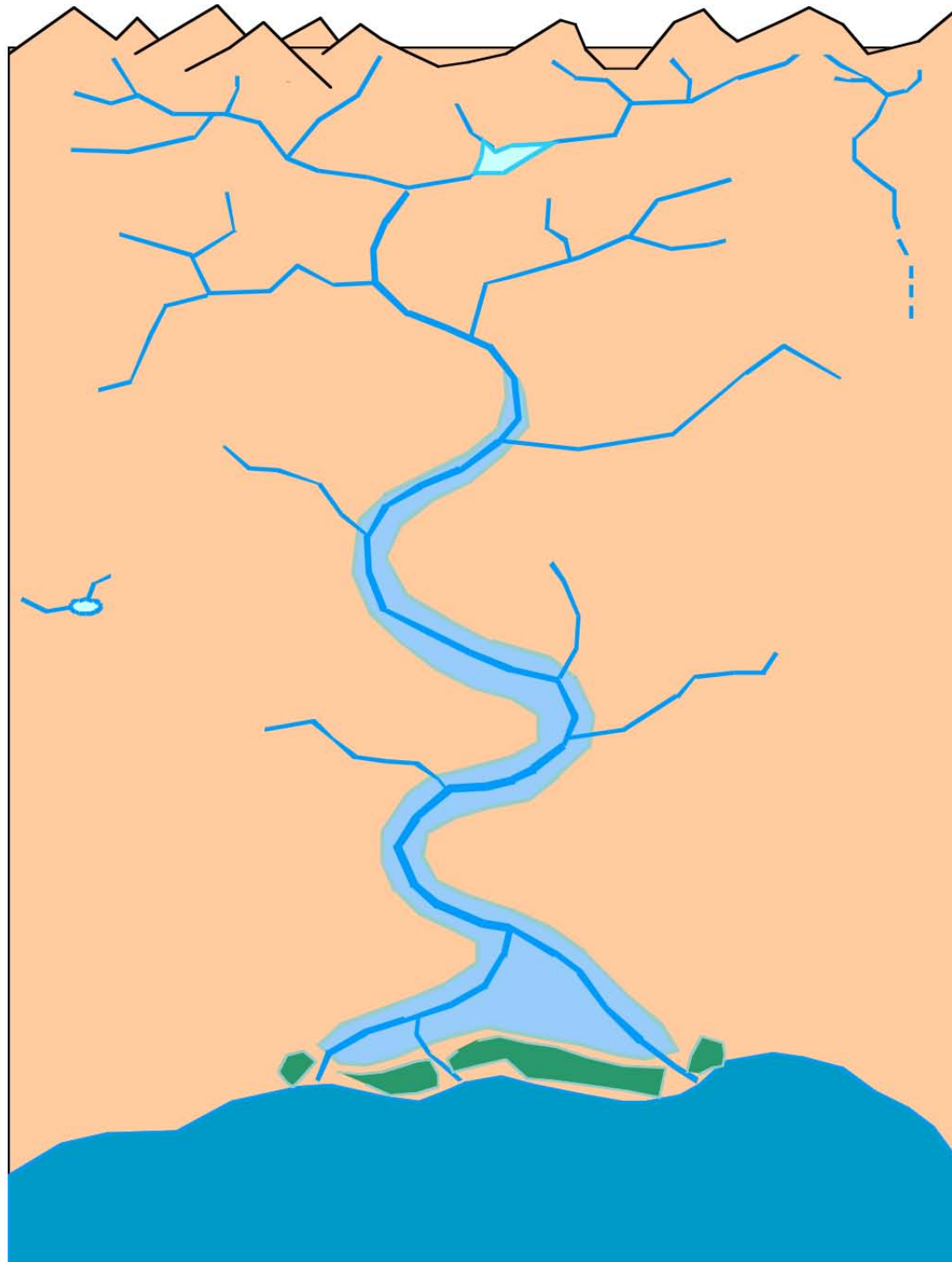
in some parts

and others institutions,
public or private ones,
in others parts

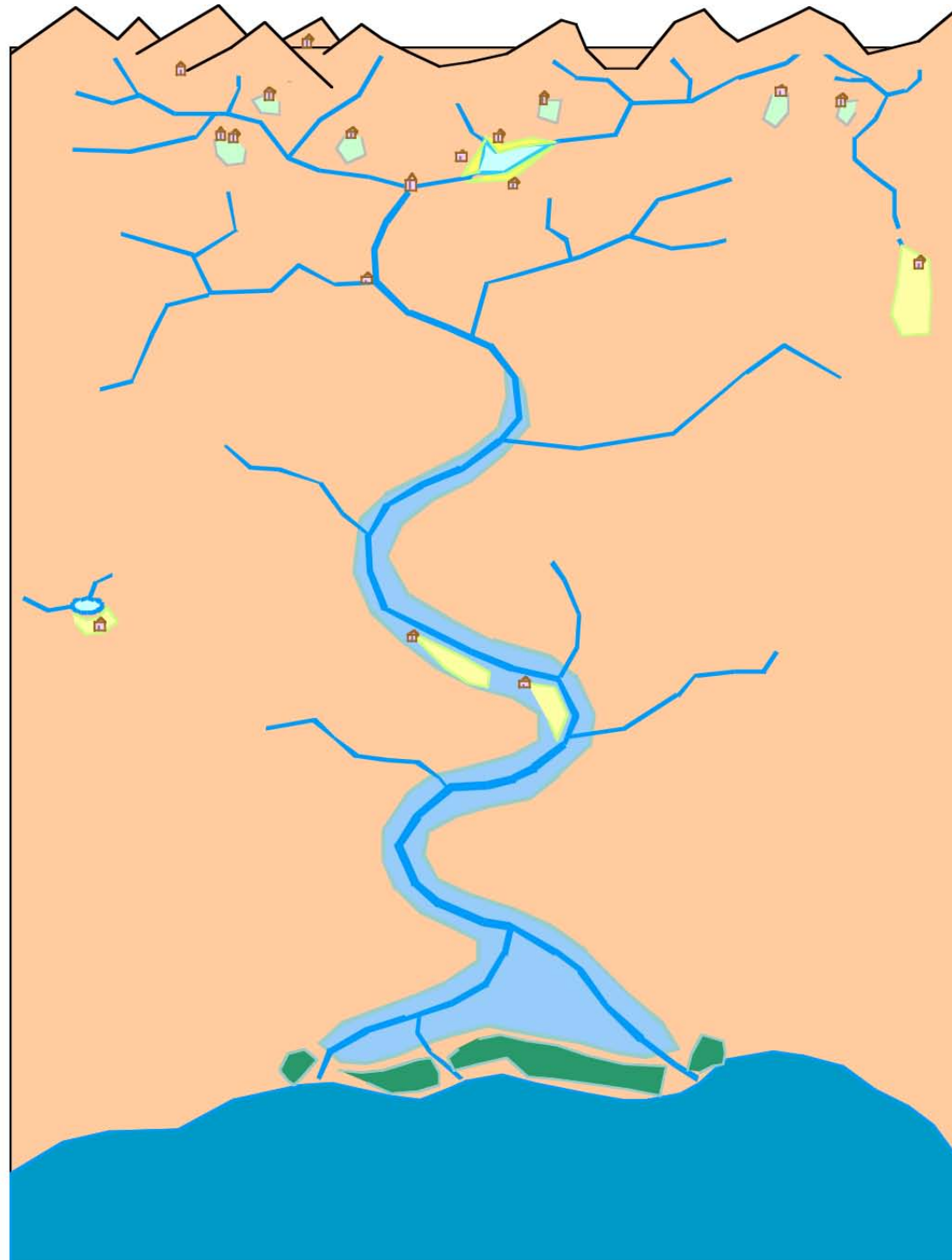


Going forward...
a theoretical
model of
development of
schemes in a
river basin

Mega-basin
Meso basin
Local basin



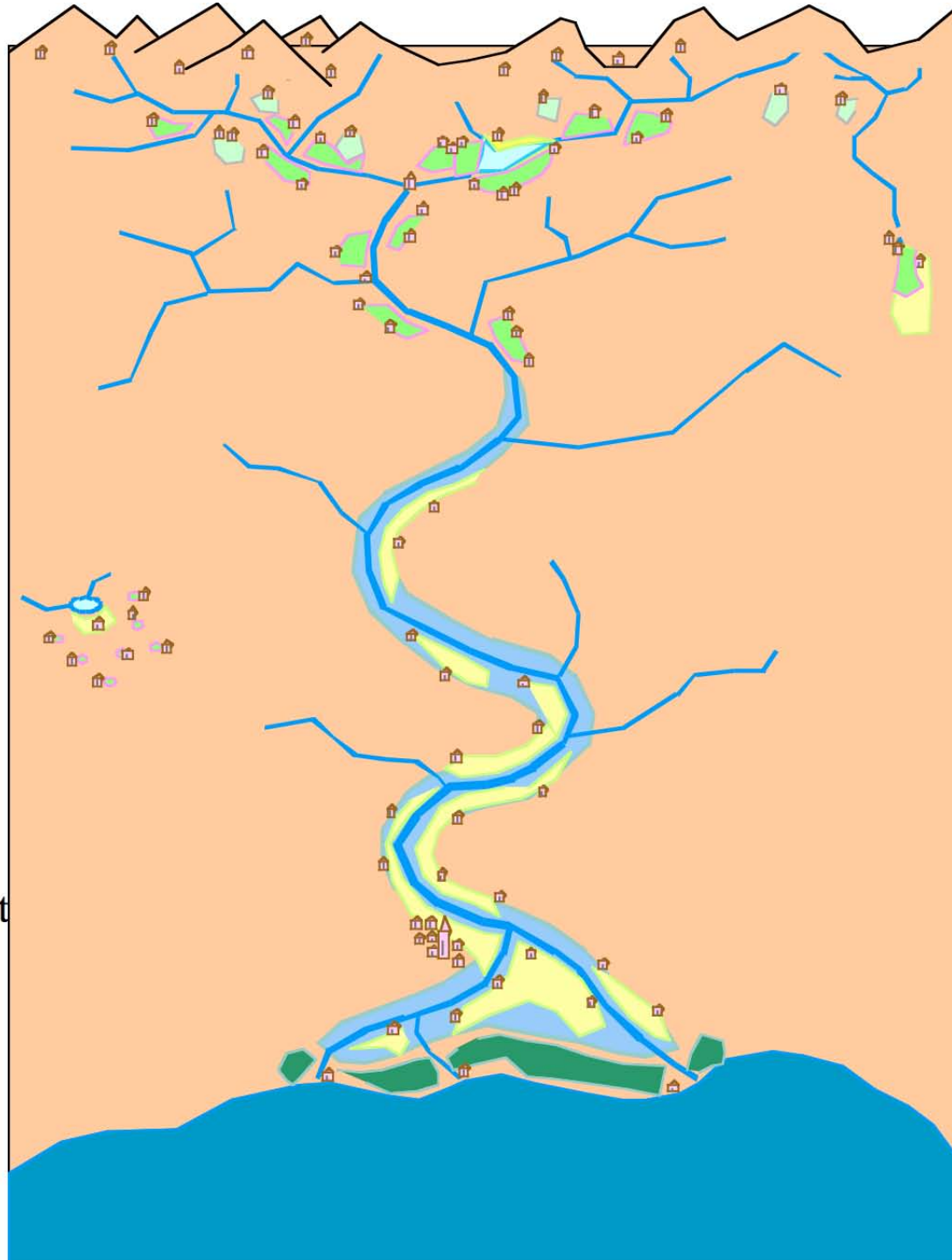
Going forward...
a theoretical
model of
development of
schemes in a
river basin



First users

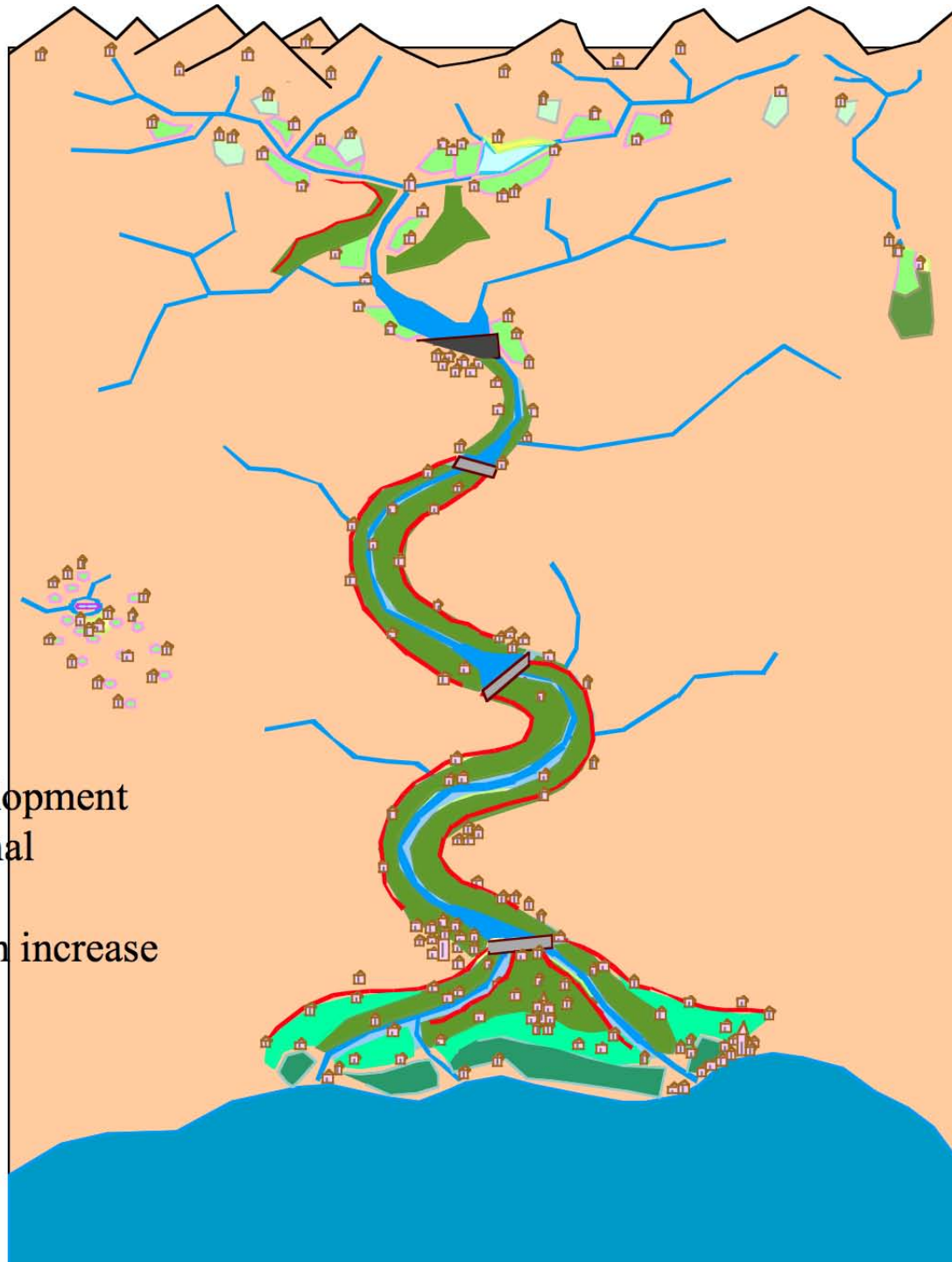
First populations

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

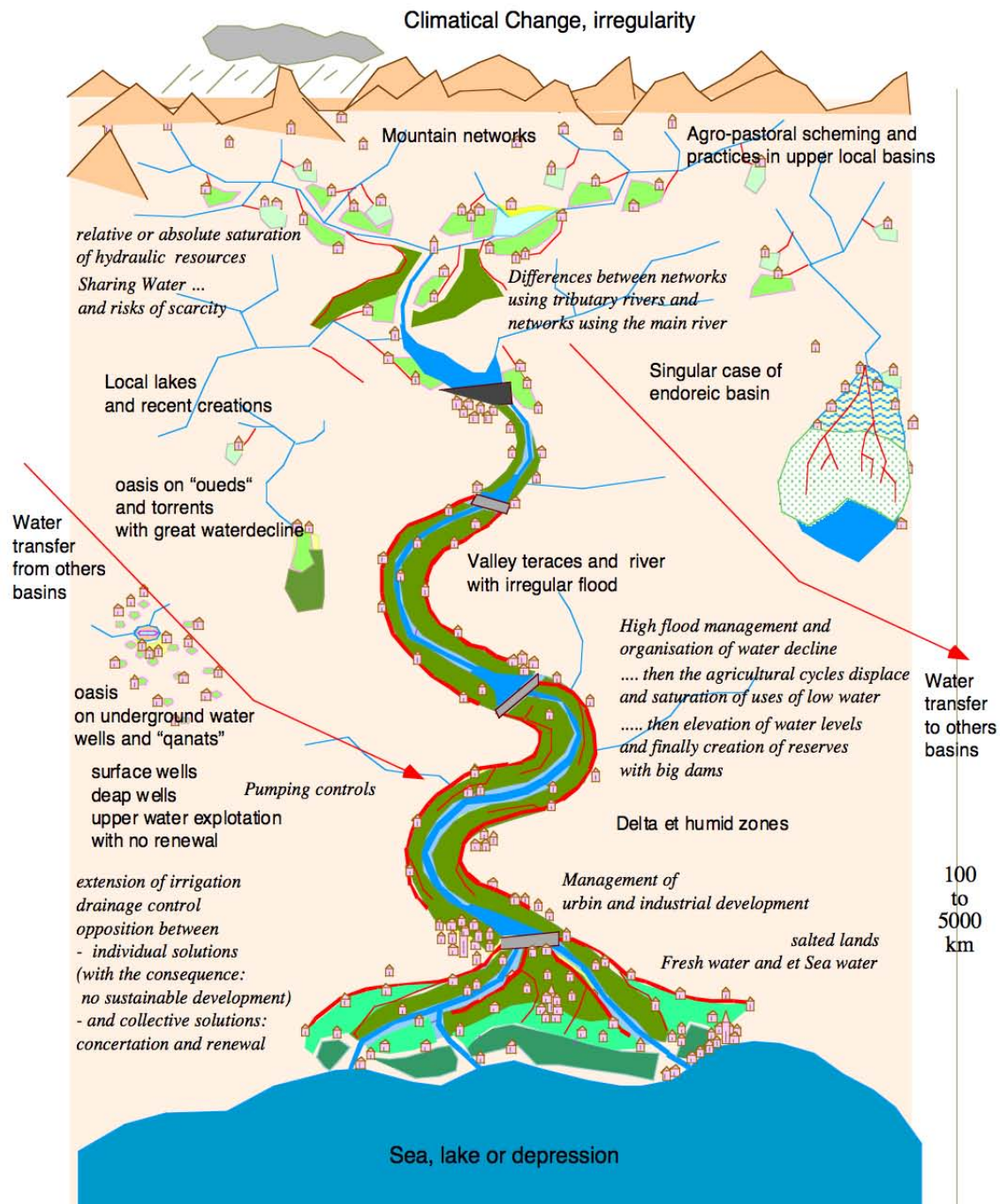


An industrial development
And an institutional
renovation
Linked to the urban increase

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

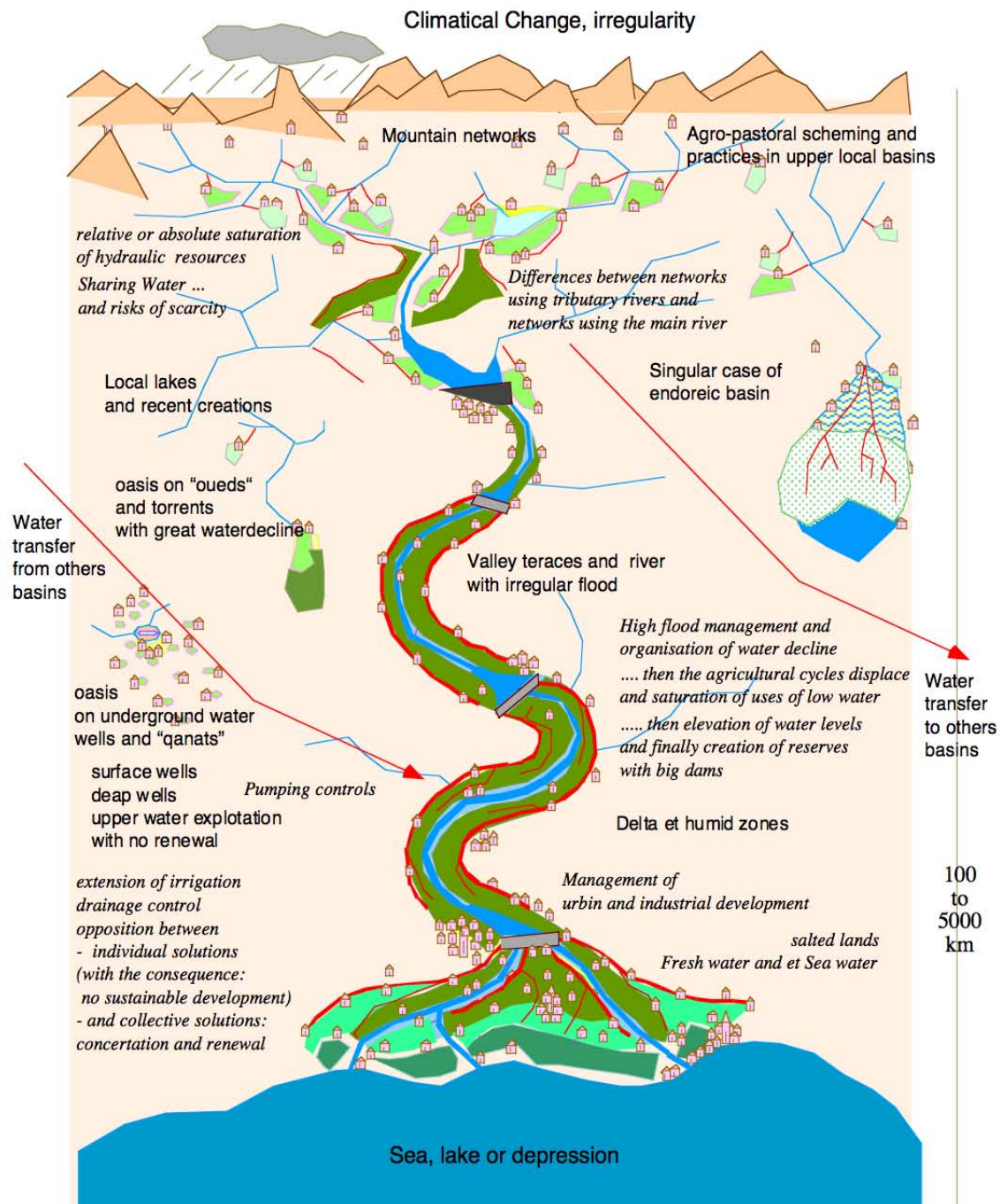
Diversity of
Local Systems
of resources
and management

General representation of water management in a basin approach
and differences of the issues upstream-downstream



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

General representation of water management in a basin approach
and differences of the issues upstream-downstream

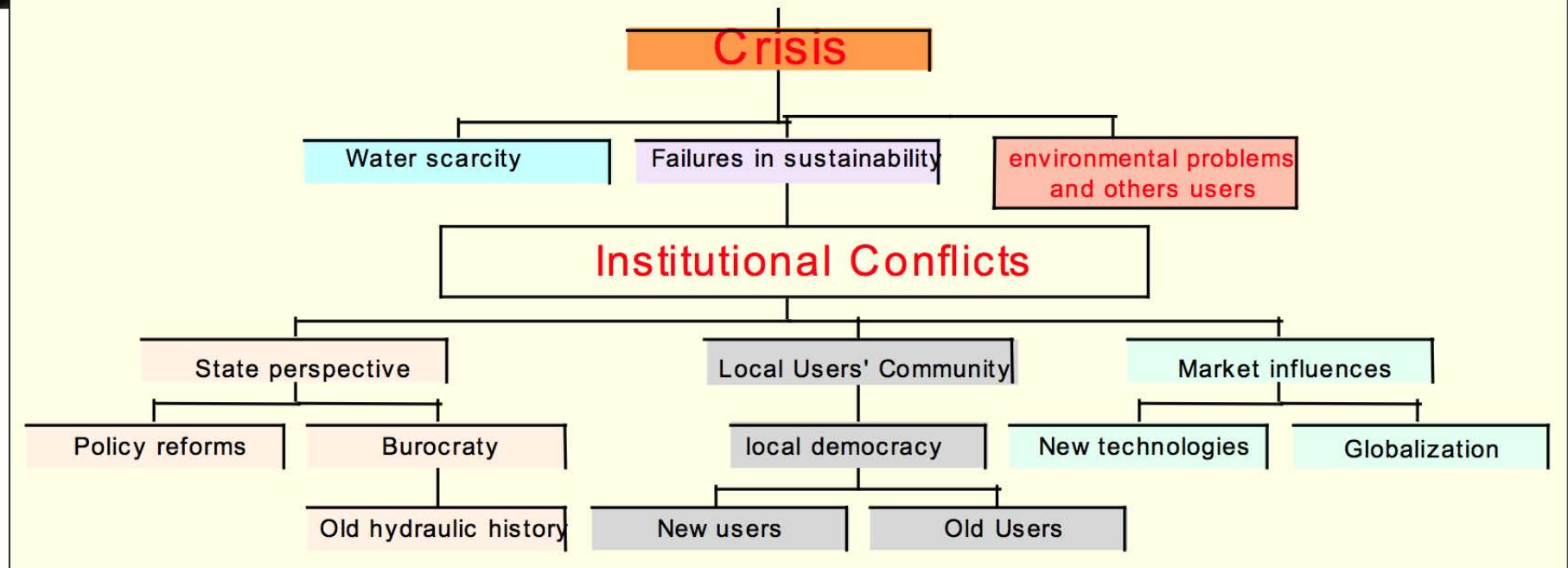


And pressures
On the resources
And promotion
Of huge transfer
Of water between
From « loser » Basins
To « Winner » basins

Going forward...working on conflicts and crisis



Global Irrigation Management Problems

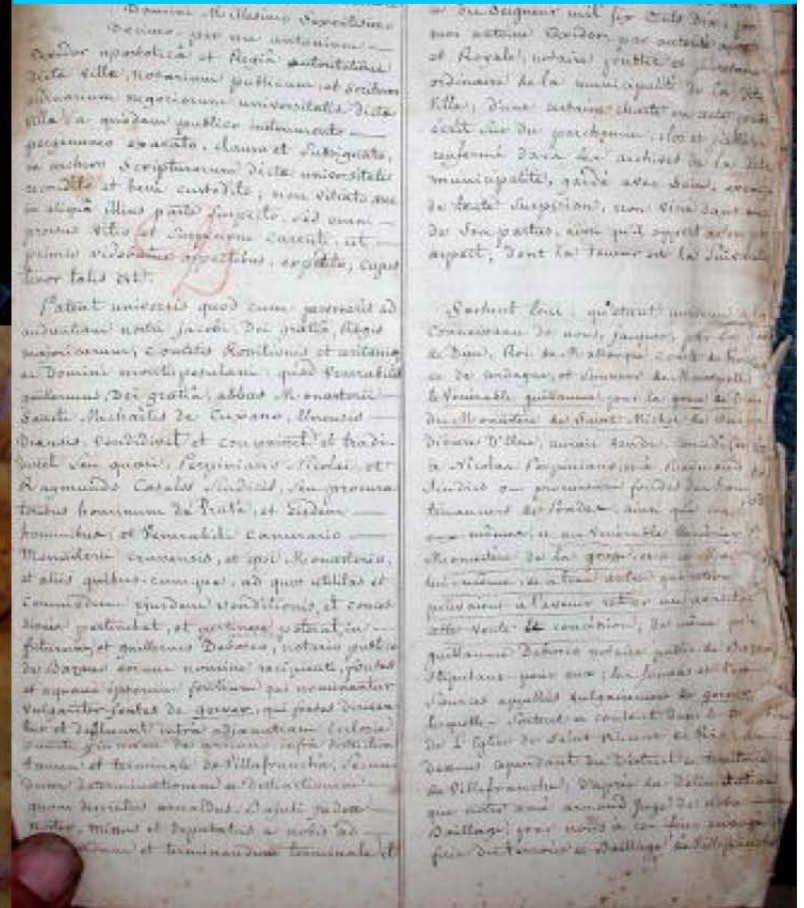
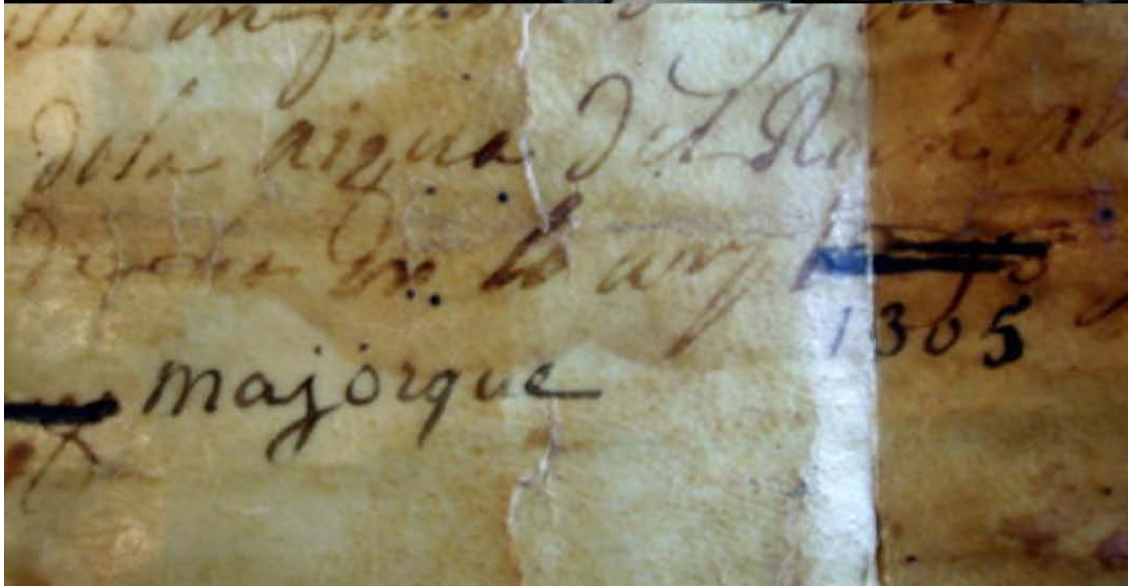
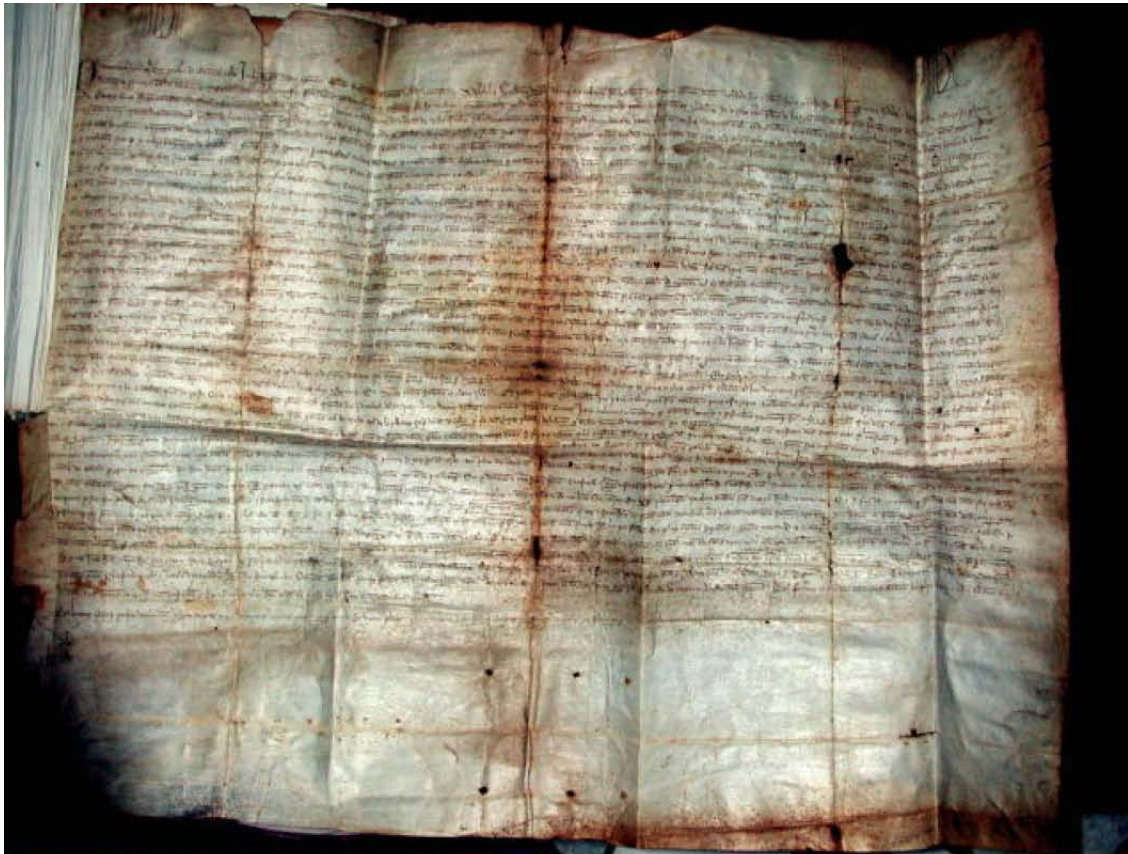


Coexistence of several crisis in the beginning of the 21th Century (and links between them)

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

type	administrative management by the State	community management	industrial and private management
Water rights	water rights not clearly defined, sometimes precarious Land rights.	designed water rights for members of the community of irrigators	water rights abolished or without object, water considered as a tradable good
payment of the water	fees by hectare (sometimes, share fixes crop) or indirect payment of the water through the economy of the State	contributions by quotas in money or in work (conditions of the exercise of water rights)	payment by free subscription and consumption
regular problematics	bureaucratic and financial crisis	gap between rules and practices	accelerated economic and social stratification, exclusion of the poorest
current dynamics	experience of participatory management of the irrigation	needs to renew local institutions	risks of regression of irrigation (by lack of subscription)

Going forward : research on Water management and archives of communities (a still useful argument in water debates in France)



From archives in fied 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*)



Columelle De l'agriculture L'économie rurale

Tome premier de Columelle ; trad. nouvelle par M. Louis Du Bois
C. L. F. Panckoucke, 1844. Bibliothèque latine-française. Seconde série

en annexe : les **Géorgiques** de Virgile (texte repris sur le site UCL) [I](#), [II](#), [III](#), [IV](#)

<http://remacle.org/bloodwolf/erudits/columelle/index.htm>

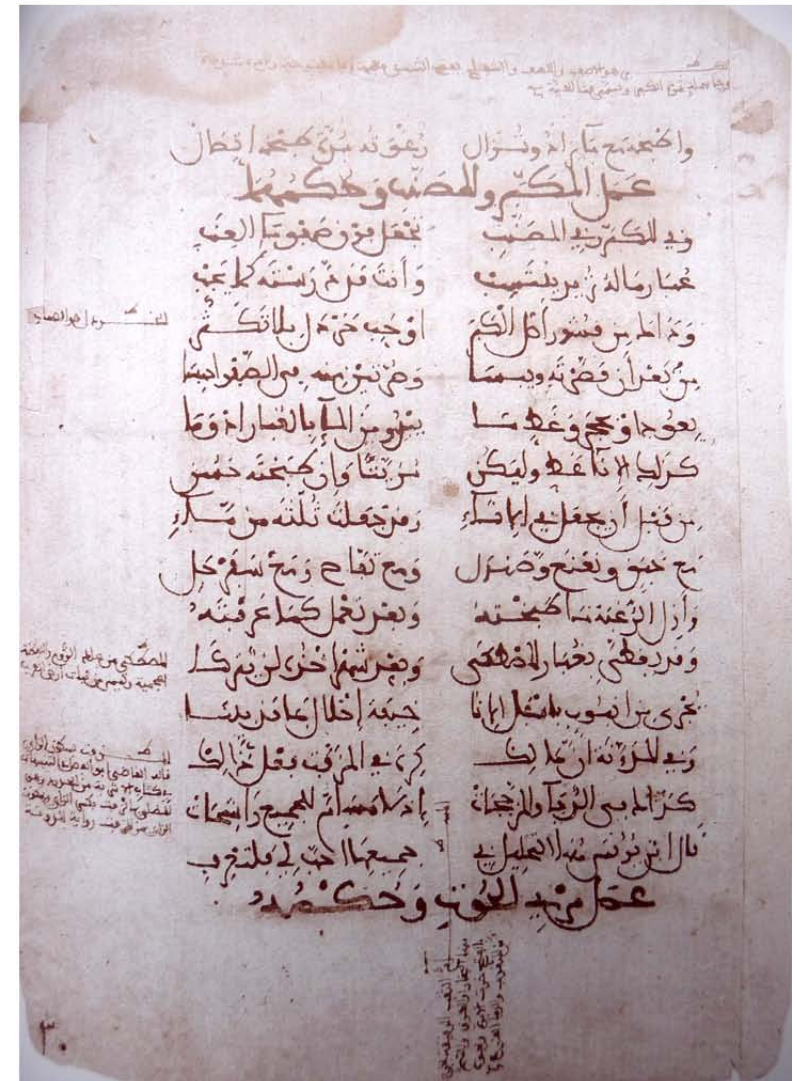
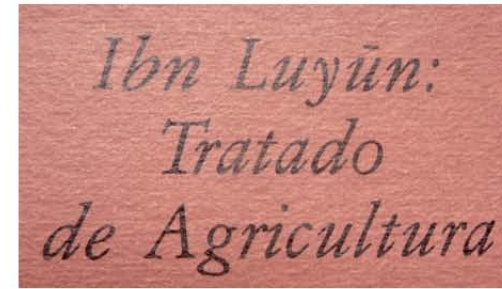
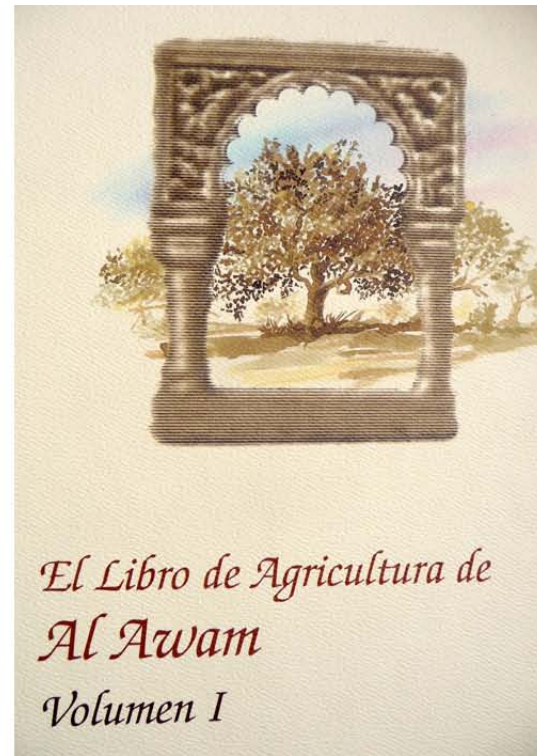
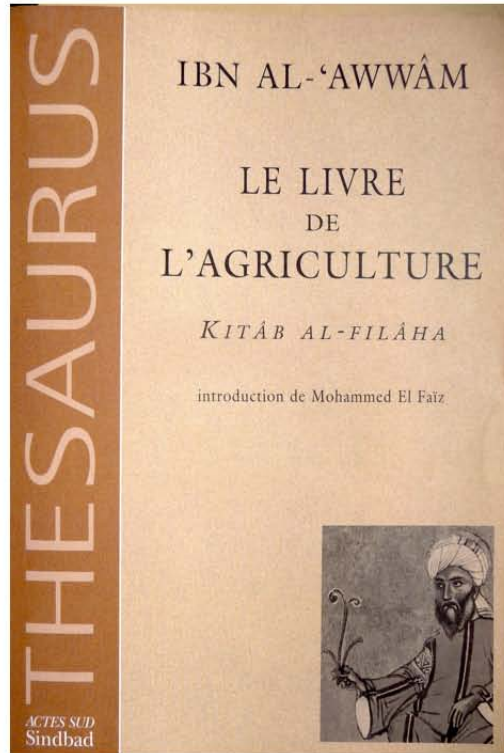
INTRODUCTION

LIVRE I

1. Préceptes que doivent observer les agriculteurs.
 2. Quelle disposition du fonds offre le plus grand avantage.
 3. Ce que, avant de l'acheter, il faut principalement observer dans l'examen d'un domaine.
 4. De la salubrité de la contrée.
 5. De l'eau.
 6. De la position de la ferme.
 7. Des obligations du père de famille.
 8. Du troupeau et de ses gardiens.
 9. En quoi les esclaves doivent contribuer à chaque ouvrage.
1. La terre ne vieillit ni ne se fatigue, si on l'engraisse.
 2. Combien y a-t-il de genres de terrains?
 3. Des soins à donner aux boeufs dételés après le travail.
 4. Dans quel temps de l'année on doit faire les labours, et comment.
 5. Comment on fume une terre maigre.
 6. Des espèces de semences.
 7. Des espèces de légumes.
 8. Quel est le temps convenable pour semer.
 9. Combien il faut de modius de semence par jugère, et recettes pour les semences malades.
 10. Quel terrain convient à chaque légume.
 11. Des espèces de fourrages: de la luzerne, de la vesce, de la dragée, de l'avoine, du fénugrec, de l'ers et de la gesse.
 12. Conditions et nombre de journées de travail nécessaires à la culture de chaque sorte de blé et de chaque légume.
 13. Quels sont les travaux à faire pour chaque genre de champ.
 14. Quels légumes nuisent ou profitent au sol.
 15. Des espèces de fumiers.
 16. En quels temps on doit fumer les champs.
 17. Comment on convertit en pré un champ labouré.

Ex : Arabic
water and agriculture
knowledge

for villages
development



MÉMOIRE

SUR LES COURS D'EAU

ET

LES CANAUX D'ARROSAGE DES PYRÉNÉES-ORIENTALES;

PAR M. JAUBERT DE PASSA,

Conseiller de Préfecture du département des Pyrénées-Orientales,

PRÉCÉDÉ

DU RAPPORT FAIT, SUR CE MÉMOIRE, A LA SOCIÉTÉ
ROYALE ET CENTRALE D'AGRICULTURE,

PAR une Commission composée de MM. le chevalier
CHALLAN, le baron de CHASSIRON, le comte DEBOIS,
le baron PETIT DE BEAUVERGER, le chevalier TESSIER,
YVART, et le vicomte HÉRICART DE THURY, Rapporteur.

A PARIS,

DE L'IMPRIMERIE DE MADAME HUZARD
(née VALLAT LA CHAPELLE),
Rue de l'Éperon-Saint-André-des-Arts, n°. 7.

JANVIER 1821.

François-Jaubert de Passa un visionnaire de chez nous



"L'irrigation est une pratique aussi miraculeuse dans ses effets que vulgaire dans ses moyens."

Le ton est donné quand paraissent en 1846, "Les Recherches sur les arrosages chez les peuples anciens" de François-Jaubert de Passa. Cette œuvre monumentale est aujourd'hui la seule histoire mondiale de l'irrigation : elle ajoute un précieux témoignage sur l'évolution des idées concernant l'eau.

Membre de l'Académie des Sciences, François-Jaubert de Passa (1785-1854) a vécu 69 ans. Il n'évoque les entreprises hydrauliques que pour combiner l'histoire politique et sociale des peuples ayant plus ou moins su s'organiser et se mobiliser à cette fin. Les sociétés sans irrigation ne sont pas oubliées car elles confirment le rôle des formes sociales nécessaires à l'irrigation.

François-Jaubert de Passa est à l'image du notable rural, à la fois fier de son enracinement régional et grand expérimentateur en agriculture dans le Département des Pyrénées-Orientales, juriste de formation, grand ami de Prosper Mérimée, il est remarqué à Paris par Napoléon Bonaparte. Il refuse le poste de Préfet que lui propose celui-ci pour devenir sous-préfet dans sa région natale, le Roussillon.

Il rédige le règlement du Syndicat de la TRL, rivière qui sert depuis le Moyen-Âge à l'irrigation et arrose Perpignan. Il entre au Conseil Général qu'il préside de 1848 à 1852. Ses racines catalanes le poussent à vouloir convaincre tout le monde de la productivité de l'agriculture irriguée et, pour ce faire, de l'importance à accorder à des institutions équilibrées entre liberté et autorité. "L'eau doit d'abord appartenir au domaine public" : de nos jours cela paraît évident, ce n'était pas le cas en 1856. François-Jaubert de Passa en avait senti l'importance et il était pour vivement encourager les associations agricoles.

sur François-Jaubert de Passa

Archives Départementales des P.O.
Bureau de Perpignan, S.F. 1048
Bibliothèque Municipale de Perpignan
Tél. 04 68 24 40 20

Membre de l'Association de Passa : email des archives de Passa
Passa et l'Association de Passa : email des archives de Passa
Passa et l'Association de Passa : email des archives de Passa
Passa et l'Association de Passa : email des archives de Passa

VOYAGE EN ESPAGNE,

DANS

LES ANNÉES 1816, 1817, 1818, 1819,

RECHERCHES

sur les ARROGAGES, sur les LOIS et COUTUMES qui les
régissent, sur les LOIS DOMANIALES et MUNICIPALES,
considérées comme un FUISSANT MOYEN DE PERSECUTION
CONTRE L'AGRICULTURE FRANÇAISE!

PAR M. JAUBERT DE PASSA;

PRÉCÉDÉ DU RAPPORT FAIT A LA SOCIÉTÉ ROYALE ET CENTRALE
D'AGRICULTURE.

Il sera à l'apogée par le
Général de l'Empire.

Gravé de six cartes.

A PARIS,

CHEZ MADAME HUZARD, LIBRAIRE,
rue de l'Éperon, n°. 7.
1823.

CANALES DE RIEGO

DE CATALUÑA Y REINO DE VALENCIA.

LEYES Y COSTUMBRES QUE LOS REGAN:

REGLAMENTOS Y ORDENANZAS DE SUS PRINCIPALES ACQUEDUCTOS:

obra escrita en francés

por Mr. Jaubert de Passa,

TRADUCIDA AL CASTELLANO

por el Señor D. Juan Fiol,

Señor de Merida, Magistrate honorario de esta Academia
y Jefe de primera instancia de Madrid.

PUBLICADA Y ADICIONADA POR LA SOCIEDAD ECONÓMICA
DE AMIGOS DEL PAIS.

TOMO I.

VALENCIA: 1844.

Imprenta de D. Genito Montfort.

QUATRIÈME PARTIE.

Arrosages de la Syrie, de l'Arabie et de l'Égypte.

CHAPITRE PREMIER.

Arrosages de la Syrie.

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Jaubert de Passa 19th Century: Studies on water communities



RECHERCHES

SUR

LES ARROSAGES

CHEZ LES PEUPLES ANCIENS;

PAR

M. JAUBERT DE PASSA,

Membre correspondant de l'Académie royale des sciences et de la Société royale et centrale
d'agriculture.

• Voyez le pays des Chaldéens., des Assyriens le
ceignent de digues et en firent présent aux habitants
du désert. • ISRAËL, XXIII, 13, traduction de Michaëlis.

TROISIÈME PARTIE.

DES ARROSAGES DE LA CHINE.

QUATRIÈME PARTIE.

DES ARROSAGES DE LA SYRIE, DE L'ARABIE ET DE L'ÉGYPTE.

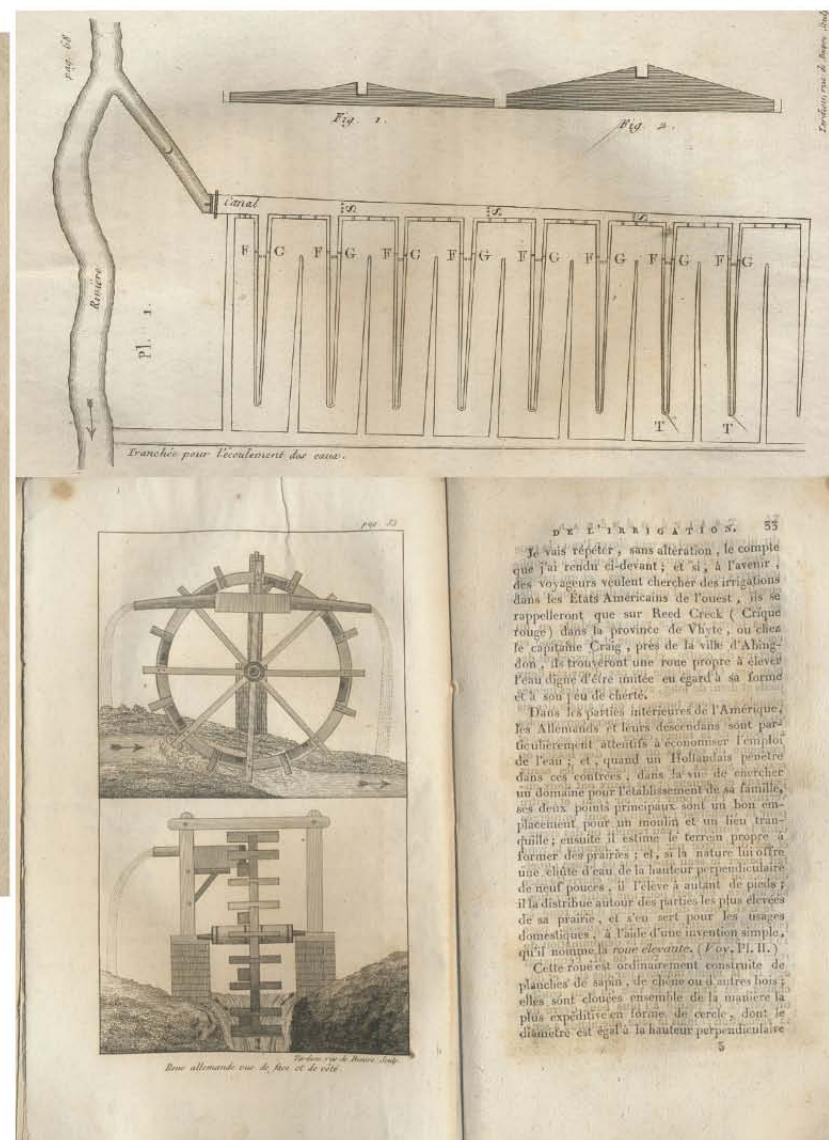
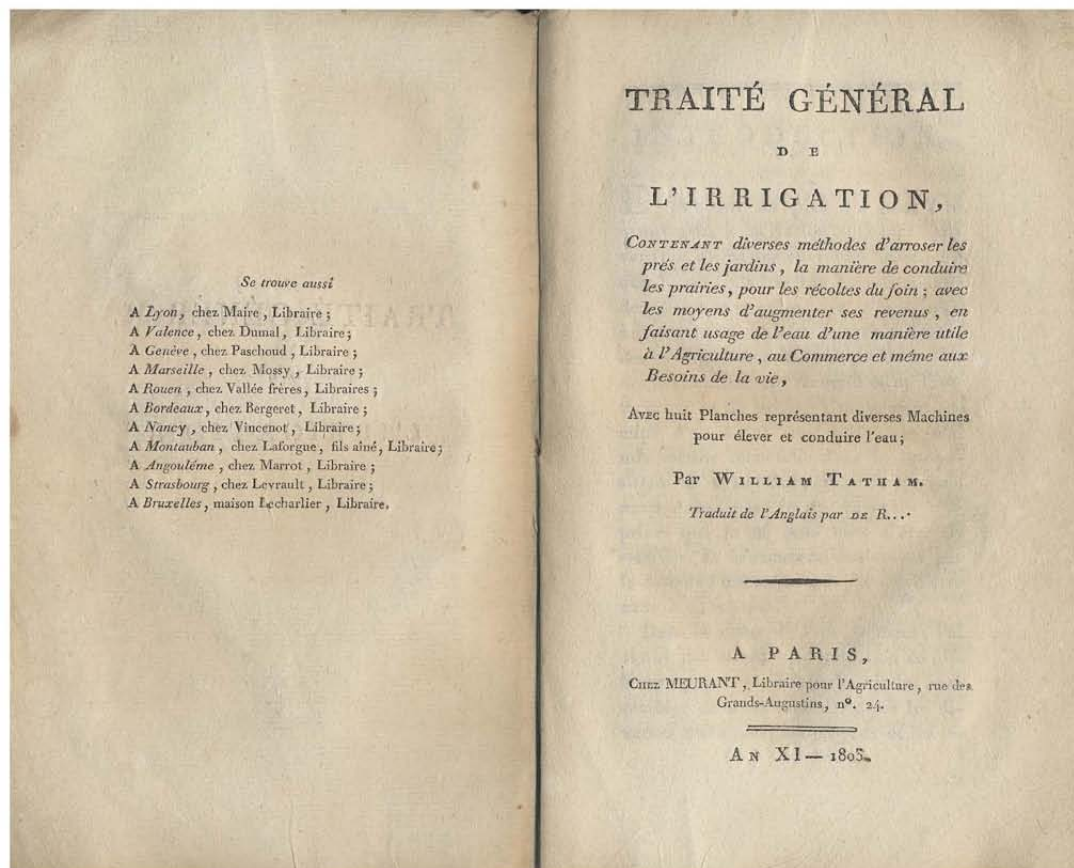
PARIS,

IMPRIMERIE ET LIBRAIRIE DE M^{me} V^e BOUCHARD-HUZARD,
7, RUE DE L'ÉPERON.

1846

William Tatham (End of 18th Century)

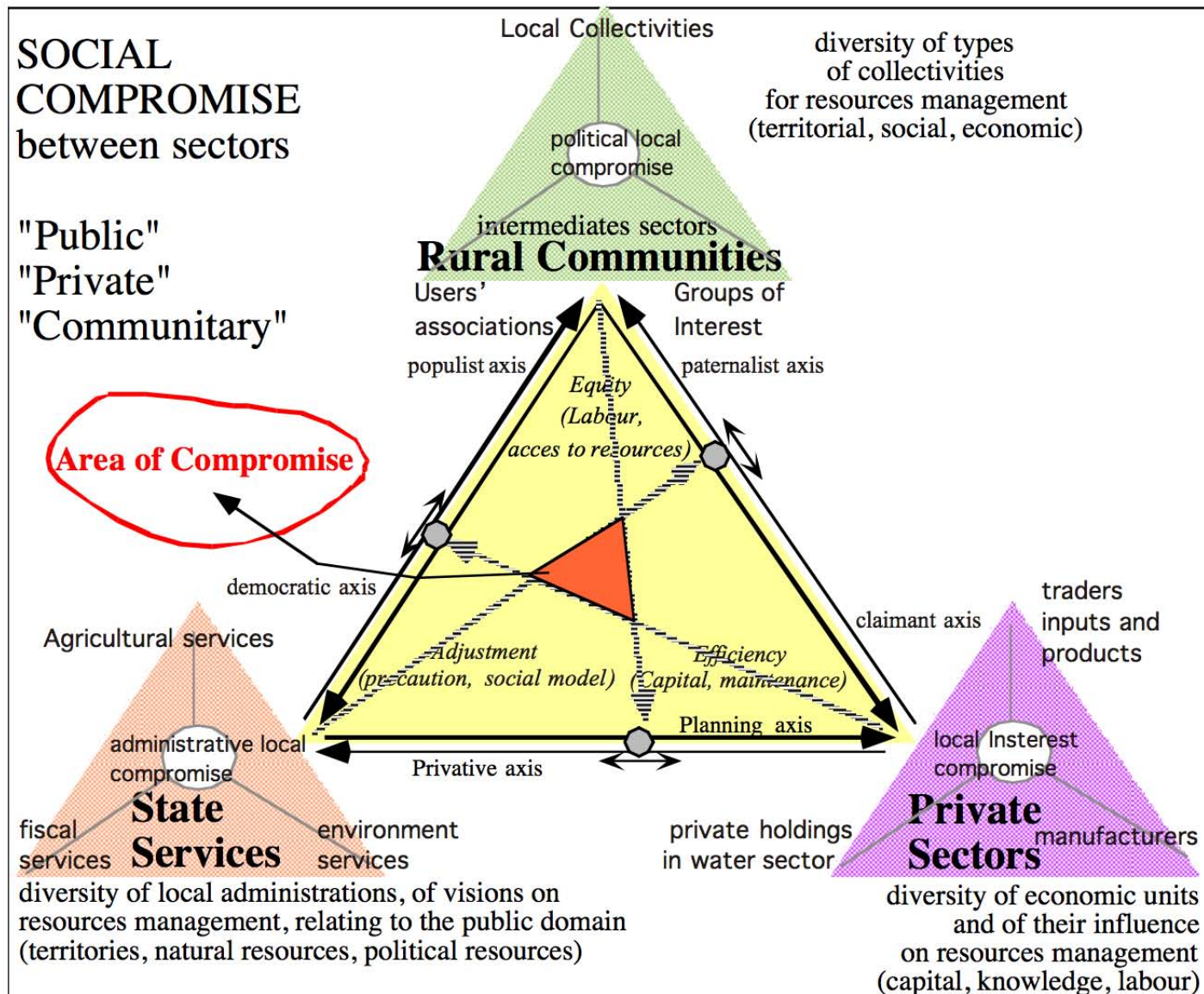
An atypical English engineer fighting for American Independence and responsible for irrigation development in Virginia and Carolina... defending communities against State (with the french reference to Cevennes moutains and irrigators communities).



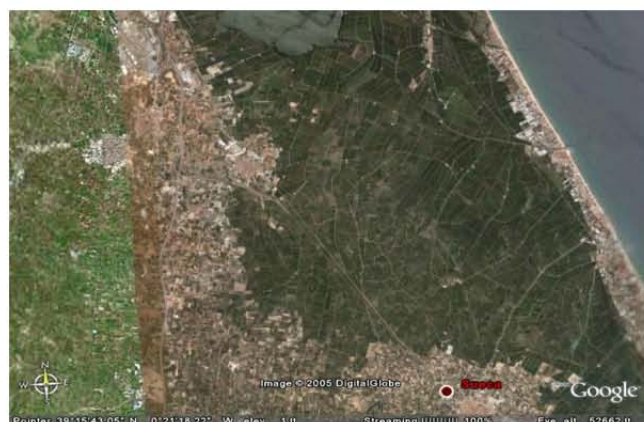
French version published in Paris in 1803 of: National irrigation or, The various methods of watering meadows; affording means to increase the population, wealth, and revenue of the kingdom, by an agricultural, commercial and general economy in the use of water.

Published 1801 by Printed for J. and T. Carpenter in London

going forward with a model of relationships and interdependence

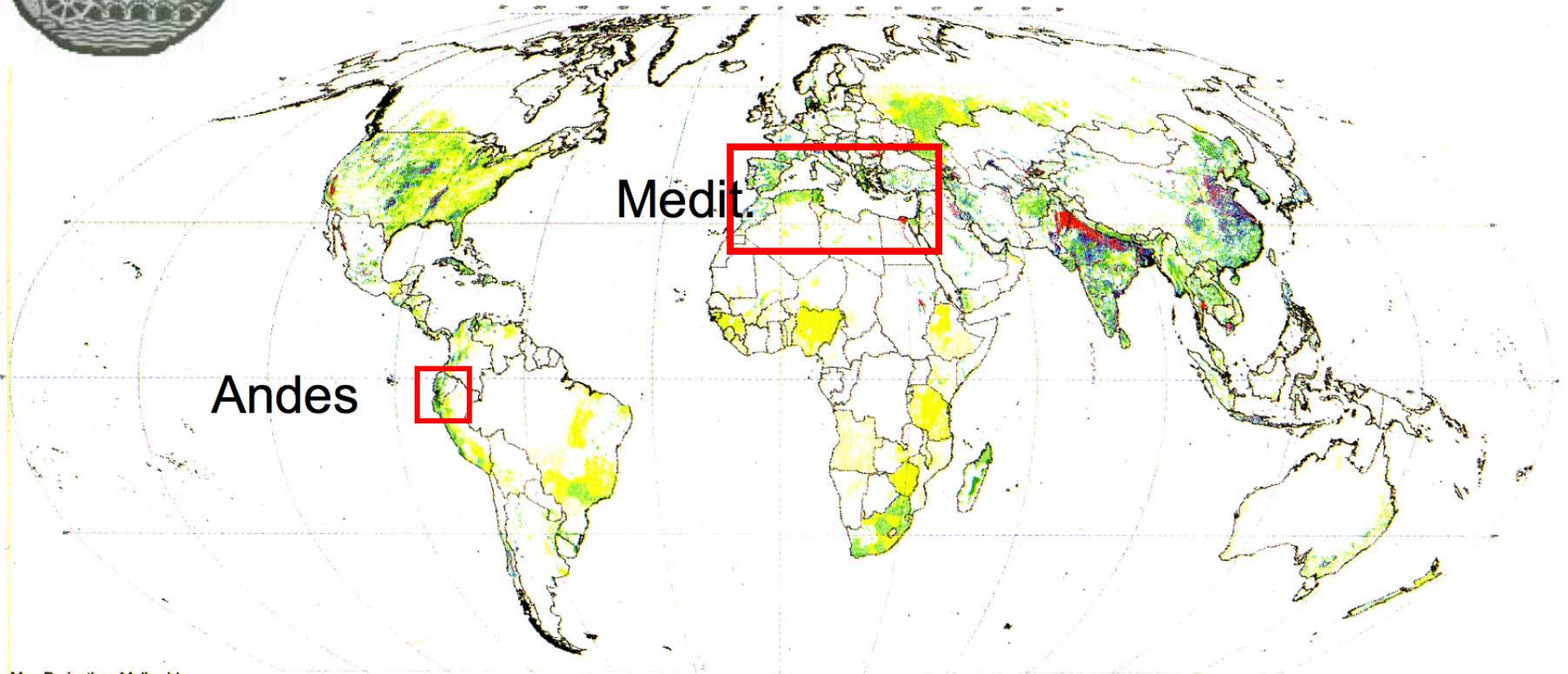


2. Some case studies





Répartition des zones sous irrigation dans le monde, 2000



Map Projection: Mollweide

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.

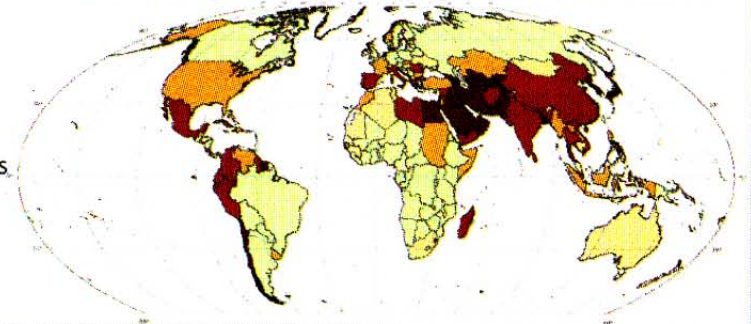
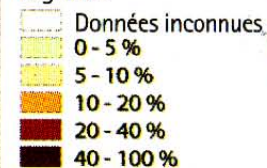
Source: Siebert et al, 2005; FAO/Aquastat, 2005.

Zone sous irrigation en pourcentage de terres immergées

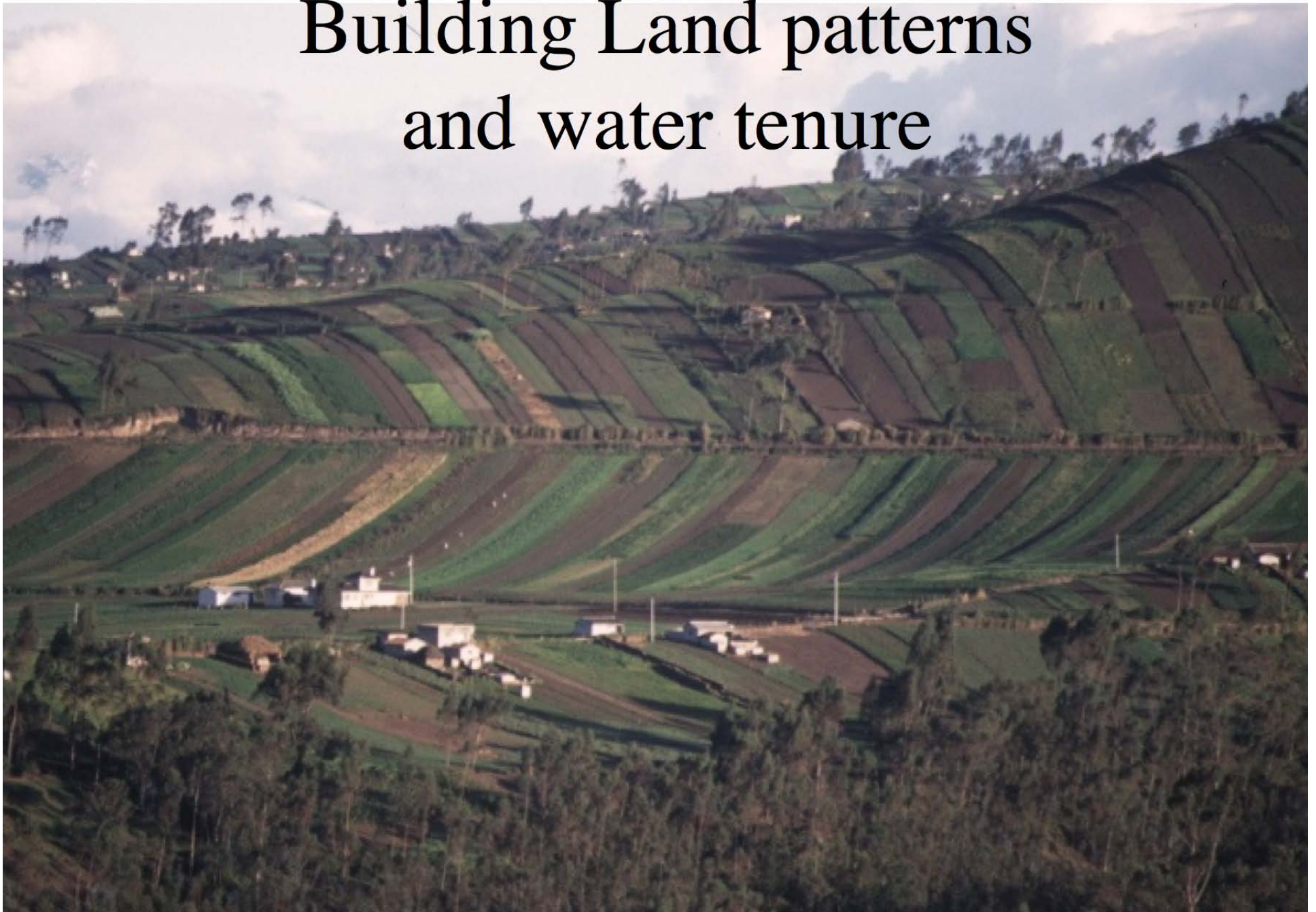


Zone sous irrigation en pourcentage de terres cultivées (2002)

Légende



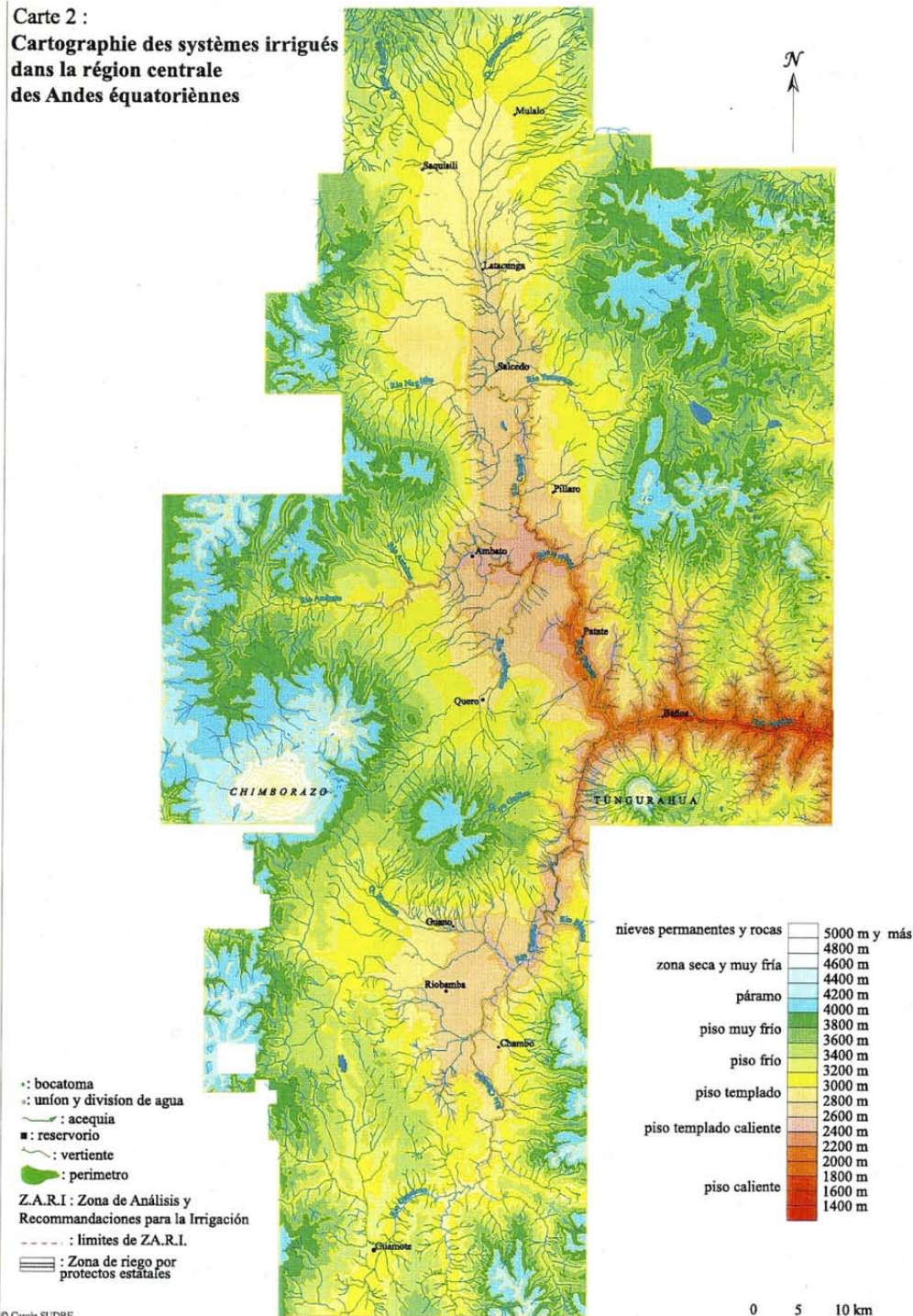
Building Land patterns and water tenure



Inventory of irrigated systems of the basin of río Ambato

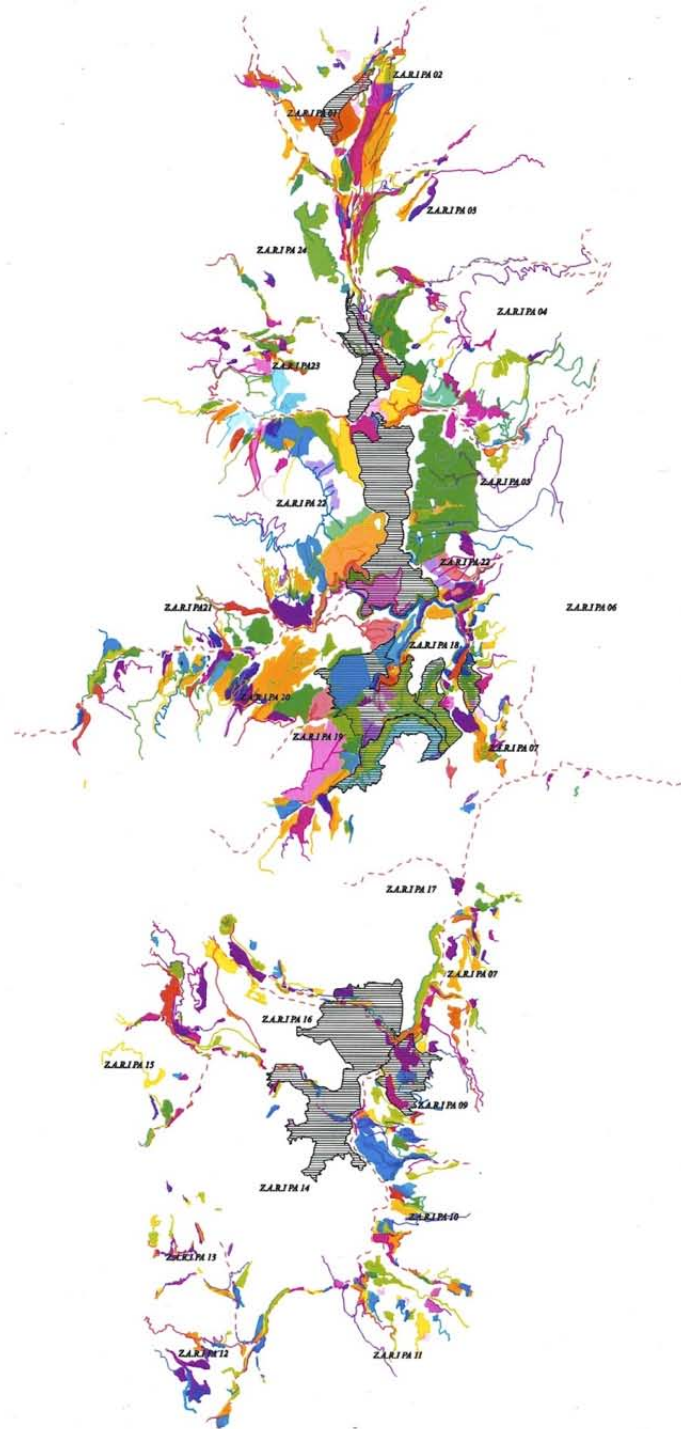
Agroclimatic levels

Carte 2 :
Cartographie des systèmes irrigués
dans la région centrale
des Andes équatoriennes



Inventory of irrigated systems of the basin of río Ambato

Communities based management
systems and State main schemes



Zari de Santa Rosa
- Pilahuin,
Secteur de Juan B. Vela

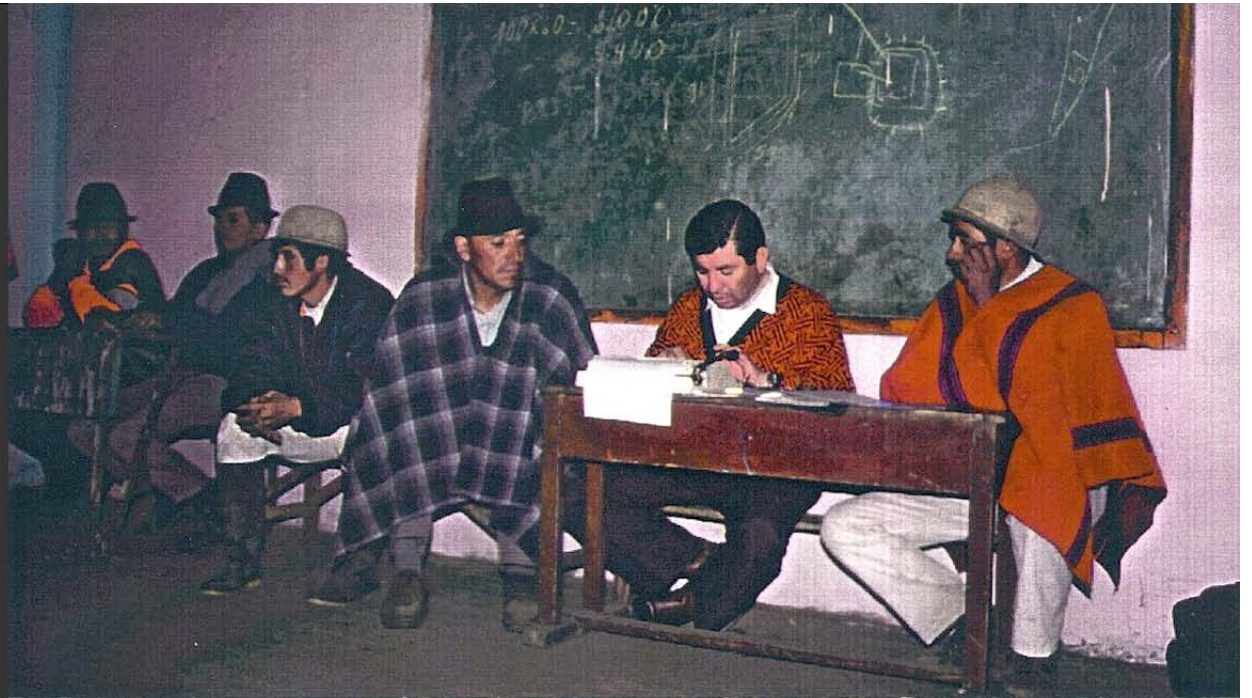


Zari de Santa Rosa - Pilahuin,
Minga du canal Cunugyacu-Chimborazo



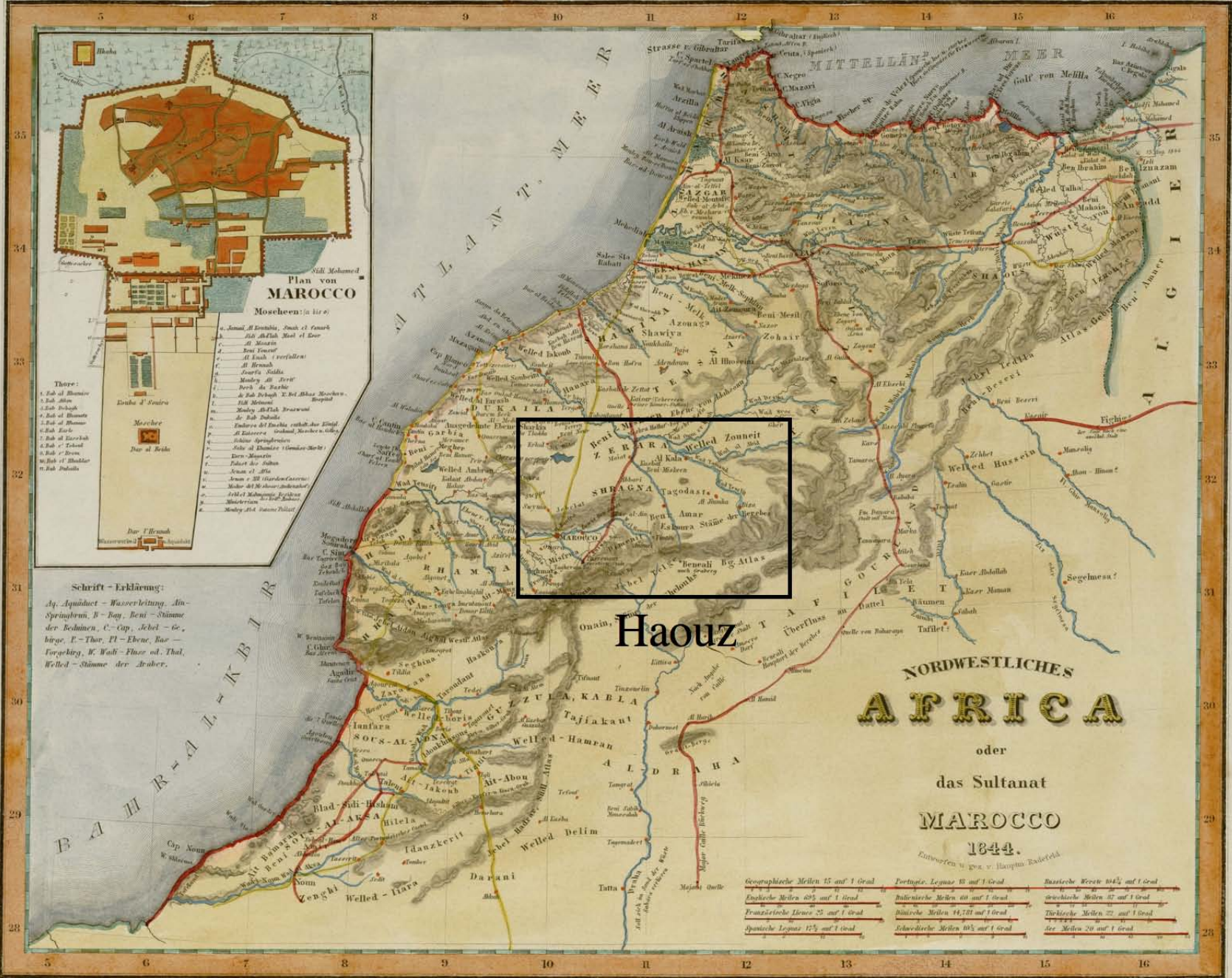
Santa Rosa Pilahuin

communities
looking for legitimacy



Tungurahua, Bassin du rio Ambato,
archives de Ambato, litiges sur les canaux de la rive gauche





Plan von MAROCCO
Moscheen (in list)

These:

1. Bab el Bhar
2. Bab el Bhar
3. Bab el Bhar
4. Bab el Bhar
5. Bab el Bhar
6. Bab el Bhar
7. Bab el Bhar
8. Bab el Bhar
9. Bab el Bhar
10. Bab el Bhar
11. Bab el Bhar
12. Bab el Bhar
13. Bab el Bhar
14. Bab el Bhar
15. Bab el Bhar
16. Bab el Bhar
17. Bab el Bhar
18. Bab el Bhar
19. Bab el Bhar
20. Bab el Bhar

Moschee

Dar el Beid

Dar el Beid

Schrift - Erklärung:
 A - Aqueduct - Wasserleitung, An-
 Springbrun, B - Bay, Beni - Stämme
 der Kalmän, C - Cap, Jebel - Ge-
 birge, E - Thal, Pl - Ebene, Bar -
 Fortgürtel, W - Wali - Fluss od. Thal,
 Welled - Stämme der Araber.

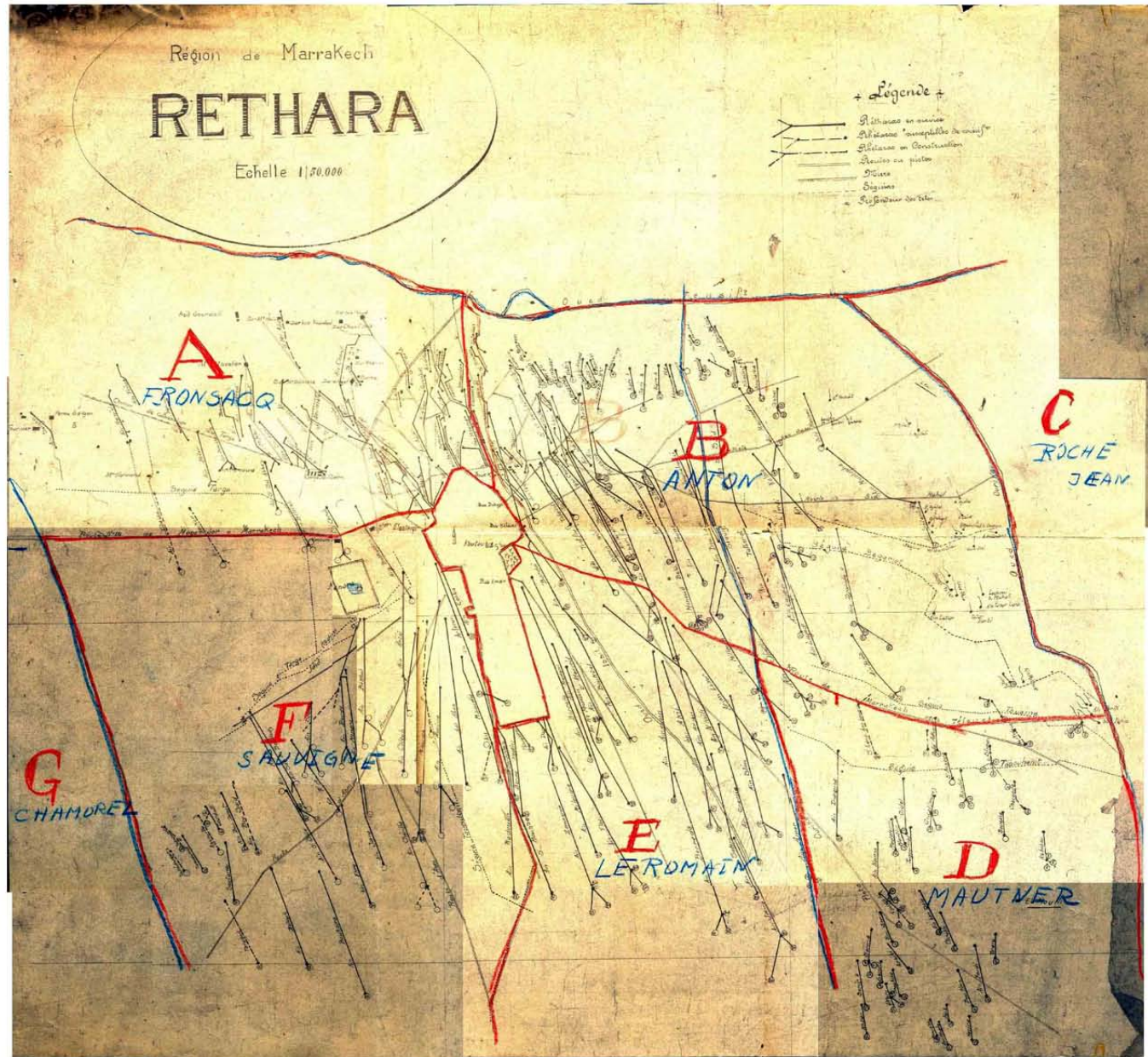
Haouz

**NORDWESTLICHES
AFRICA**
 oder
 das Sultanat
MAROCCO
 1844.

Geographische Meilen 15 auf 1 Grad	Portugiesische Leguas 12 auf 1 Grad	Russische Werste 1042 auf 1 Grad
Englische Meilen 695 auf 1 Grad	Italienische Meilen 69 auf 1 Grad	Schwedische Meilen 67 auf 1 Grad
Französische Lignes 25 auf 1 Grad	Dänische Meilen 14,121 auf 1 Grad	Türkische Meilen 32 auf 1 Grad
Spanische Leguas 12½ auf 1 Grad	Schwedische Meilen 10½ auf 1 Grad	Ser. Meilen 26 auf 1 Grad

Aus der Geograph. Graviranstalt des Bibliograph. Instituts zu Hildburghausen, Amsterdam, Paris u. Philadelphia.

Colonial times (1912-1955), discrimination and control of water management



Surface irrigation systems,
inheritance of last centuries
With rewriting water rights in
colonial period

OUEDS et réseau des SEGUIAS principales
de la plaine du HAOUZ-TASSAOUT

Ech : 1/300.000



**After independence (1955)
The model of the “Grande
hydraulique” through State
regional agencies**



Maroc

© 2007 Europa Technologies
Image © 2007 TerraMetrics

57 km

Pointeur 31°43'43.18" N 7°13'42.19" O

Mise au point ||||| 100%


ROYAUME DU MAROC


MINISTÈRE DE L'AGRICULTURE ET DU
DÉVELOPPEMENT RURAL


AGRIINVEST

Centre d'Information de l'Office Régional de Mise en Valeur Agricole du Haouz



Bienvenue 

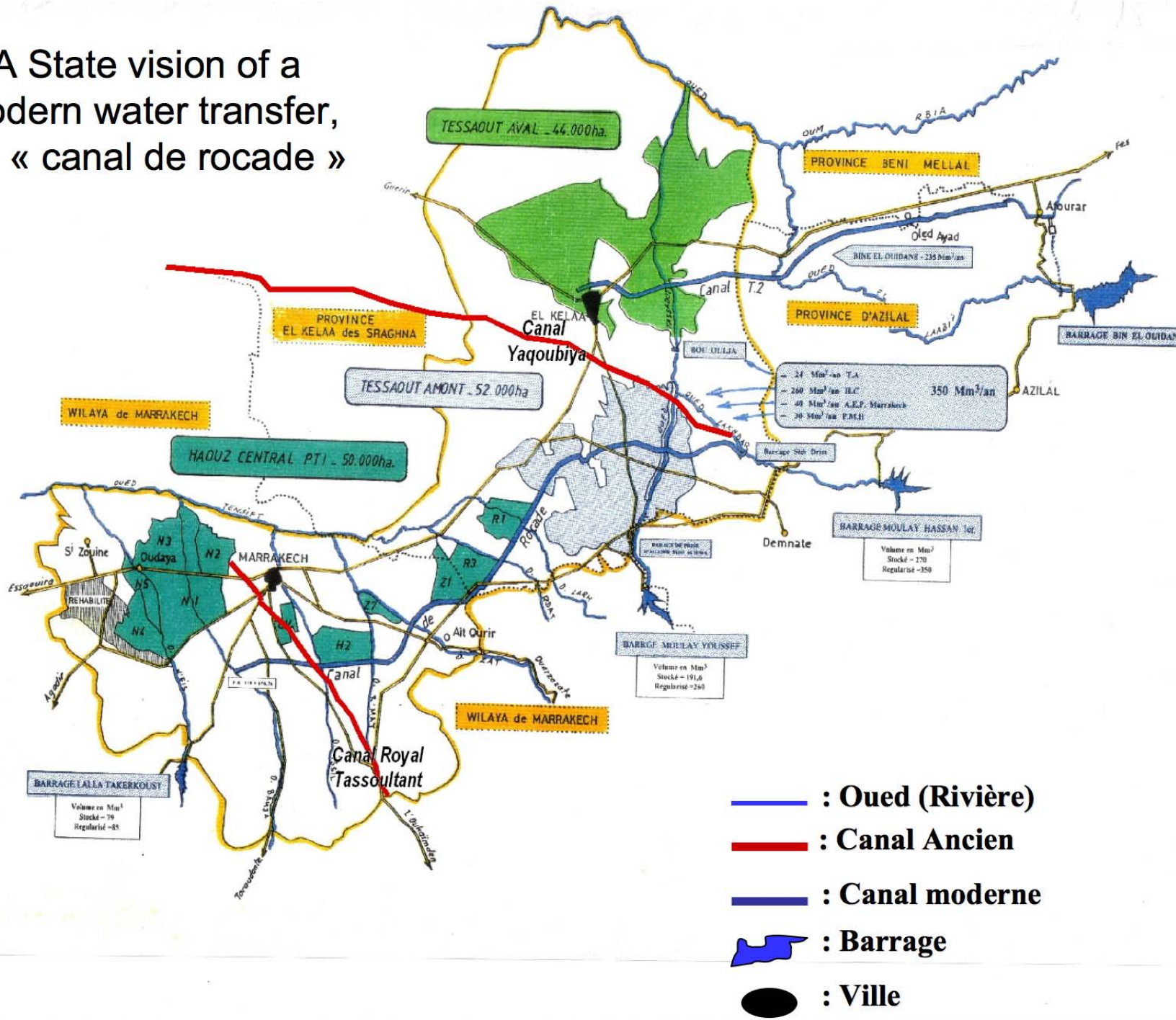
Welcome 

Bienvenida 

©ORMVA du Haouz - Avenue Hassan II, BP 2411, Marrakech, MAROC
Tel: (212) - 04 - 44.96.50/44.95.97 Fax: (212) - 04 - 44.97.93

E-mail: ORMVAH.1@iam.net.ma

A State vision of a modern water transfer, the « canal de rocade »

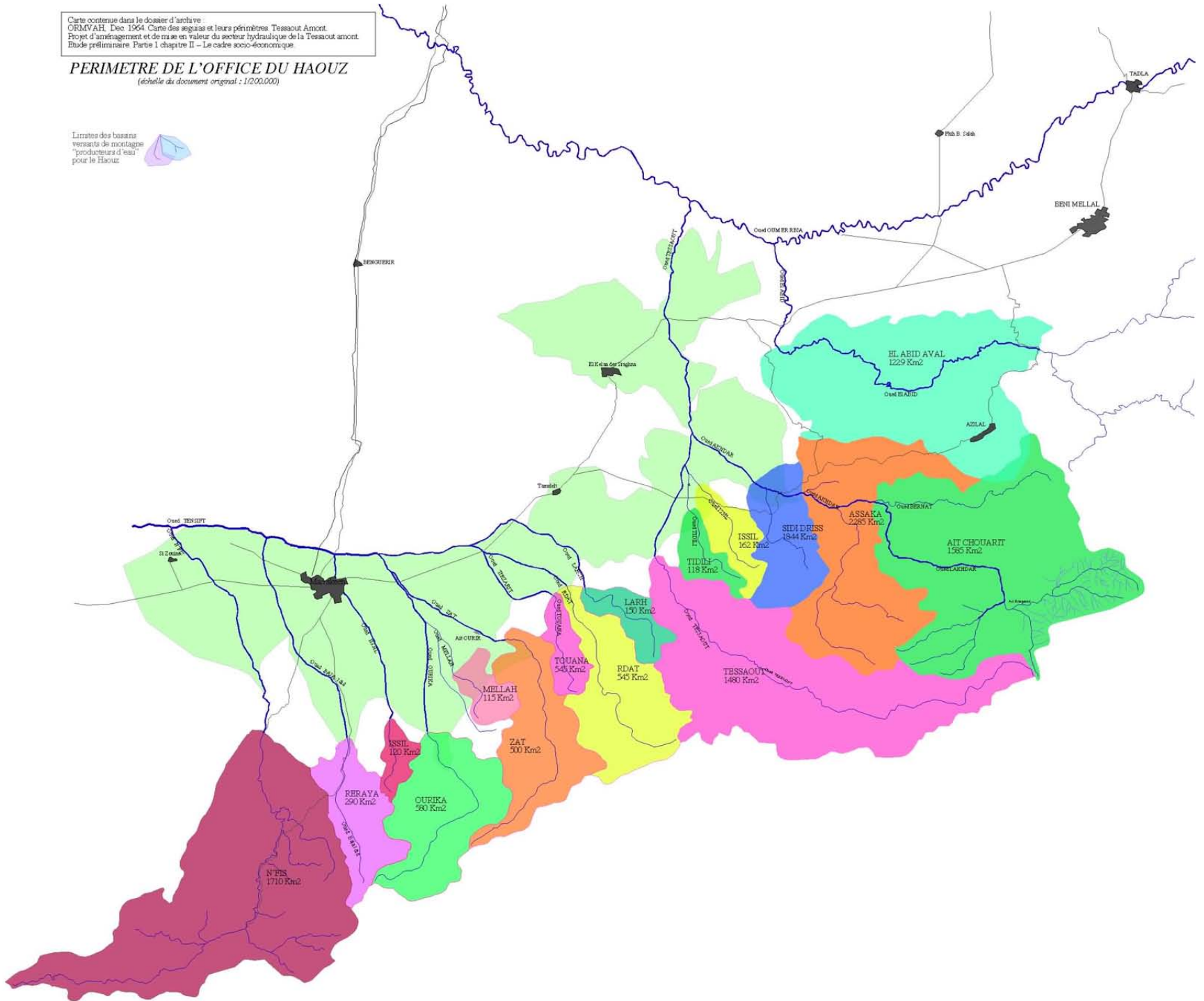


Carte contenue dans le dossier d'archive
ORMVAH, Dec 1964. Carte des segnas et leurs périmètres, Tessaout Amont.
Projet d'aménagement et de mise en valeur du secteur hydraulique de la Tessaout amont.
Etude préliminaire, Partie 1 chapitre II - Le cadre socio-économique.

PERIMETRE DE L'OFFICE DU HAOUZ

(échelle du document original : 1/200,000)

Limites des bassins
versants de montagne
"producteurs d'eau"
pour le Haouz

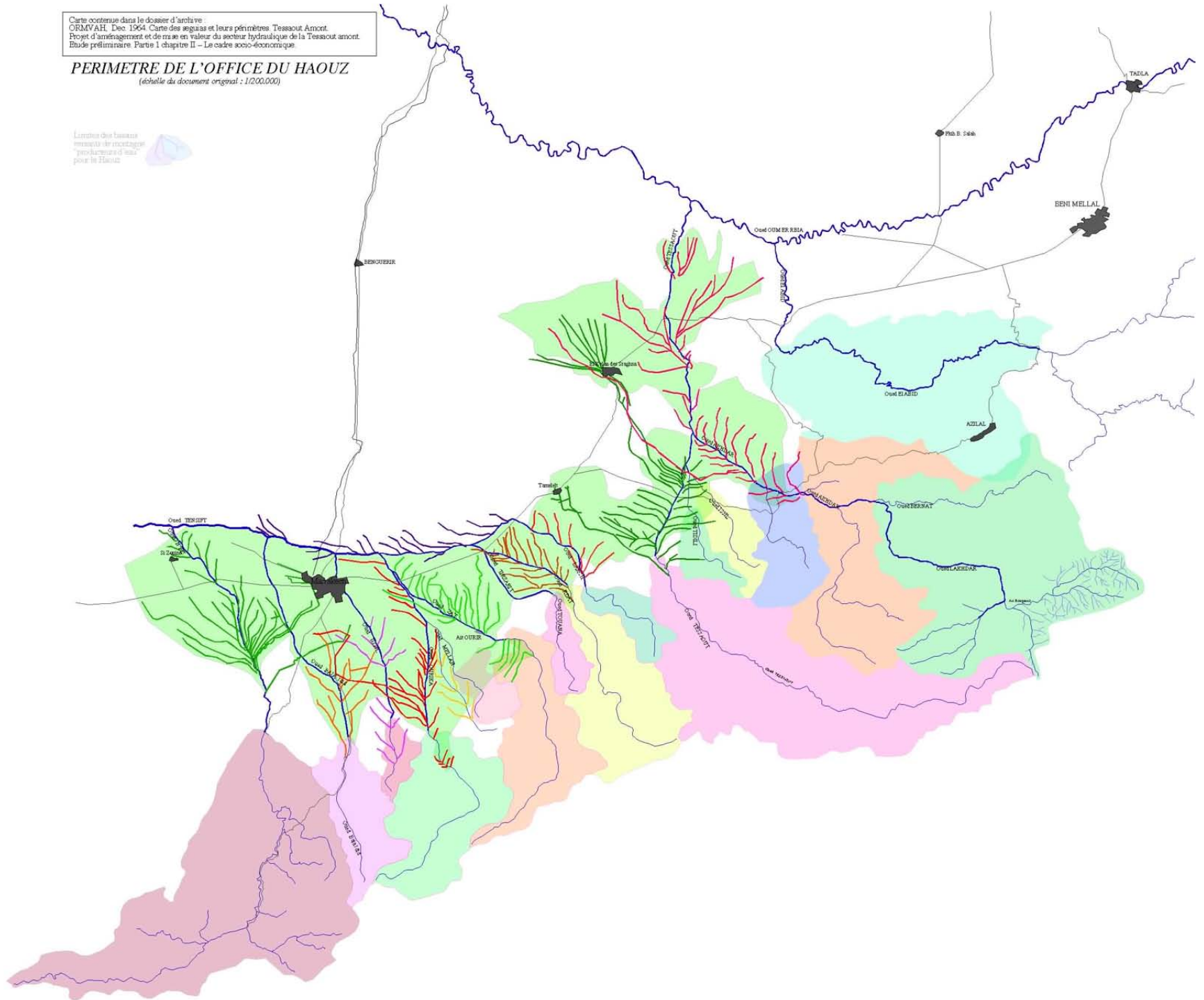


Carte contenue dans le dossier d'arrosage
ORMVAH, Dec 1964. Carte des seguias et leurs périmètres. Tessout Amont.
Projet d'aménagement et de mise en valeur du secteur hydraulique de la Tessout amont.
Etude préliminaire Partie 1 chapitre II - Le cadre socio-économique.

PERIMETRE DE L'OFFICE DU HAOUZ

(échelle du document original : 1/200,000)

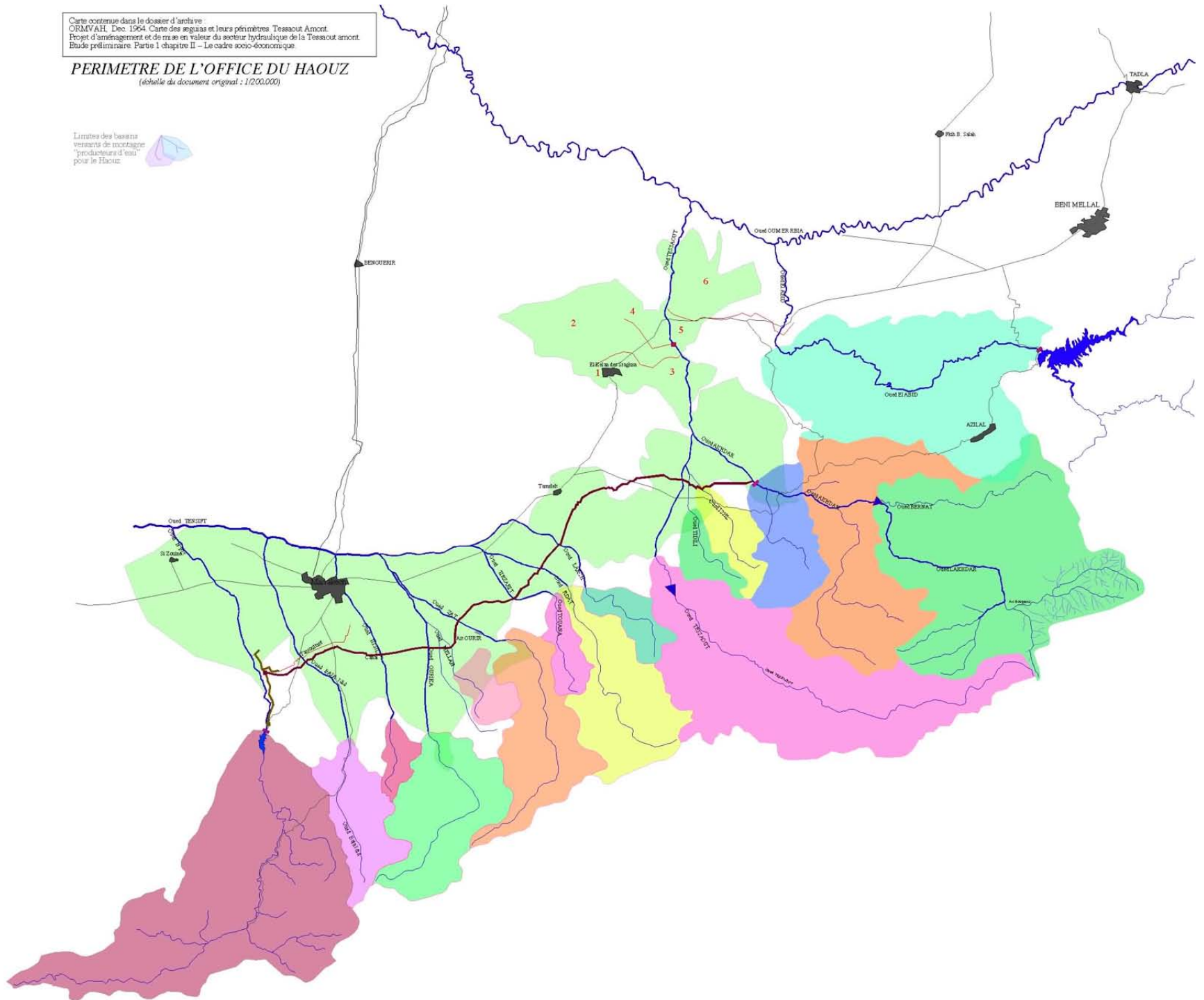
Limites des bassins
versants et partage
permanente d'eau
pour le Haouz



Carte contenue dans le dossier d'archive
 ORMVAH, Dec. 1964. Carte des segras et leurs périmètres Tessaout Amont.
 Projet d'aménagement et de mise en valeur du secteur hydraulique de la Tessaout amont.
 Etude préliminaire Partie 1 chapitre II – Le cadre socio-économique

PERIMETRE DE L'OFFICE DU HAOUZ
 (échelle du document original : 1/200.000)

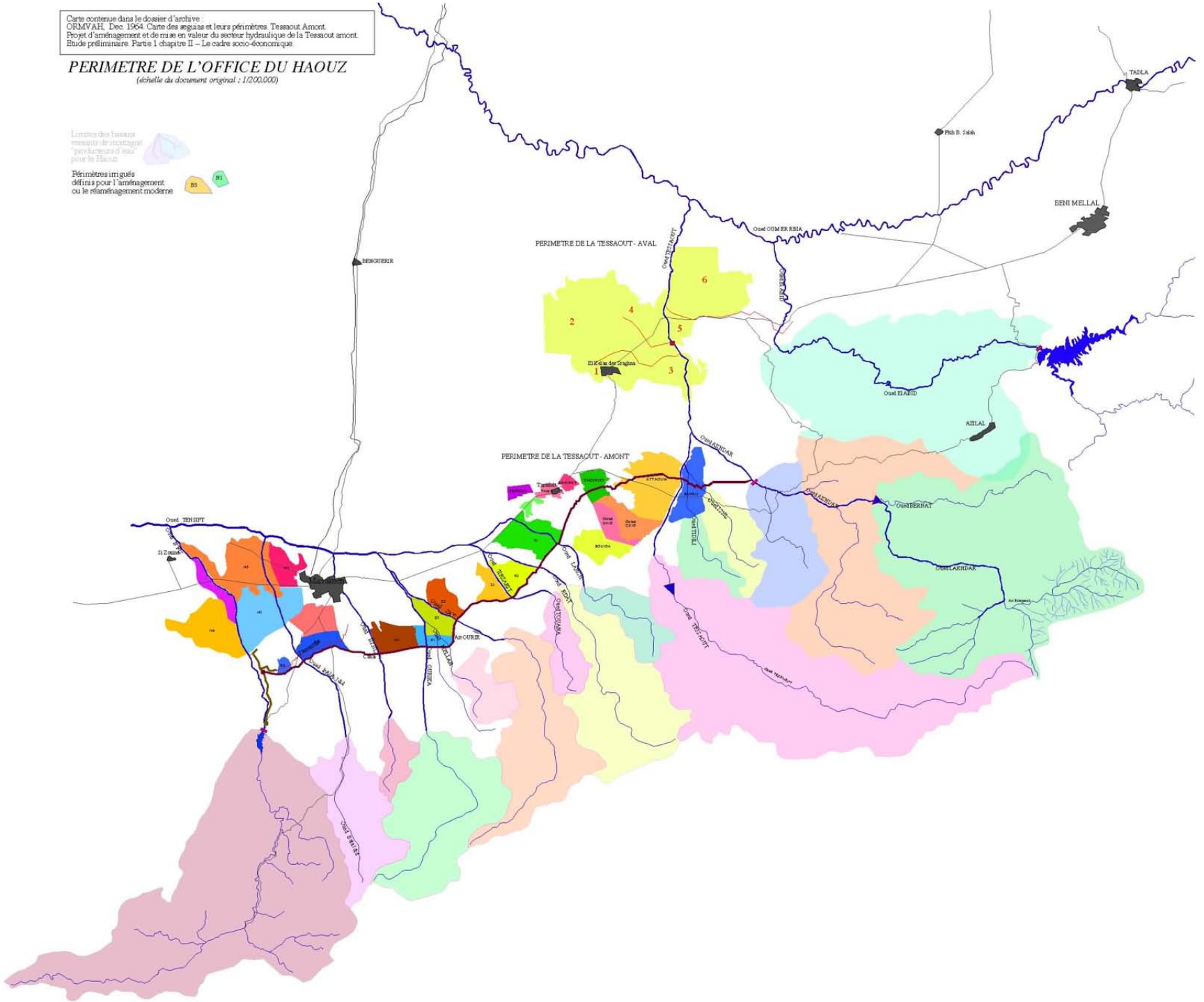
Limites des bassins
 versants de montagne
 "producteurs d'eau"
 pour le Haouz.



Carte contenue dans le dossier d'archive
 ORMVAH, Dec 1964. Carte des seguias et leurs périmètres, Tessaout Amont.
 Projet d'aménagement et de mise en valeur du secteur hydraulique de la Tessaout amont.
 Etude préliminaire, Partie 1 chapitre II - Le cadre socio-économique.

PERIMETRE DE L'OFFICE DU HAOUZ
(échelle du document original : 1/200.000)

Limites des bassins versants et partage périmétraire définis pour le Haouz
 Périmètres irrigués définis pour l'aménagement ou le réaménagement moderne

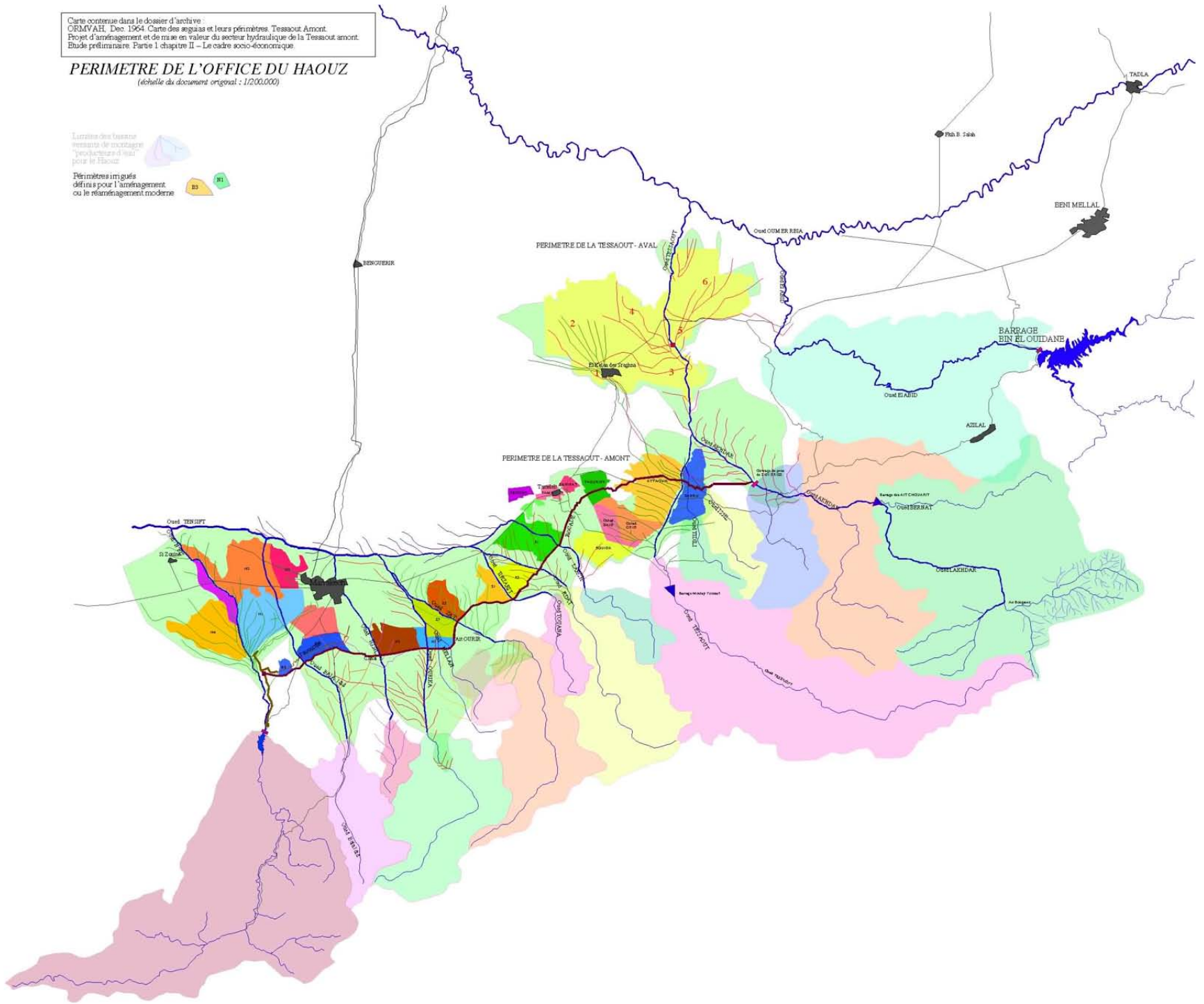


Carte contenue dans le dossier d'archive :
 ORMVAH, Dec. 1964. Carte des seguias et leurs périmètres Tessaout Amont.
 Projet d'aménagement et de mise en valeur du secteur hydraulique de la Tessaout amont.
 Etude préliminaire. Partie I chapitre II - Le cadre socio-économique.

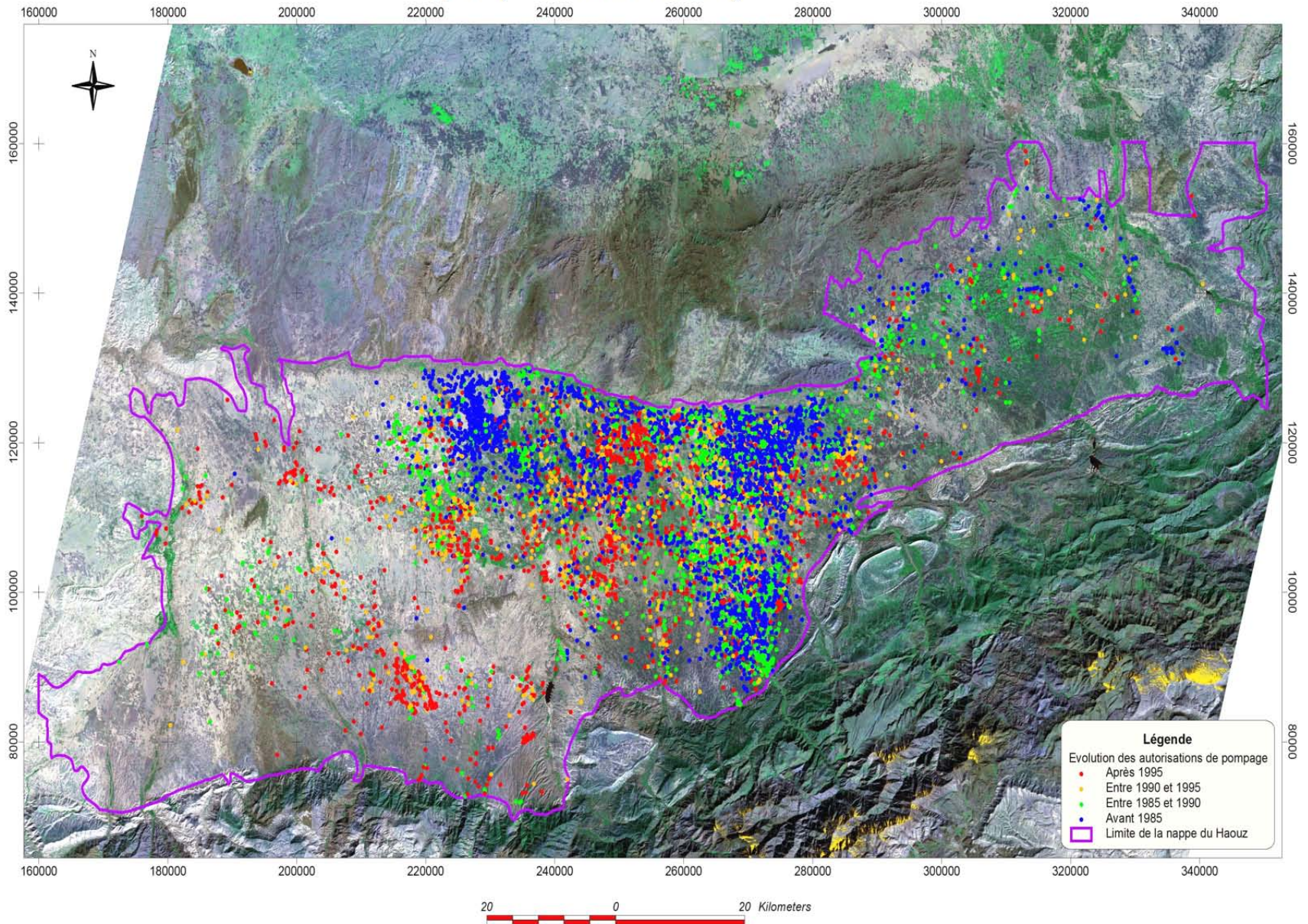
PERIMETRE DE L'OFFICE DU HAOUZ

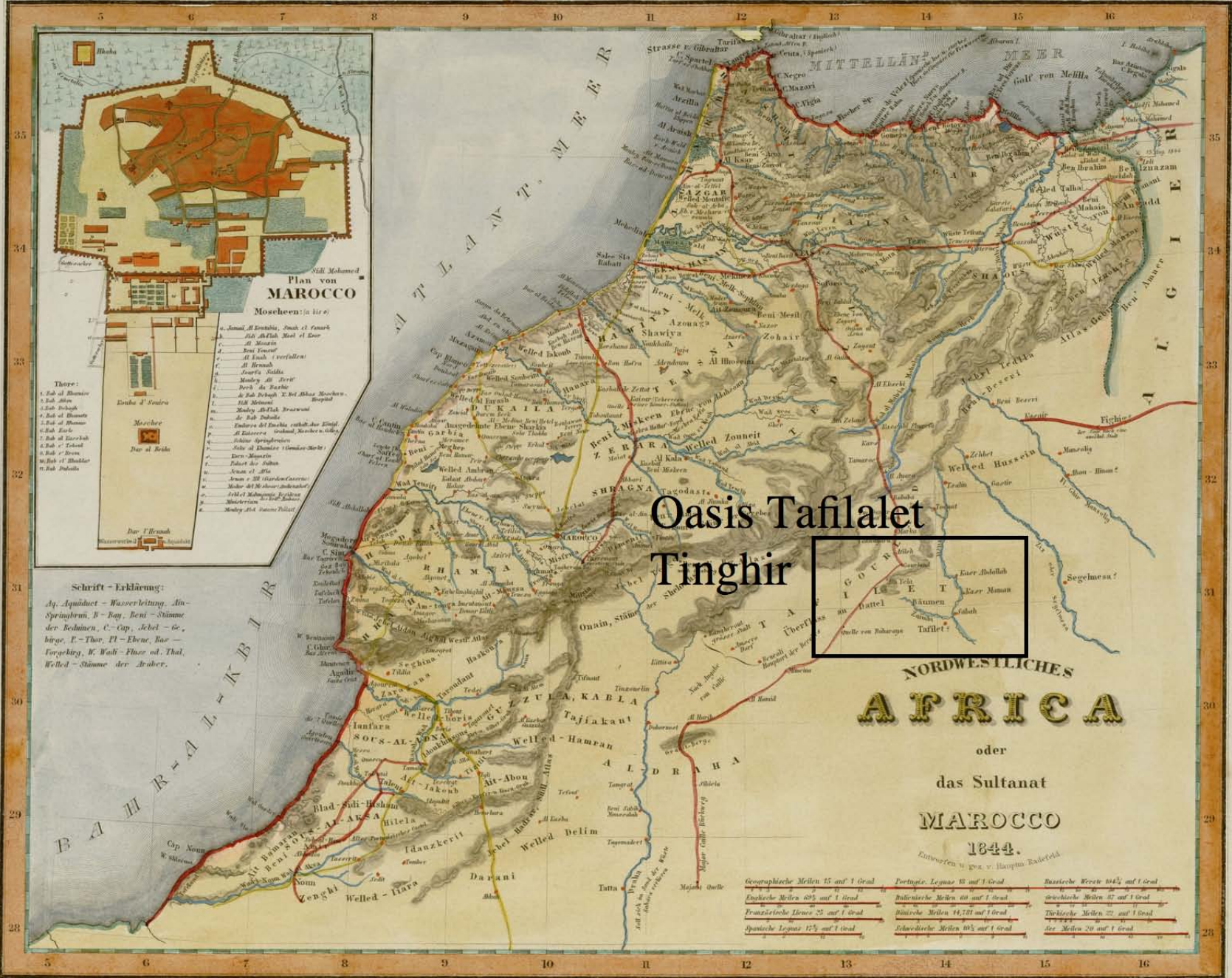
(échelle du document original : 1/200.000)

Terrains des bassins versants de montagne producteurs d'eau pour le Haouz
 Périmètres irrigués définis pour l'aménagement ou le réaménagement moderne



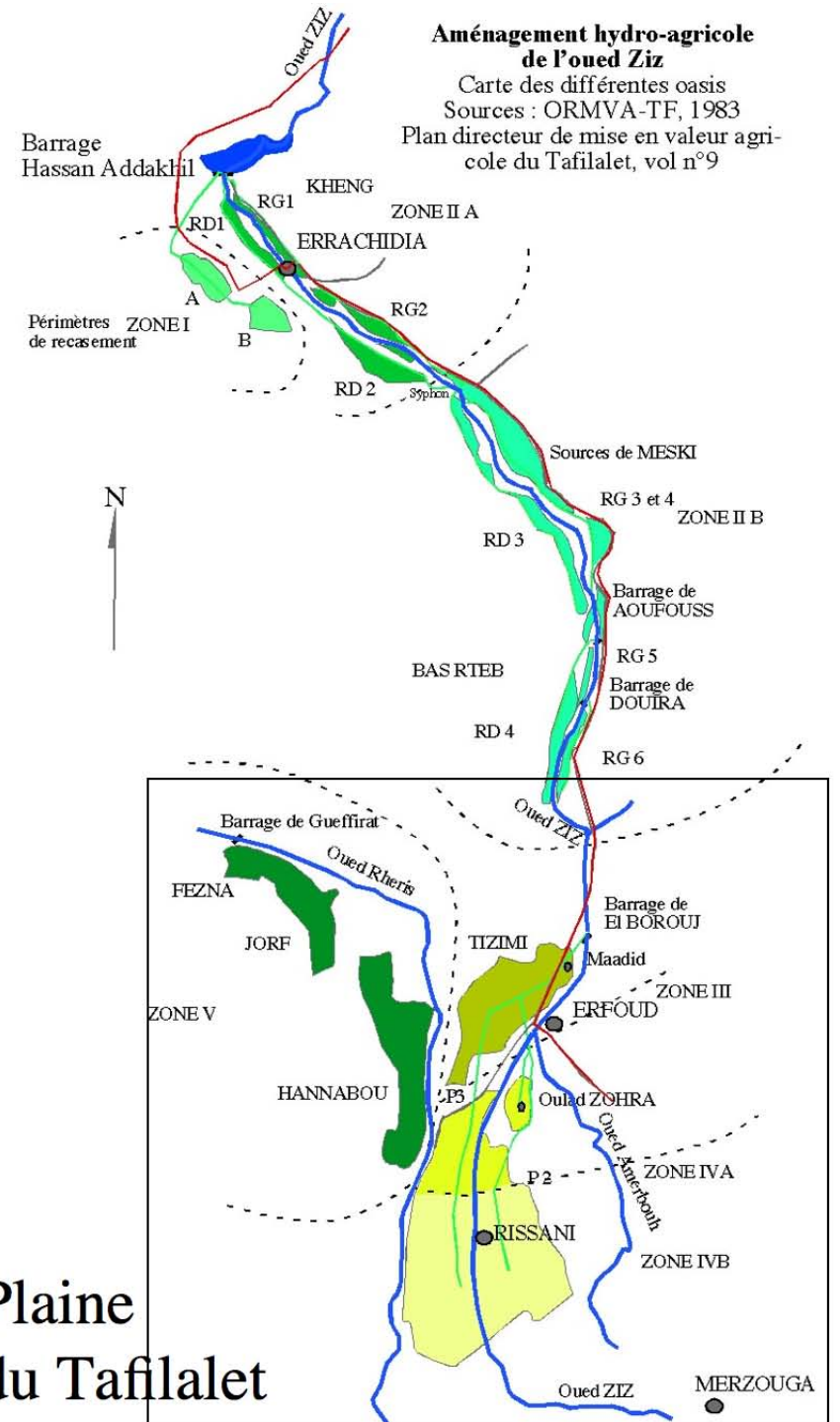
Pumping station in Haouz of Marrakech (map of the ABHT)





Aus der Geograph. Graviranstalt des Bibliograph. Instituts zu Hildburghausen, Amsterdam, Paris u. Philadelphia.

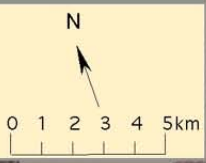
Contrasted areas



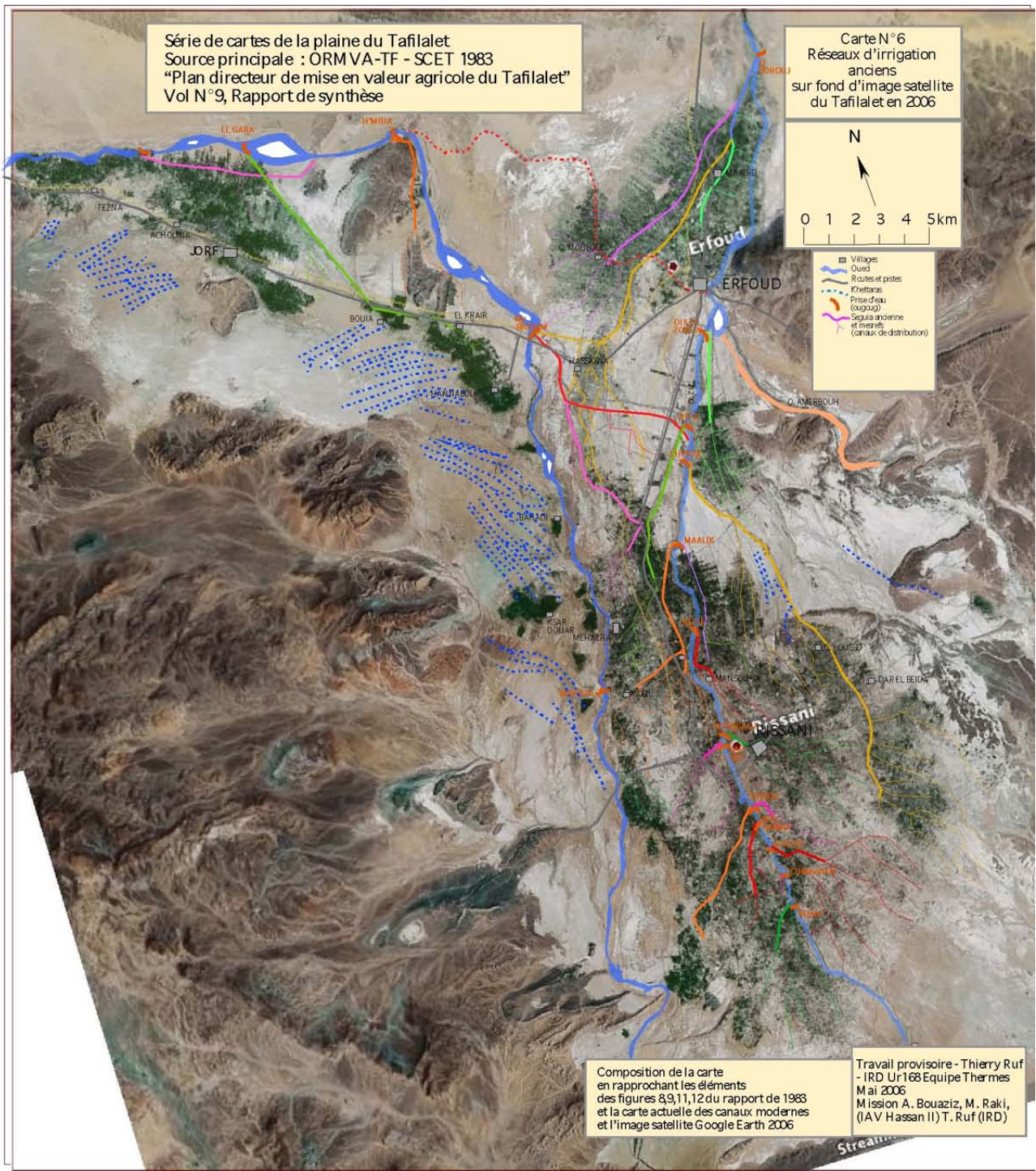
Plaine du Tafilalet

Série de cartes de la plaine du Tafilalet
Source principale : ORM VA-TF - SCET 1983
"Plan directeur de mise en valeur agricole du Tafilalet"
Vol N°9, Rapport de synthèse

Carte N°6
Réseaux d'irrigation
anciens
sur fond d'image satellite
du Tafilalet en 2006



- Villages
- Oued
- Ruines et postes
- Khetans
- Prise d'eau (ouagug)
- Sigala ancienne et misers (canaux de distribution)



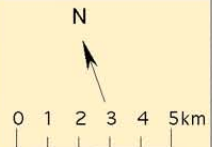
Composition de la carte
en rapprochant les éléments
des figures 8,9,11,12 du rapport de 1983
et la carte actuelle des canaux modernes
et l'image satellite Google Earth 2006

Travail provisoire - Thierry Ruf
- IRD Ur168 Equipe Thermes
Mai 2006
Mission A. Bouaziz, M. Raki,
(IAV Hassan II) T. Ruf (IRD)

Stream...

Série de cartes de la plaine du Tafilalet
Source principale : ORM VA-TF - SCET 1983
"Plan directeur de mise en valeur agricole du Tafilalet"
Vol N°9, Rapport de synthèse

Carte N°7
Réseaux d'irrigation
modernes
sur fond d'image satellite
du Tafilalet en 2006



- Villages
- Oued
- Routes et pistes
- Stations de pompage ORMVATF
- Canaux principaux bétonnés ORMVATF

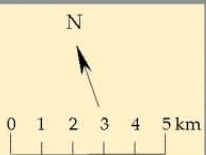


Composition de la carte
en rapprochant les éléments
des figures 8,9,11,12 du rapport de 1983
et la carte actuelle des canaux modernes
et l'image satellite Google Earth 2006

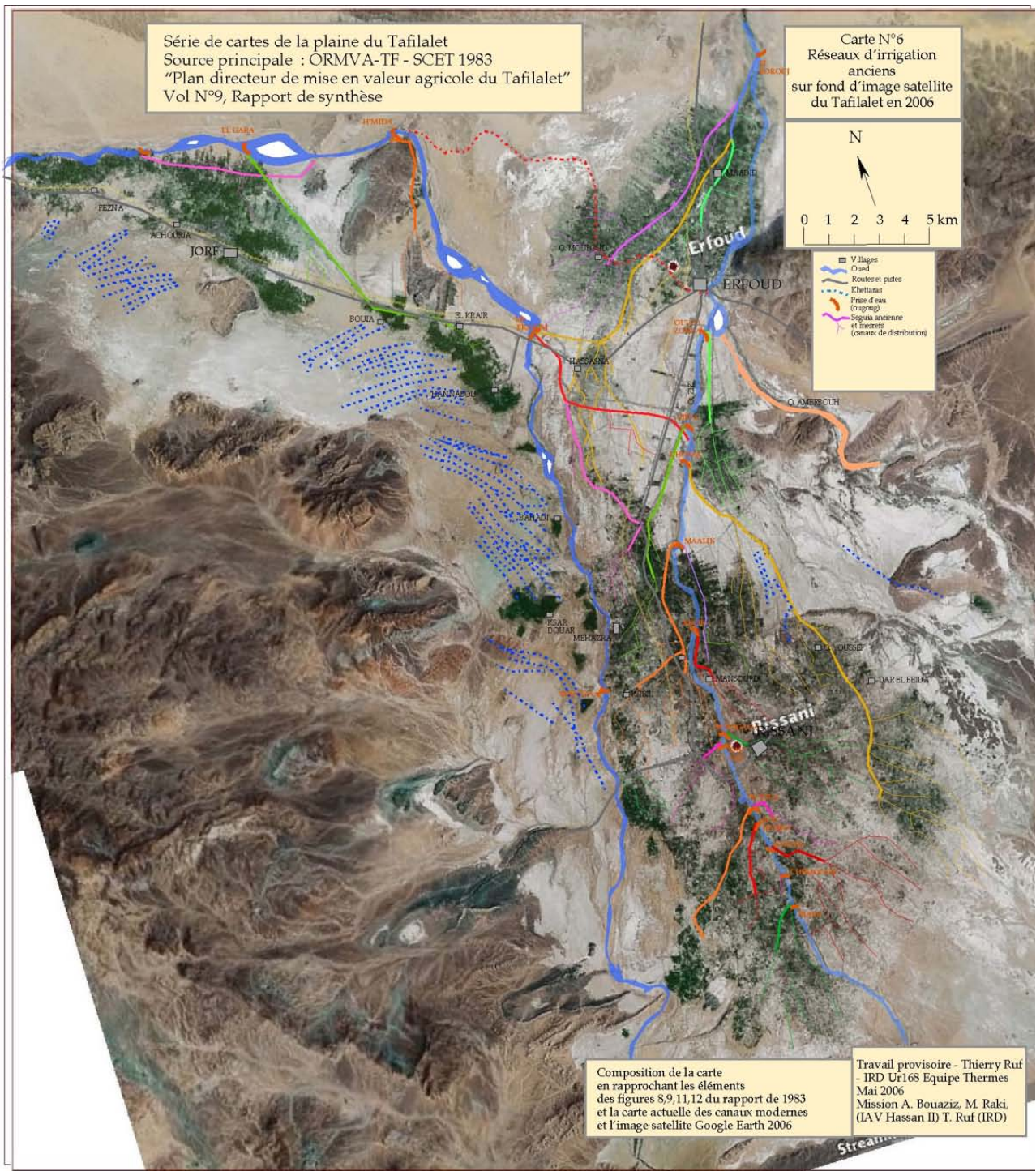
Travail provisoire - Thierry Ruf
- IRD Ur168 Equipe Thermes
Mai 2006
Mission A. Bouaziz, M. Raki,
(IAV Hassan II) T. Ruf (IRD)

Série de cartes de la plaine du Tafilalet
Source principale : ORMVA-TF - SCET 1983
"Plan directeur de mise en valeur agricole du Tafilalet"
Vol N°9, Rapport de synthèse

Carte N°6
Réseaux d'irrigation
anciens
sur fond d'image satellite
du Tafilalet en 2006



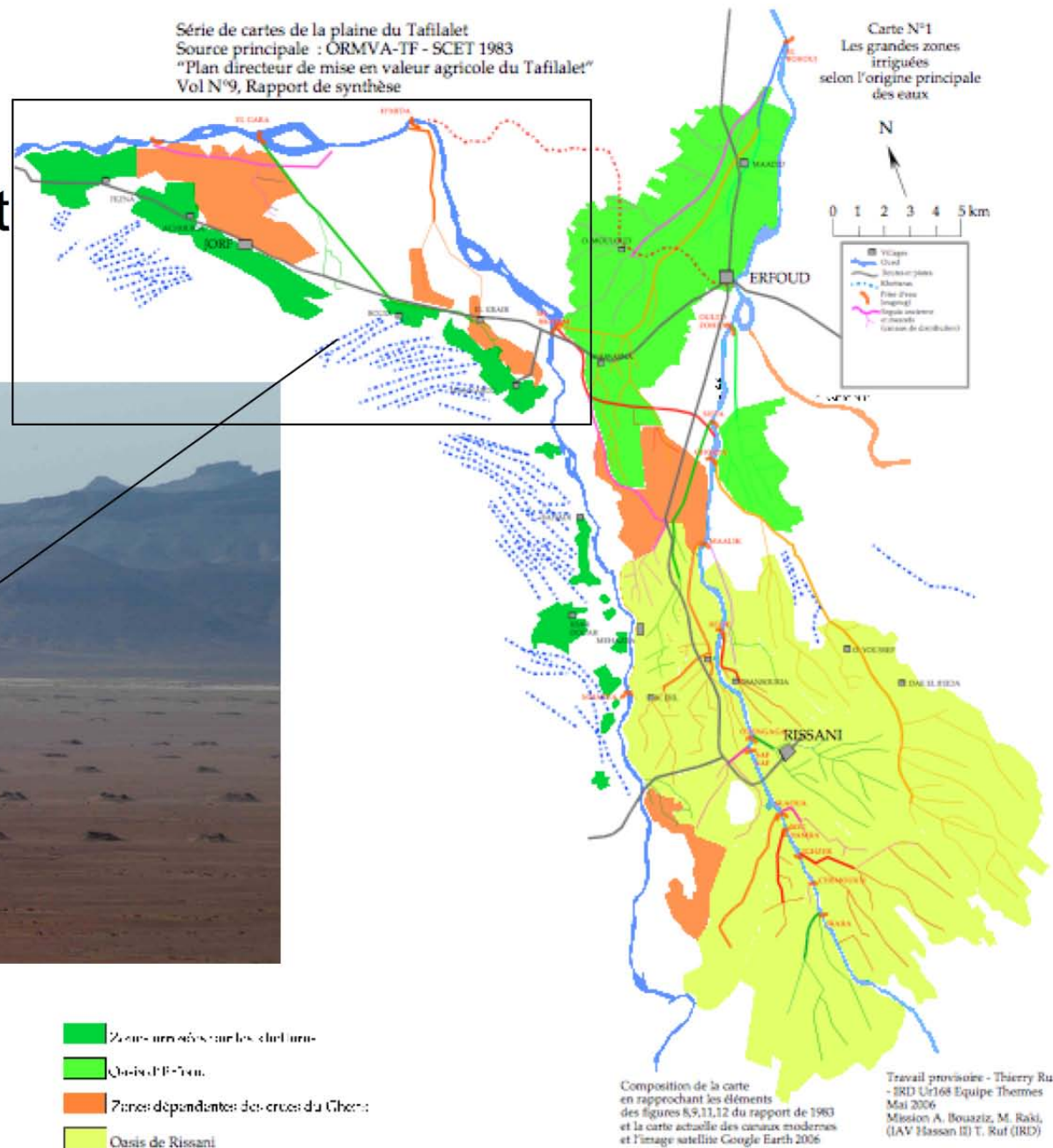
- Villages
- Oued
- Routes et pistes
- Khetlans
- Prise d'eau (ouagag)
- Sigilla ancienne et moderne (canaux de distributeurs)



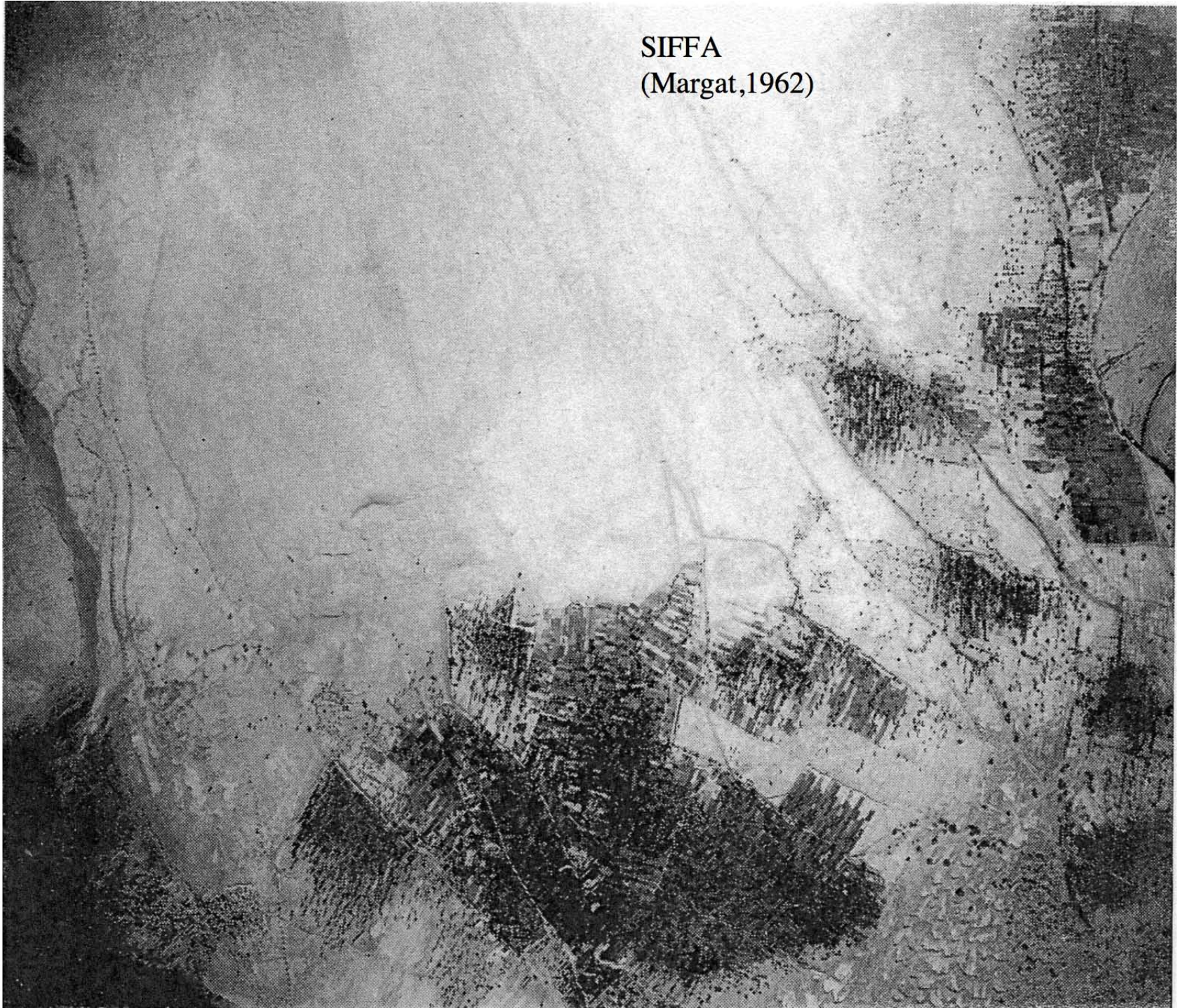
Composition de la carte
en rapprochant les éléments
des figures 8,9,11,12 du rapport de 1983
et la carte actuelle des canaux modernes
et l'image satellite Google Earth 2006

Travail provisoire - Thierry Ruf
- IRD Ur168 Equipe Thermes
Mai 2006
Mission A. Bouaziz, M. Raki,
(IAV Hassan II) T. Ruf (IRD)

Cartography Irrigated zones connected to different schemes



SIFFA
(Margat,1962)



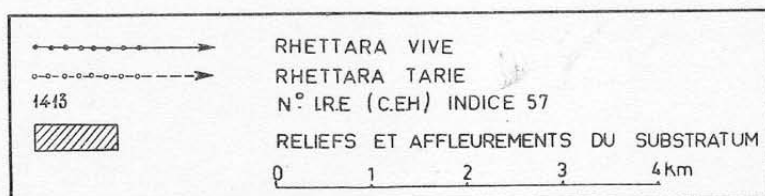
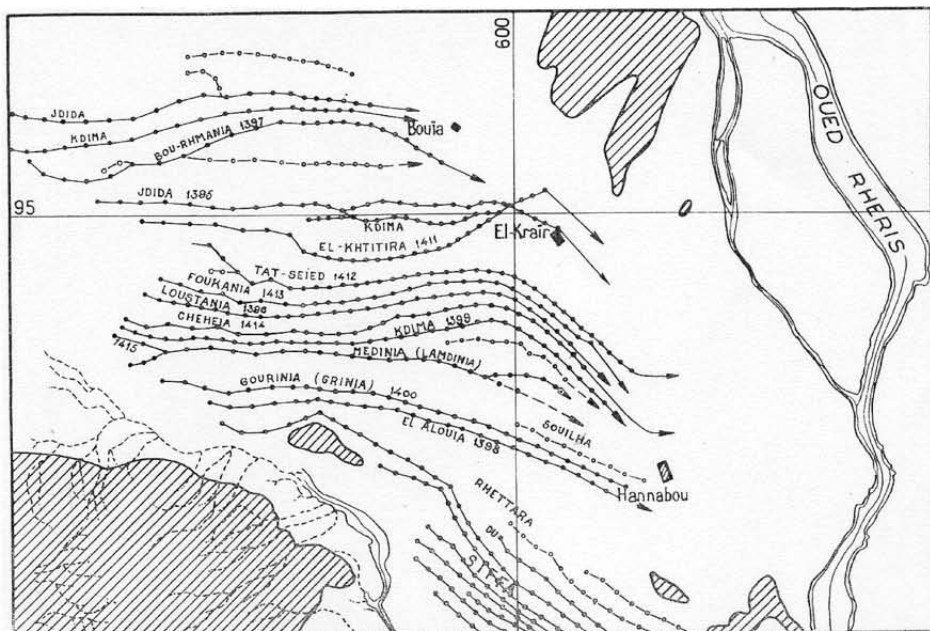


Fig. 85 : Plan du réseau de Rhettara d'Hannabou

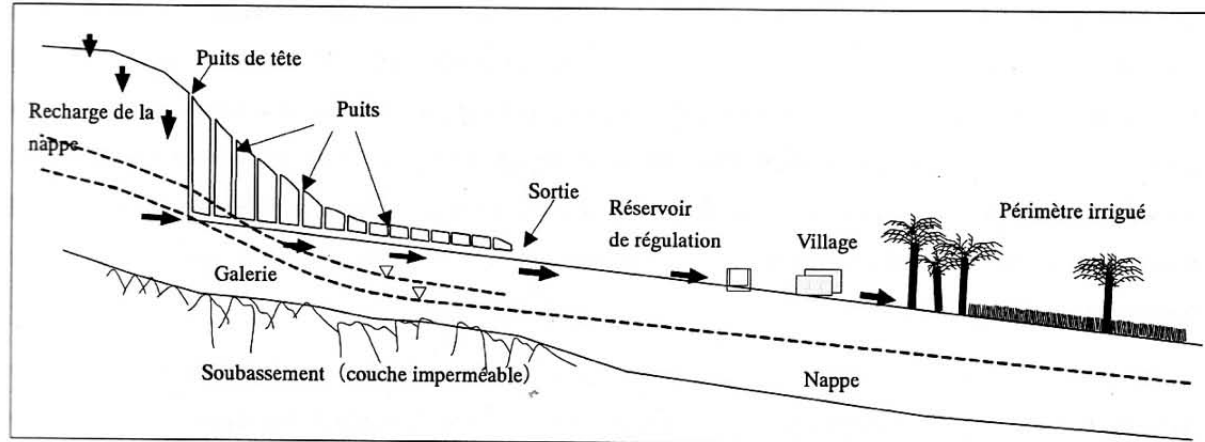
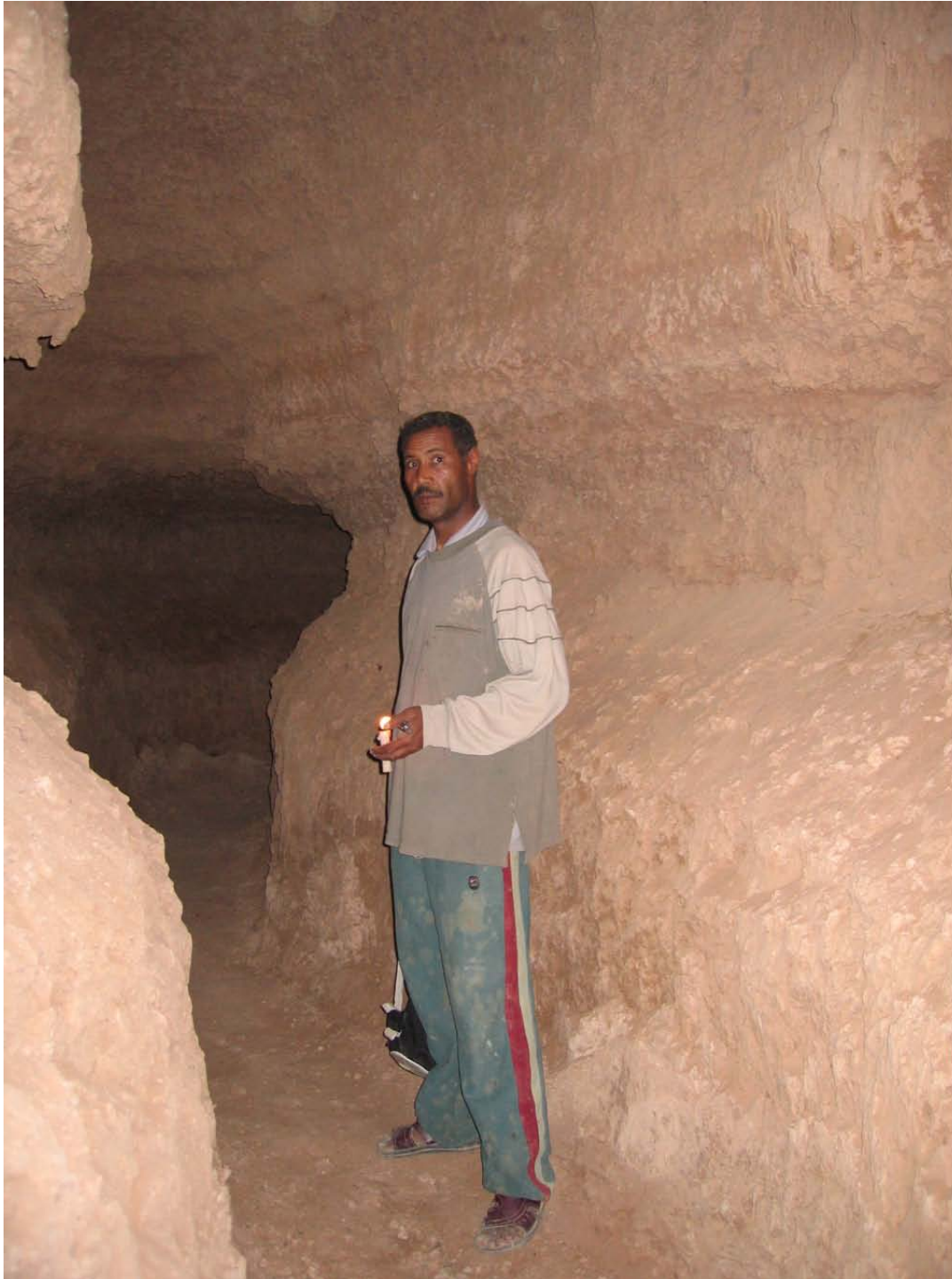


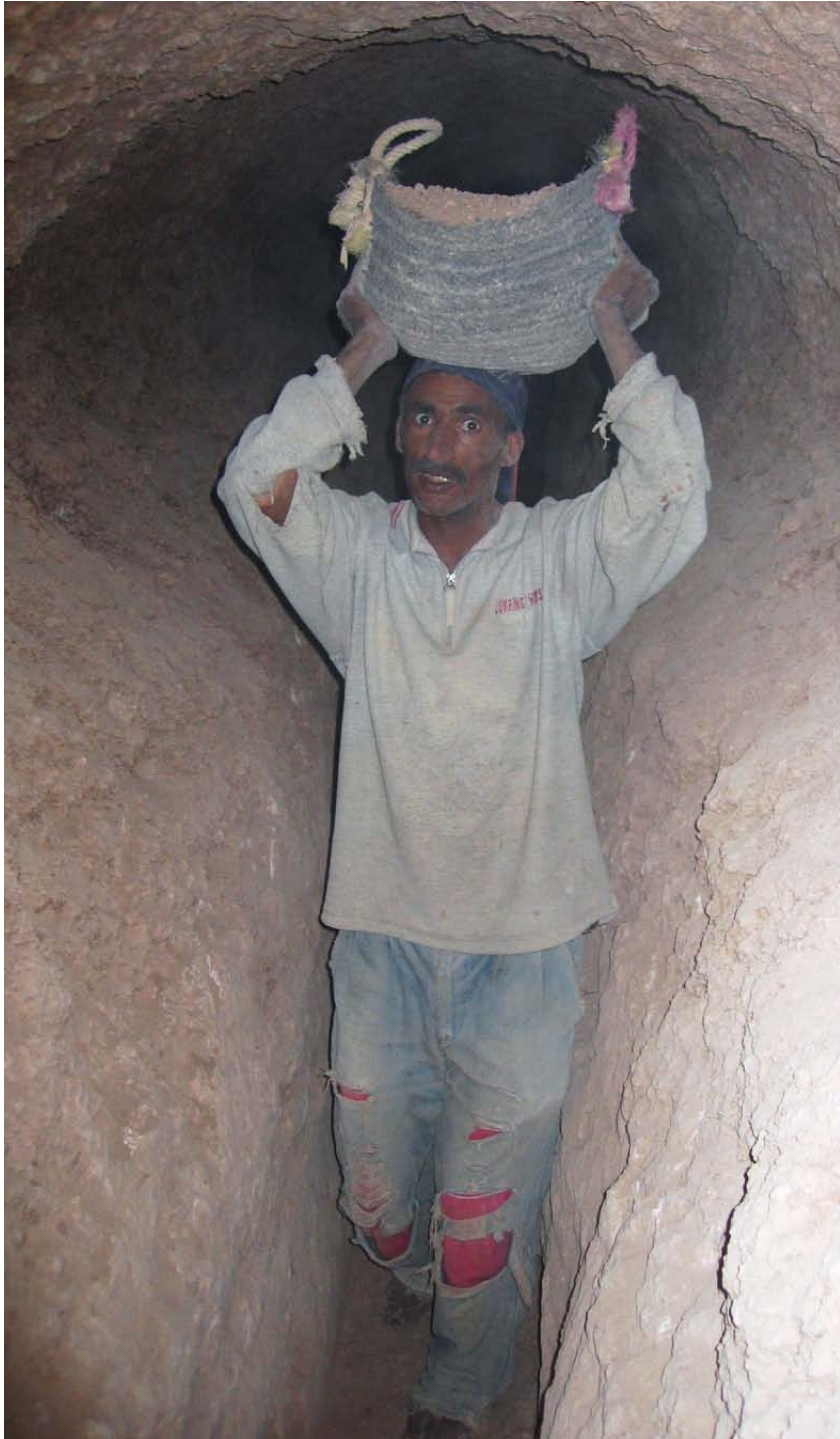
Schéma simplifié d'une khattara



Water come back !

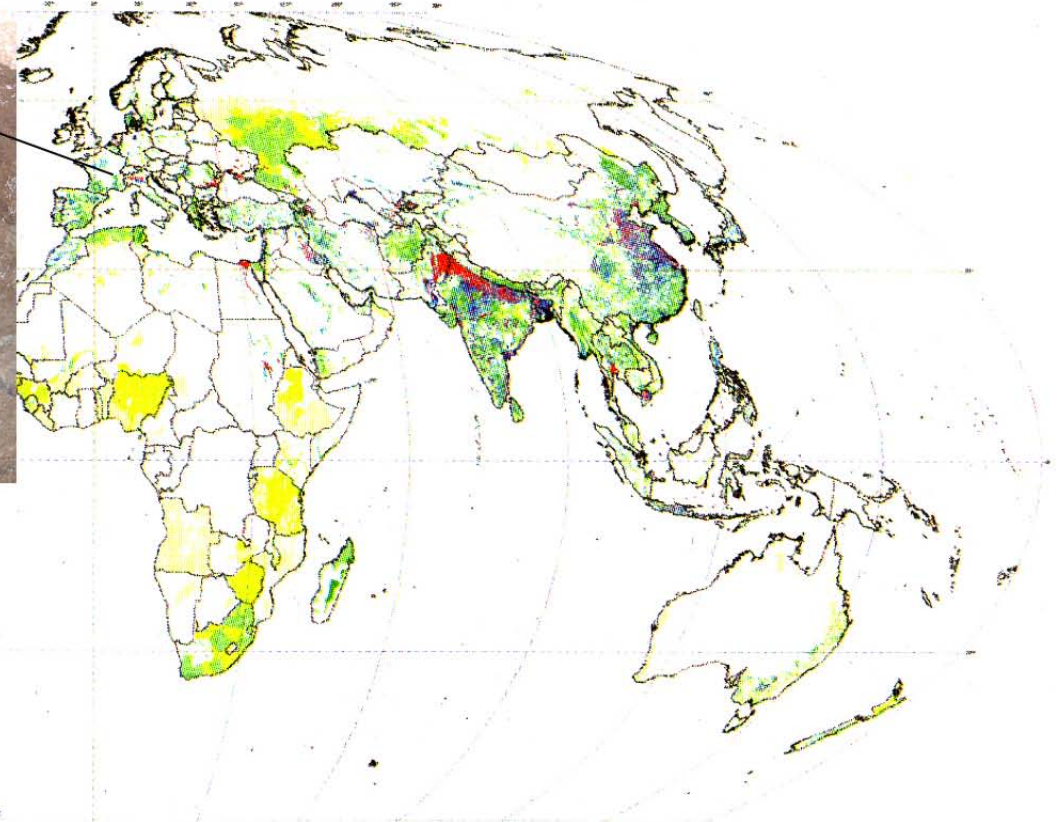








Zones sous irrigation dans le monde, 2000



“Qanats” in France



Map Projection: Mollweide

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.

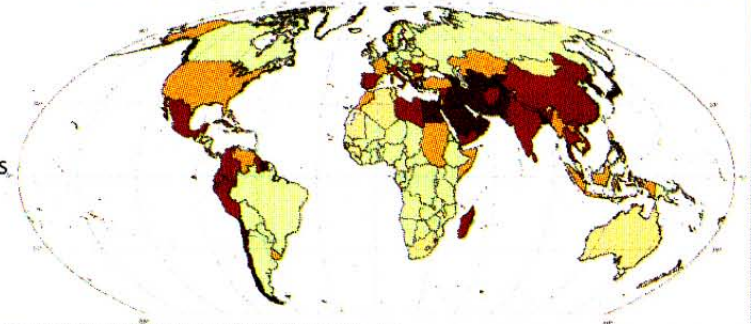
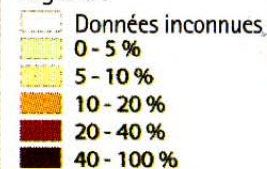
Source: Siebert et al, 2005; FAO/Aquastat, 2005.

Zone sous irrigation en pourcentage de terres immergées



Zone sous irrigation en pourcentage de terres cultivées (2002)

Légende



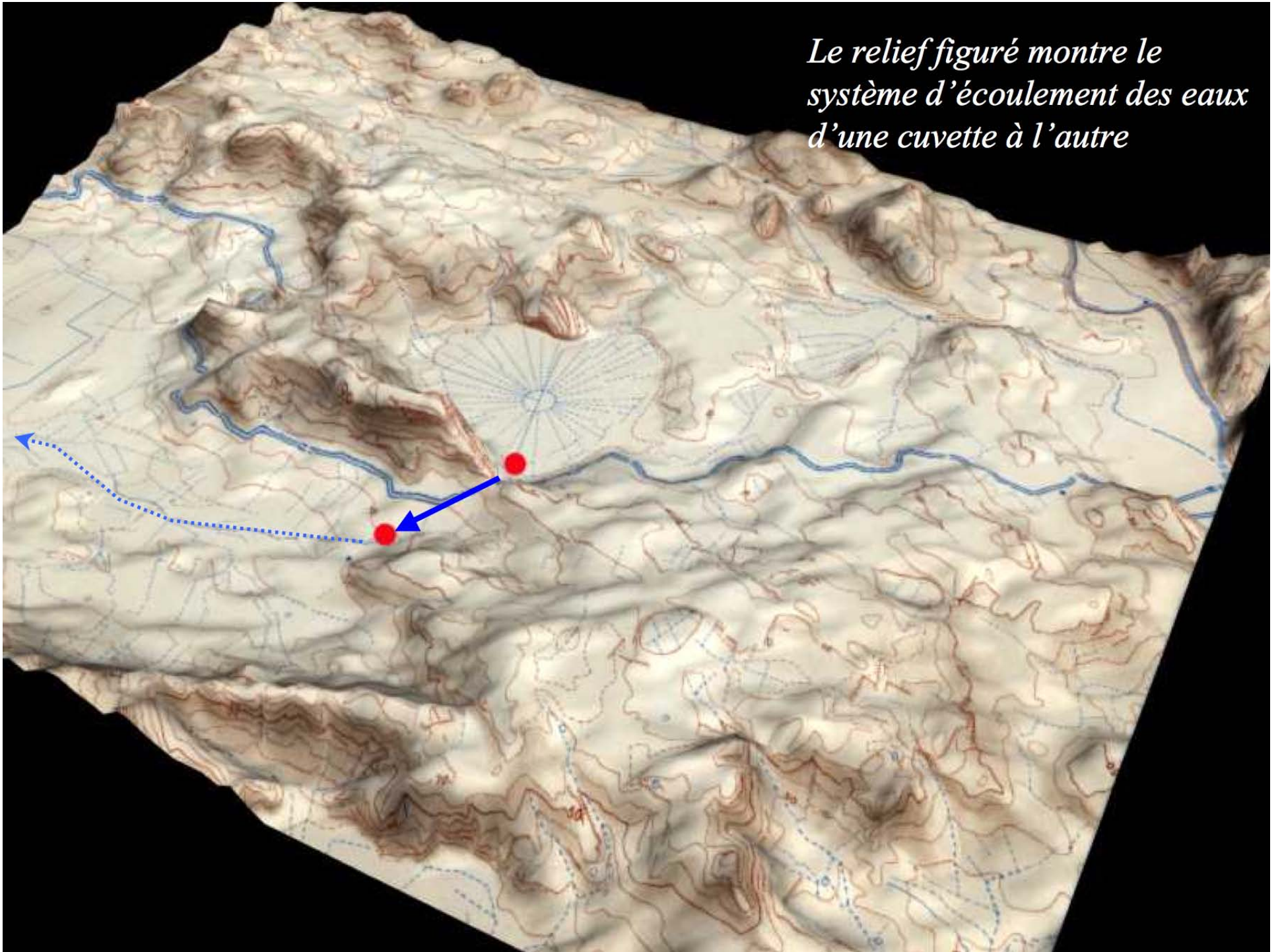


L'étang de Montady

Carte 18e Garipuy 1774



Le relief figuré montre le système d'écoulement des eaux d'une cuvette à l'autre

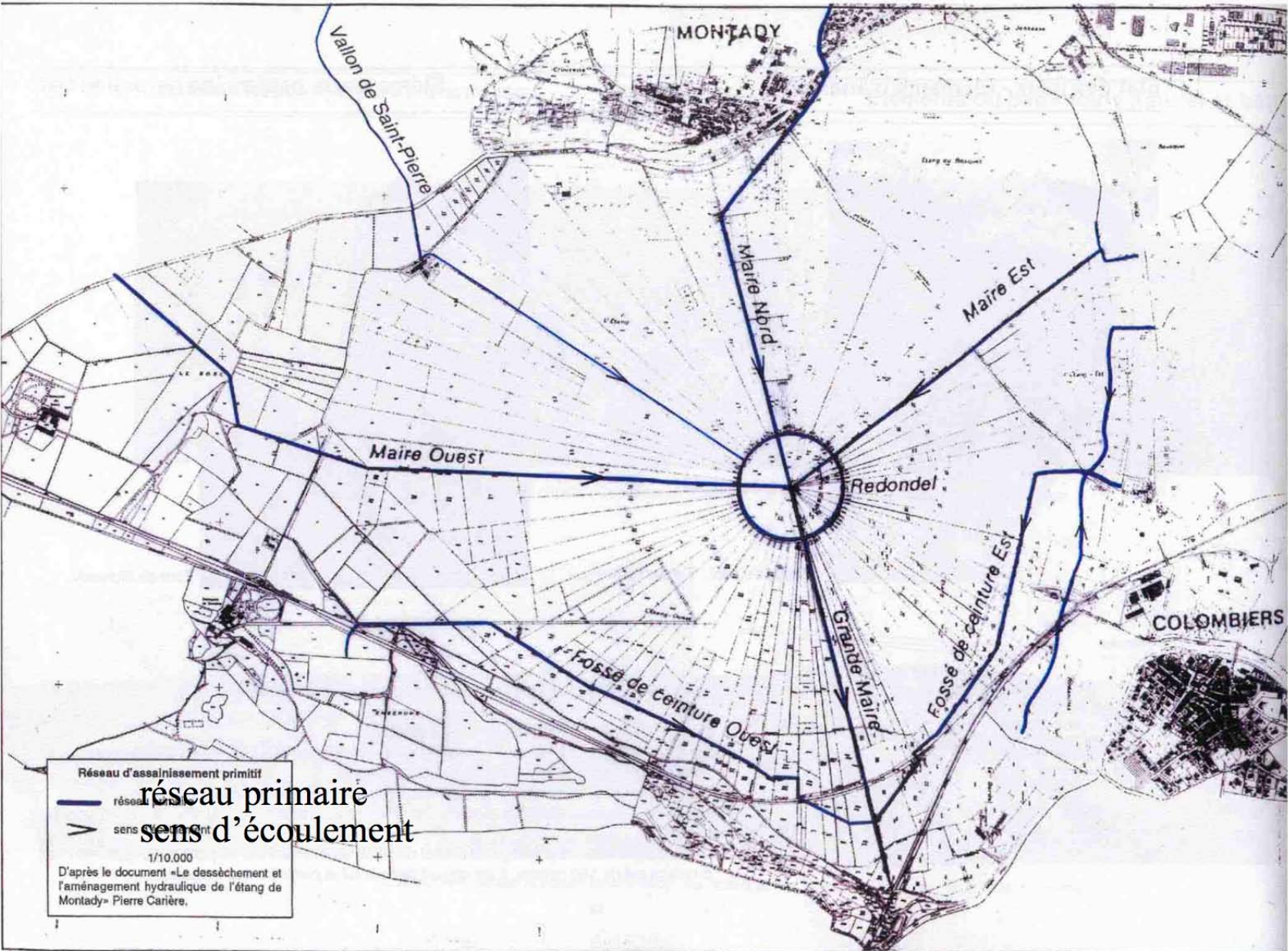




16



Réseau d'assainissement primitif



Sud aval



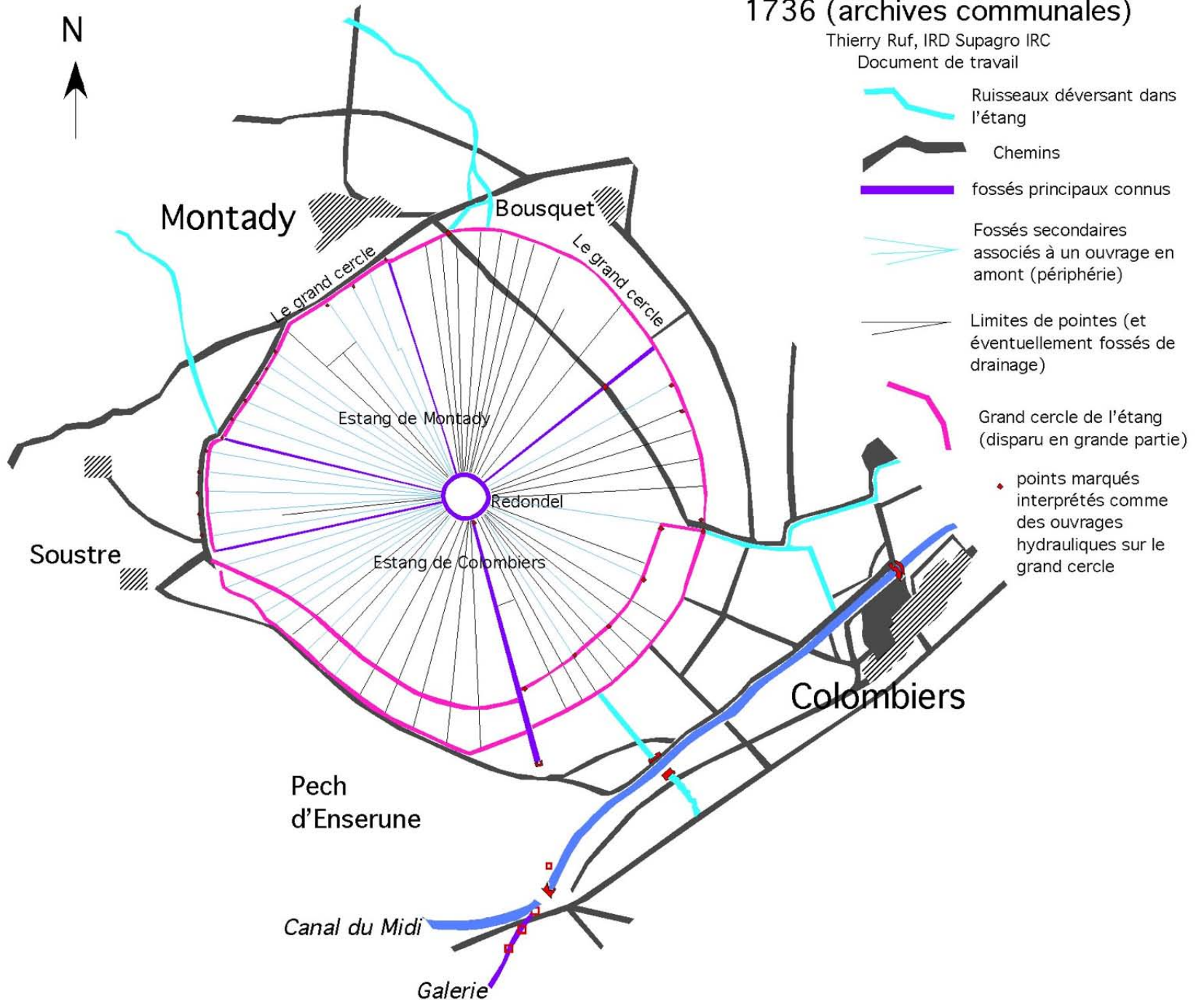
Interprétation de la carte de 1735 1736 (archives communales)

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

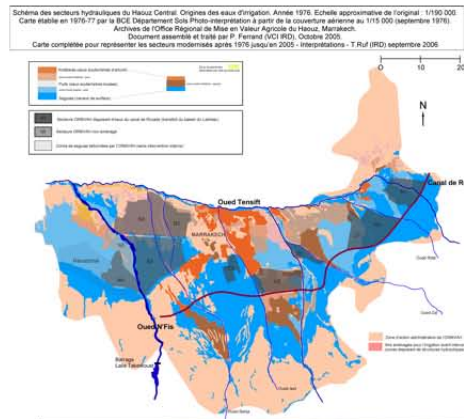


Working in cooperation, sharing experiences, and visions : a common construction

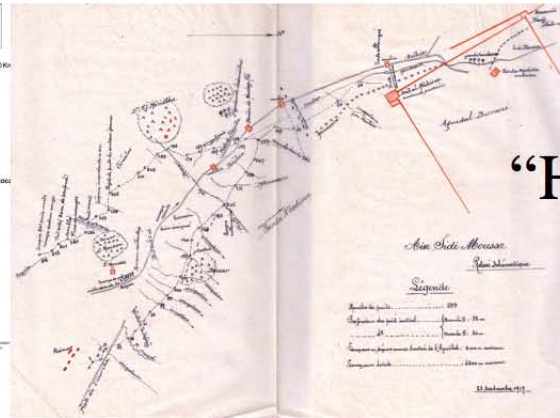


3- What we may learn from the “commons” approach through larger scale in history and experiences in the XXIth century

“Territorial”



“Historical”

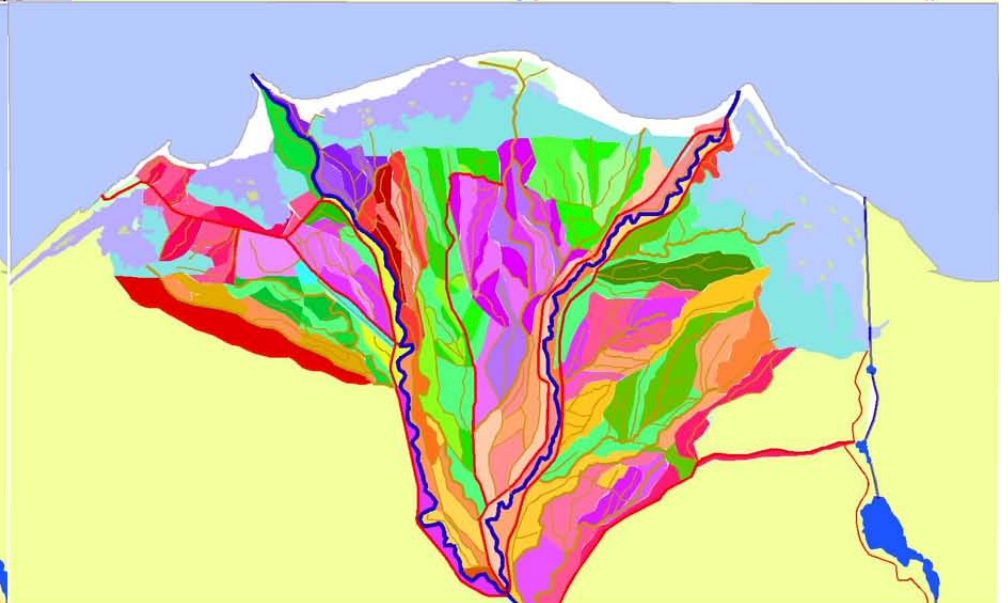
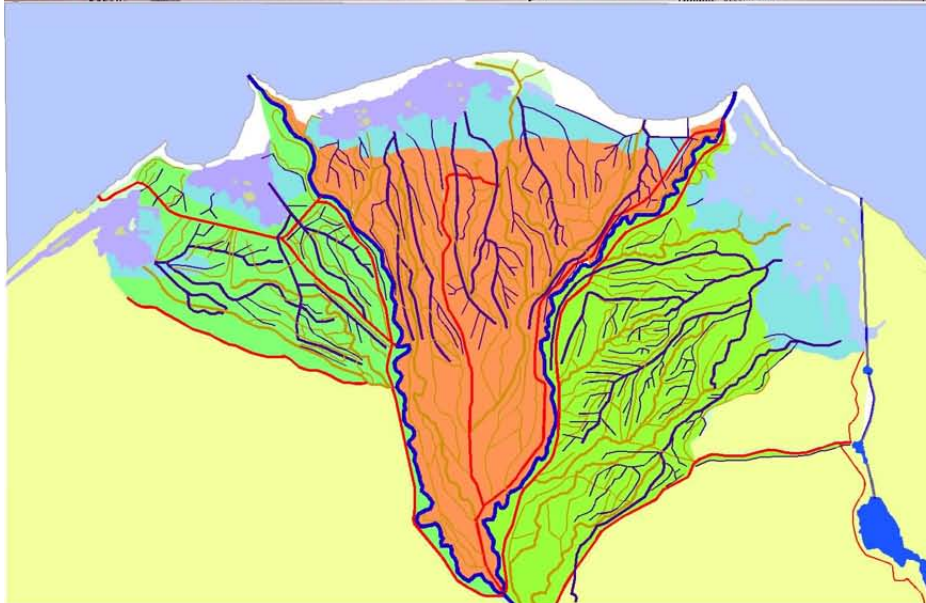
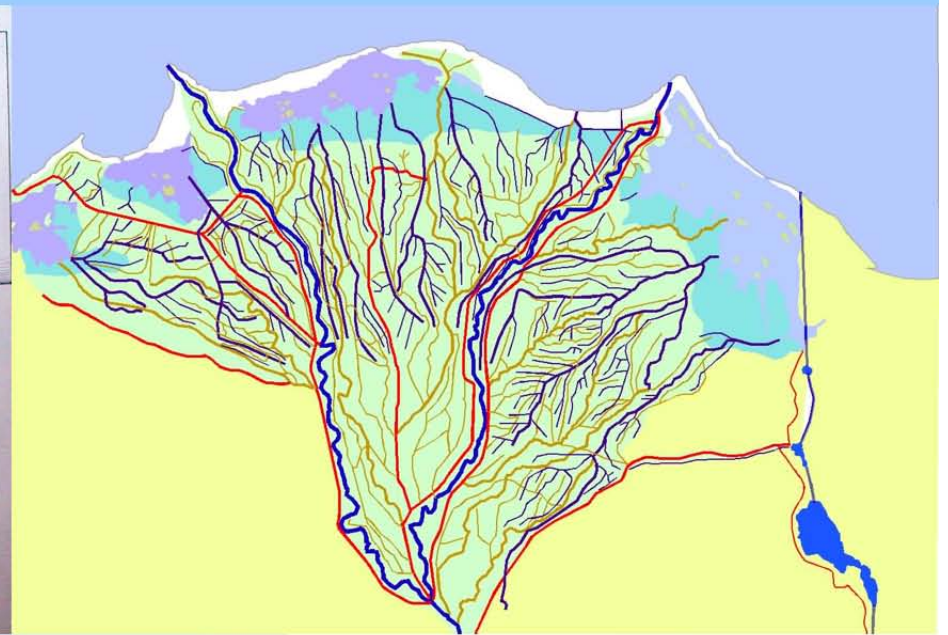
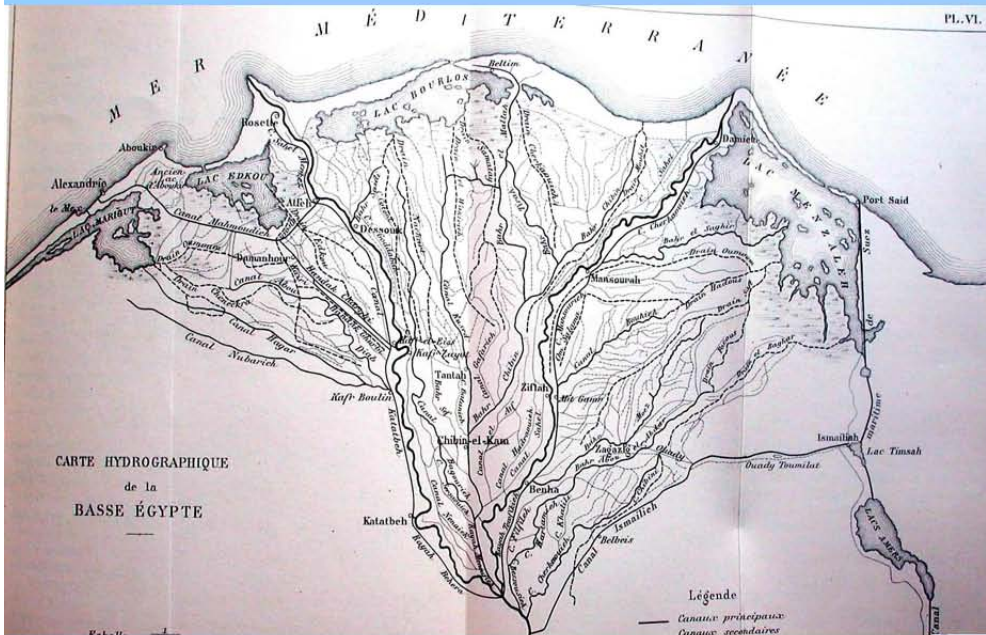


“social and institutional”



“agricultural and hydrological”

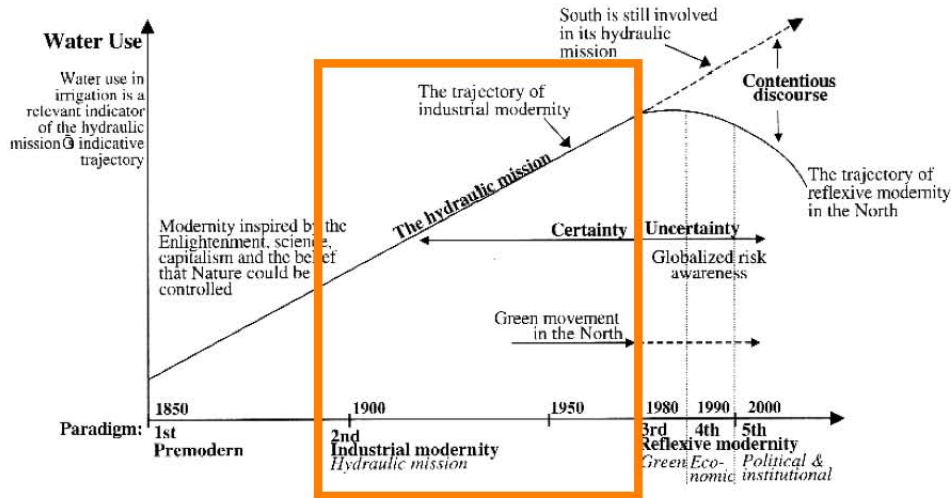
A territorial understanding



- 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.

An historical understanding

Modernity theory and the trajectories & paradigms of water risk management

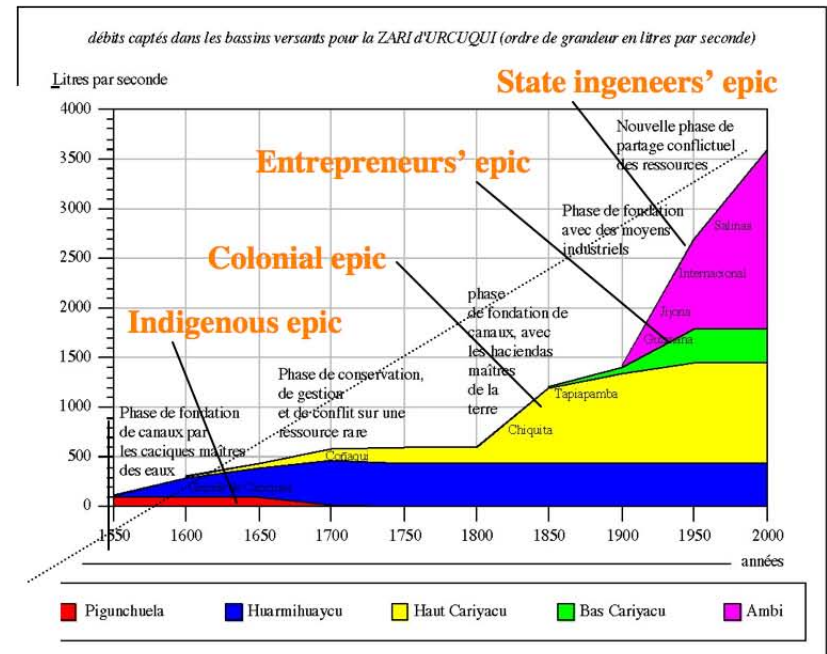
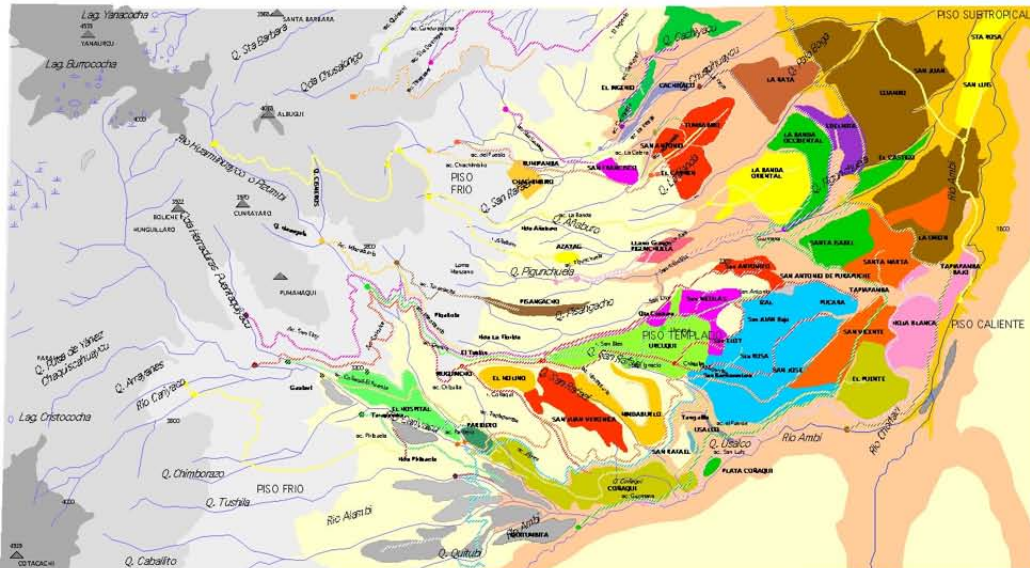


URCUQUI DYNAMIQUE HISTORIQUE DE CAPTATION DES RESSOURCES HYDRIQUES PAR BASSIN VERSANT

Périodes débits captés dans les bassins versants pour la ZARI d'URCUQUI (ordre de grandeur en litres par seconde)

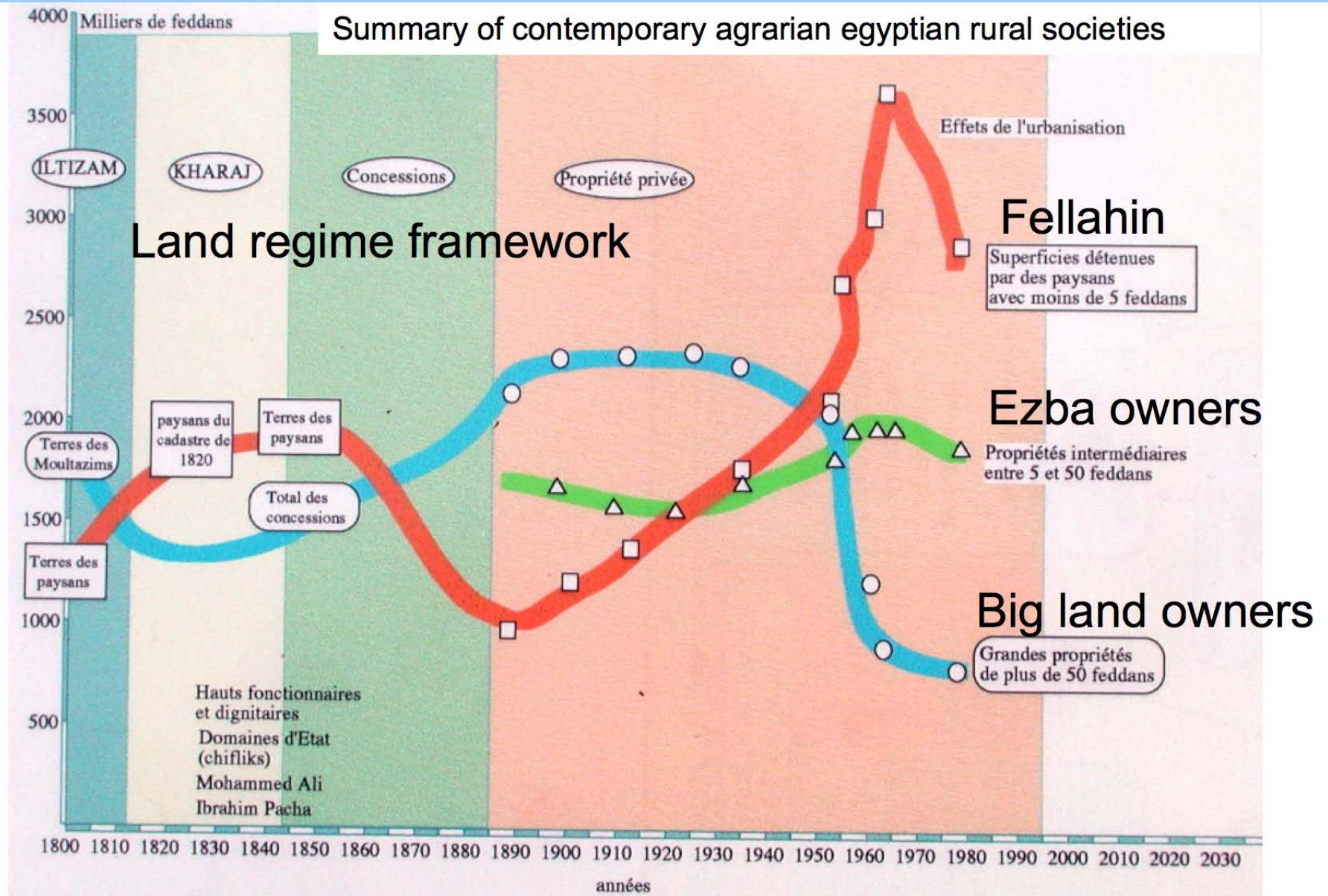
	Pigunchuela	Huarmihuaycu	Haut Cariyacu	Bas Cariyacu	Ambi	total	système représentatif
1500 - 1550	100	20				120	Coambo (Pigunchuela)
1550 - 1600	100	200	20			320	Caciques (Huarmihuaycu)
1600 - 1650	100	300	50			450	Coñaqui (Huarmihuaycu)
1650 - 1700	20	450	110			580	Coñaqui (Cariyacu)
1700 - 1750		450	150			600	
1750 - 1800		450	150			600	
1800 - 1850		450	750	20		1220	Chiquita (Cariyacu)
1850 - 1900		450	900	50	20	1420	Tapiapamba (Cariyacu)
1900 - 1950		450	1000	350	900	2700	Jijona (Ambi)
1950 - 2000		450	1000	350	1800	3600	Salinas (Ambi)

Après 1650	Saturation	Saturation	Saturation	Saturation	Saturation
seul la rive gauche prélevée de l'eau.	acquise au XVIIe siècle	acquise au XIXe siècle	acquise au début du XXe siècle	acquise à la fin du XXe siècle	



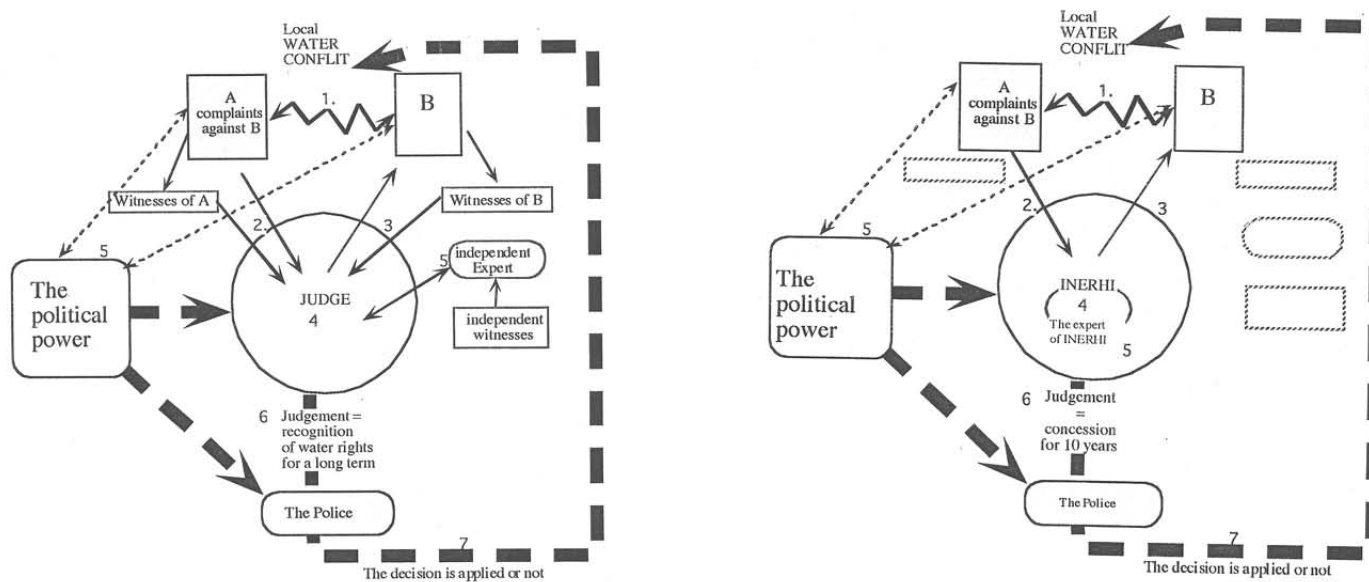
- describes how these systems have been able to exist according to sequences that are related to cycles of schemes, management and crisis, new foundations, rehabilitation and new organisation.

A social understanding



- 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.

An institutional understanding



Arbitration and development of a water conflict before the nationalisation of water (1972).

Arbitration and development of a water conflict after the nationalisation of waters (1972).

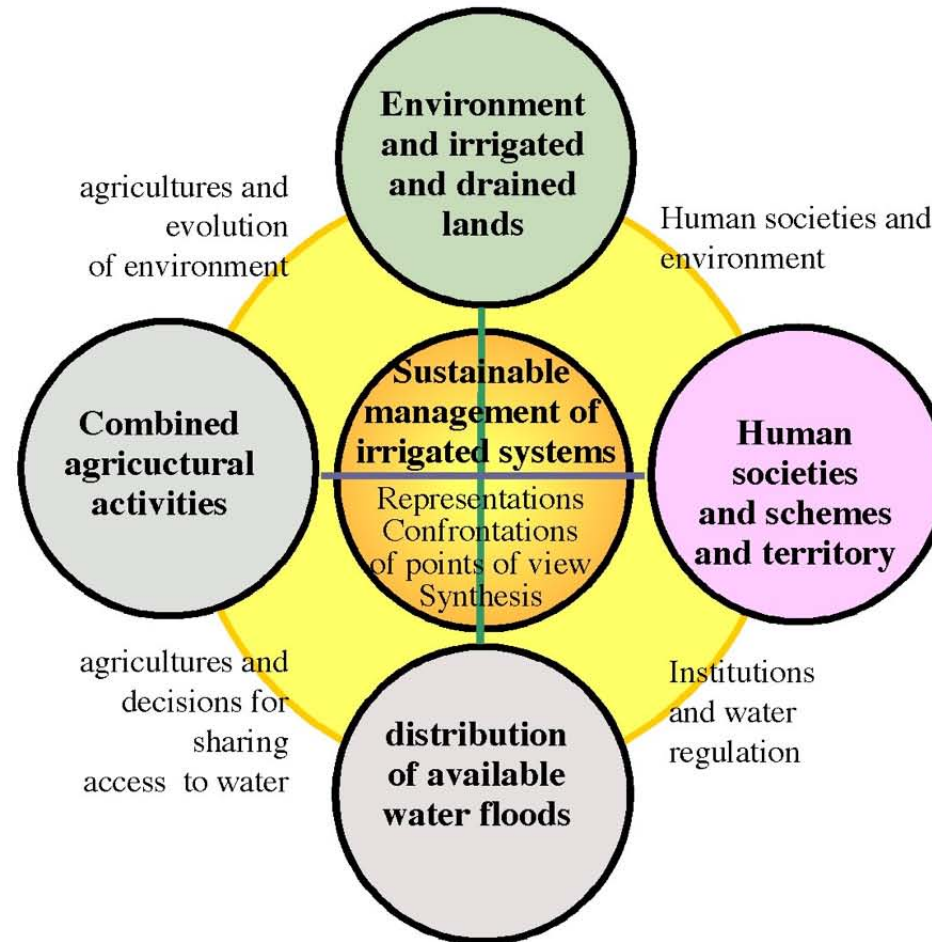
1. The conflict exists, but no negotiation appears and leads to any agreement.
2. A party A complains to the authorities and uses some favorable witnesses.
3. The party B defends and uses others witnesses
4. The authority takes account of the demand and notes the points of view.
5. An expert is in charge to understand the conflict in the field, sometimes with the help of others new witnesses. In the same time, the different groups use political influences
6. A judgement is done, following the laws and below the interpretations of the judges. It may be contested (and it goes to a high jurisdiction)
7. The political power applies the decision or does not, what diminishes or increases the conflict.

1. The conflict exists, but no negotiation appears and leads to any agreement.
2. A party A complains to the authorities and uses some favorable witnesses. regional agency of INERHI.
3. The party B defends itself.
4. The INERHI notes the problem.
5. INERHI names a engineer from its agency in charge to find on the fields the technical elements to compare with the normes of allocation defined by INERHI. In the same time, the different groups use political influences.
6. A concession is given for ten years. It might be contested (to the central administration of INERHI, and after that to the tribunals).
7. The political power applies the decision or does not, what diminishes or increases the conflict.

Figure 1

- 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

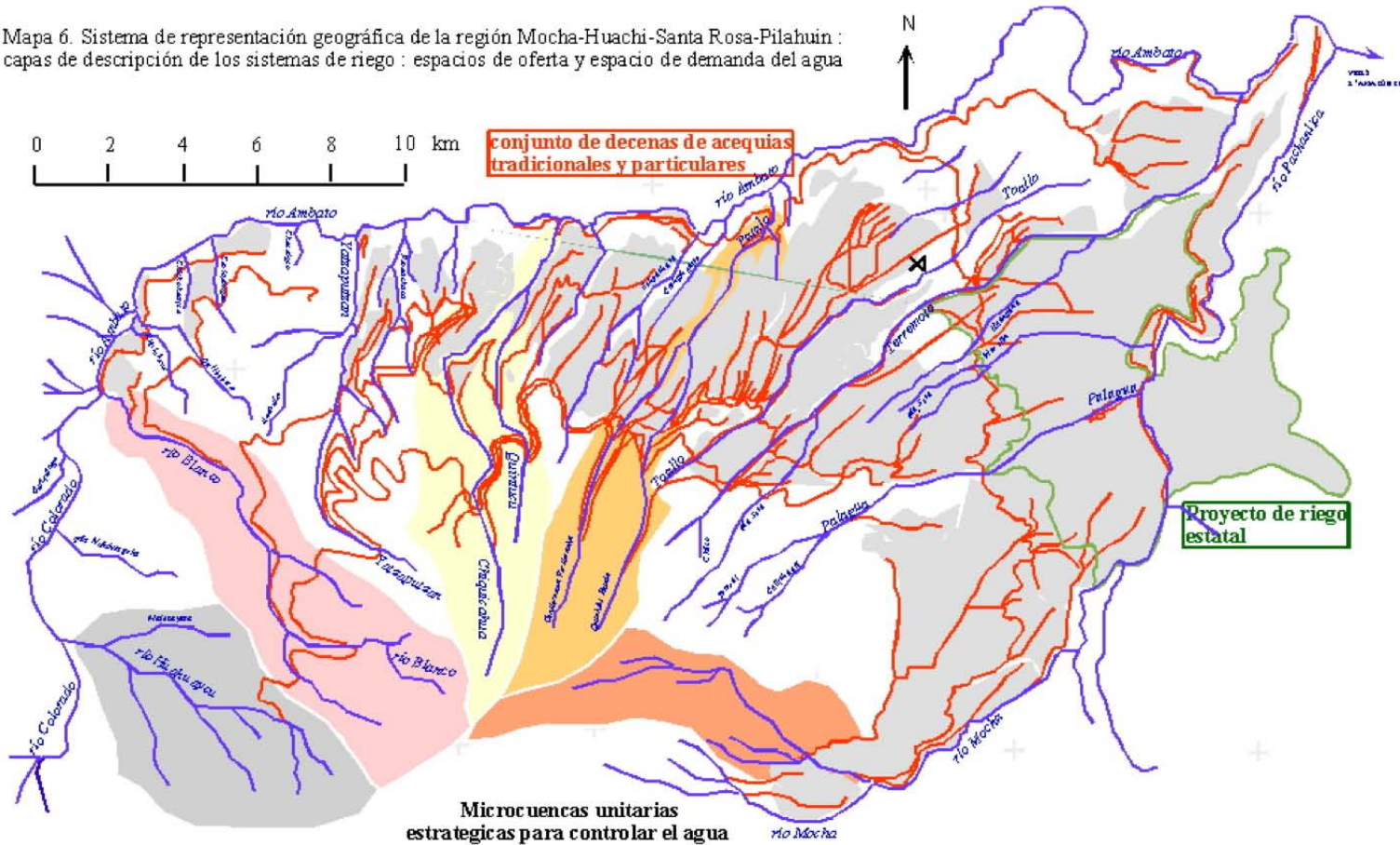


**An integration of knowledge for the actors
of a sustainable management of irrigated systems**

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

A hydrological understanding

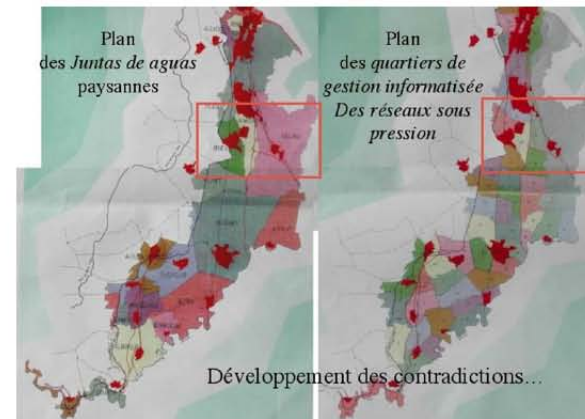
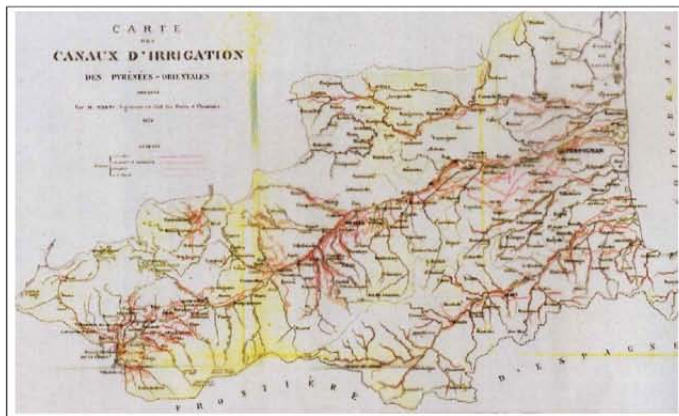
Mapa 6. Sistema de representación geográfica de la región Mocha-Huachi-Santa Rosa-Pilahuín : capas de descripción de los sistemas de riego : espacios de oferta y espacio de demanda del agua



Réalisation Thierry Ruf, 1996-98 según Ruf, Borhommeau Le Goulier, Proaño, Segovia, Romo
Mapa de la Zona de análisis y recomendaciones de la irrigación de SANTA ROSA PILAHUÍN (1:25.000) (1991)
y mapa de inventario de la zona de MOCHA HUACHI. Proyecto INERHI - ORSTOM, 1994

- 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.

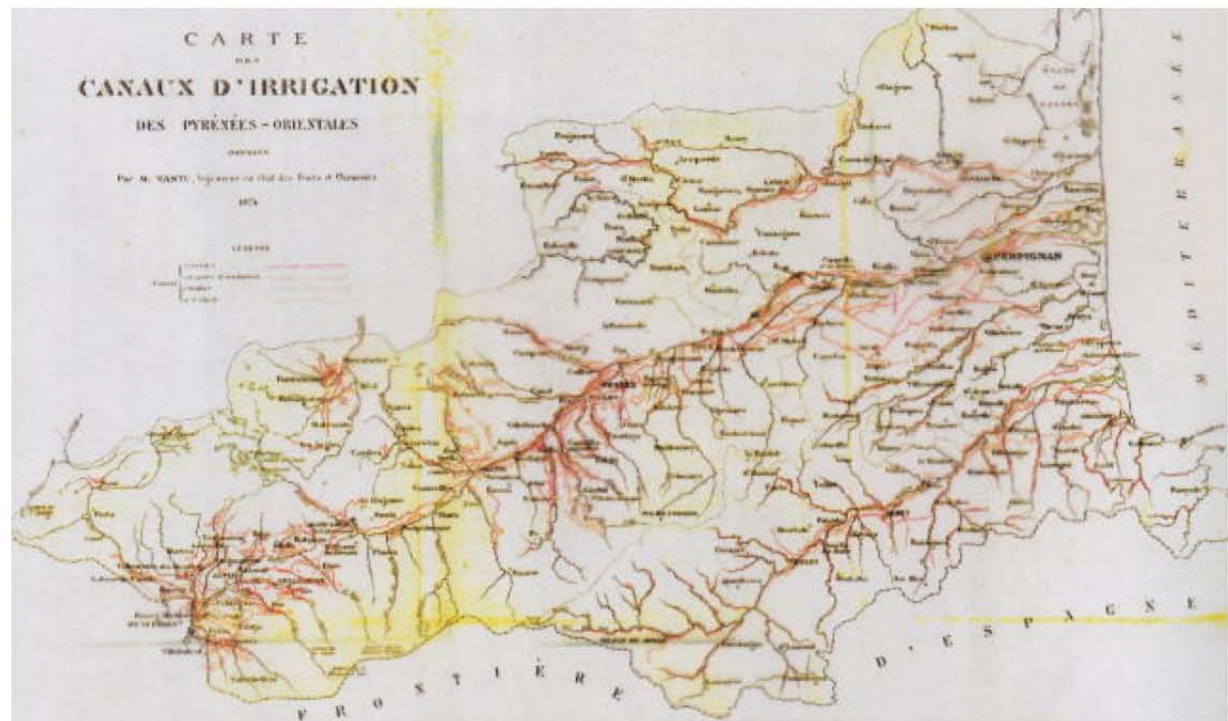
Conclusions, issues



1. CONTRADICTIONARY 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"

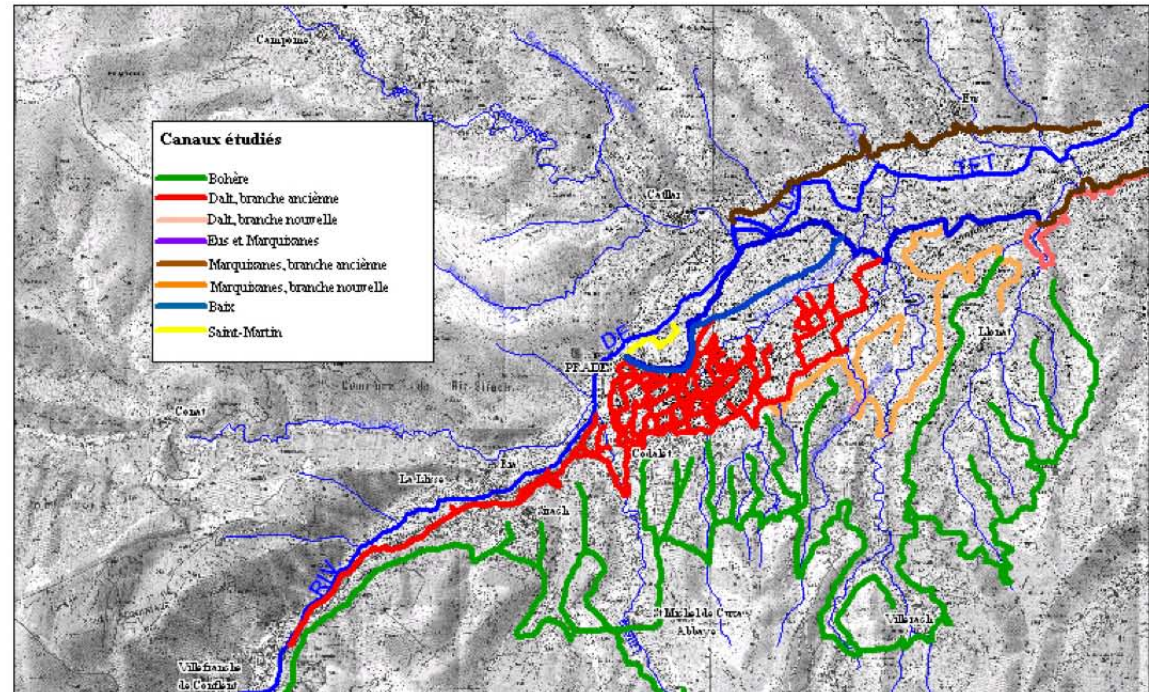
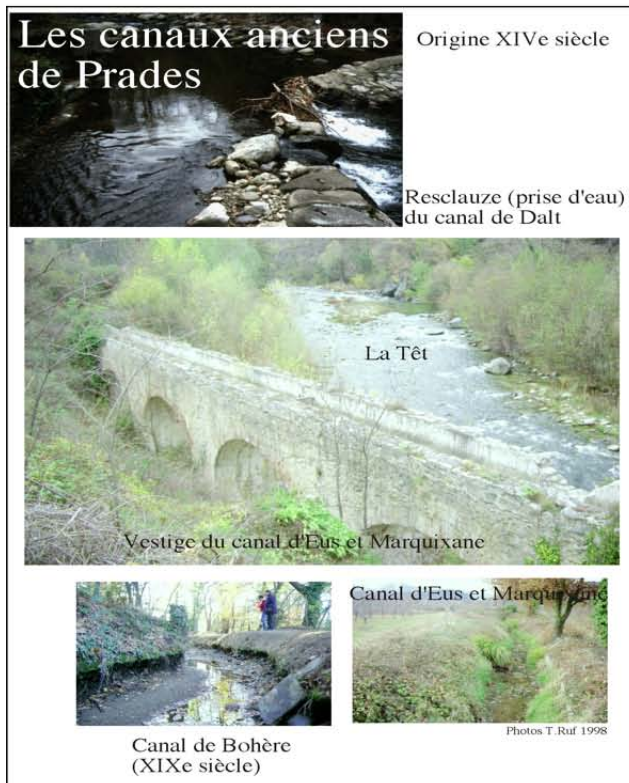
The collection of money for irrigation water is a point of divergence between the different models. From the point of view of the local actors, the fee is perceived as:

- 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.



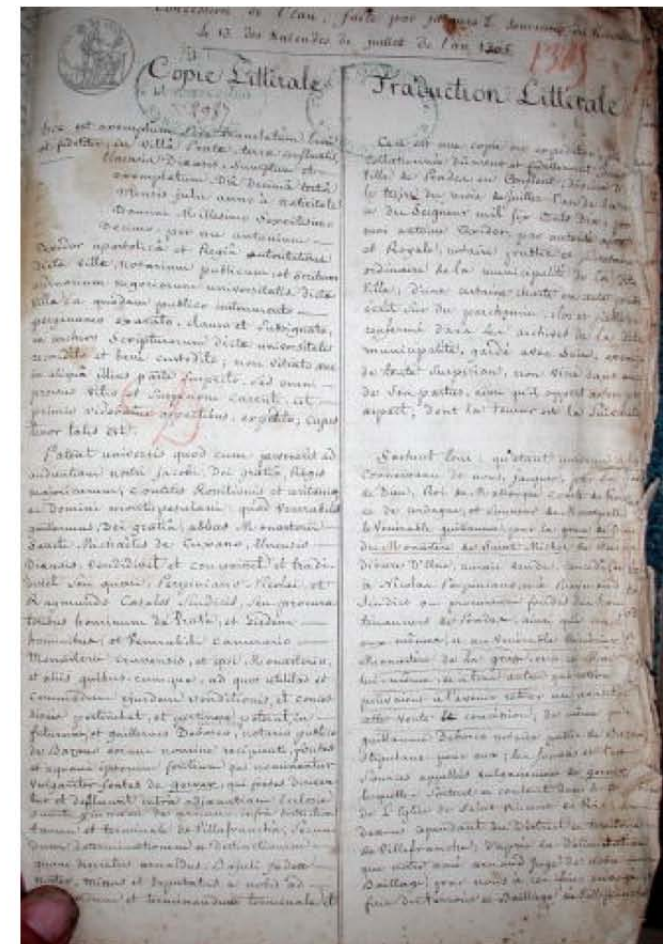
5. DIFFERENCES IN KNOWLEDGE BETWEEN PEASANTS AND ENGINEERS

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.



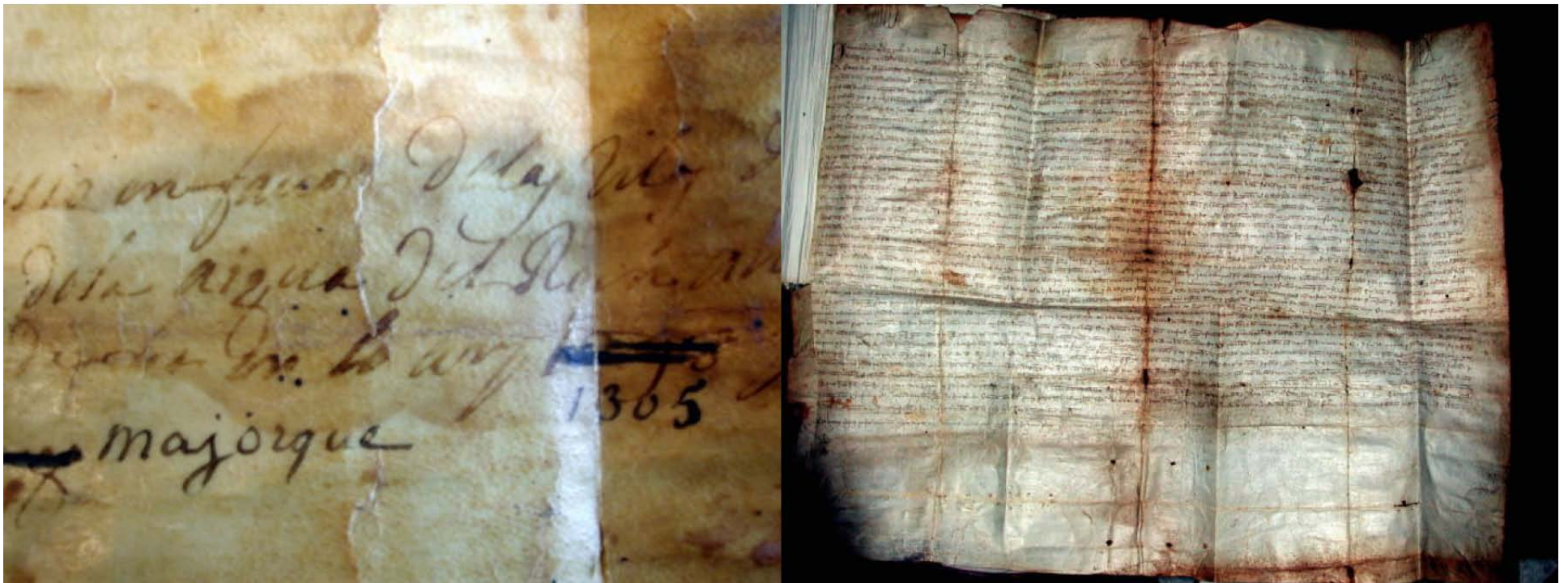
6. CONFUSION OF ROLES MAINTAINED BY LEGAL FRAMEWORKS

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.



Thank you

www.archivesirrigation.org

www.isiimm.agropolis.org/

www.gred.ird.fr/

<http://www.supagro.fr/>

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Hani schemes

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