

How the farmers of El Guerdane (Morocco) integrate the diminution of water access and the new schemes of watersharing for drop irrigation



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Comment se sont adaptés les agriculteurs d'El Guerdane (Maroc) à la diminution de l'accès à l'eau et à la mise en place d'un système de distribution d'eau pour l'irrigation localisé ?



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Presentation outlines

1. **The context of Guerdane**
2. **History of successive schemes**
3. **The new project of Guerdane**
4. **Effects of the new paradigmes**
5. **Colateral projects for small farmers**
6. **conclusion**





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Plan de la Présentation

1. **Le contexte de Guerdane**
2. **Histoire des aménagements hydro-agricoles successifs**
3. **Le nouveau projet de Guerdane**
4. **Les effets des nouveaux paradigmes**
5. **Les projets colatéraux pour les petits producteurs**
6. **conclusion**

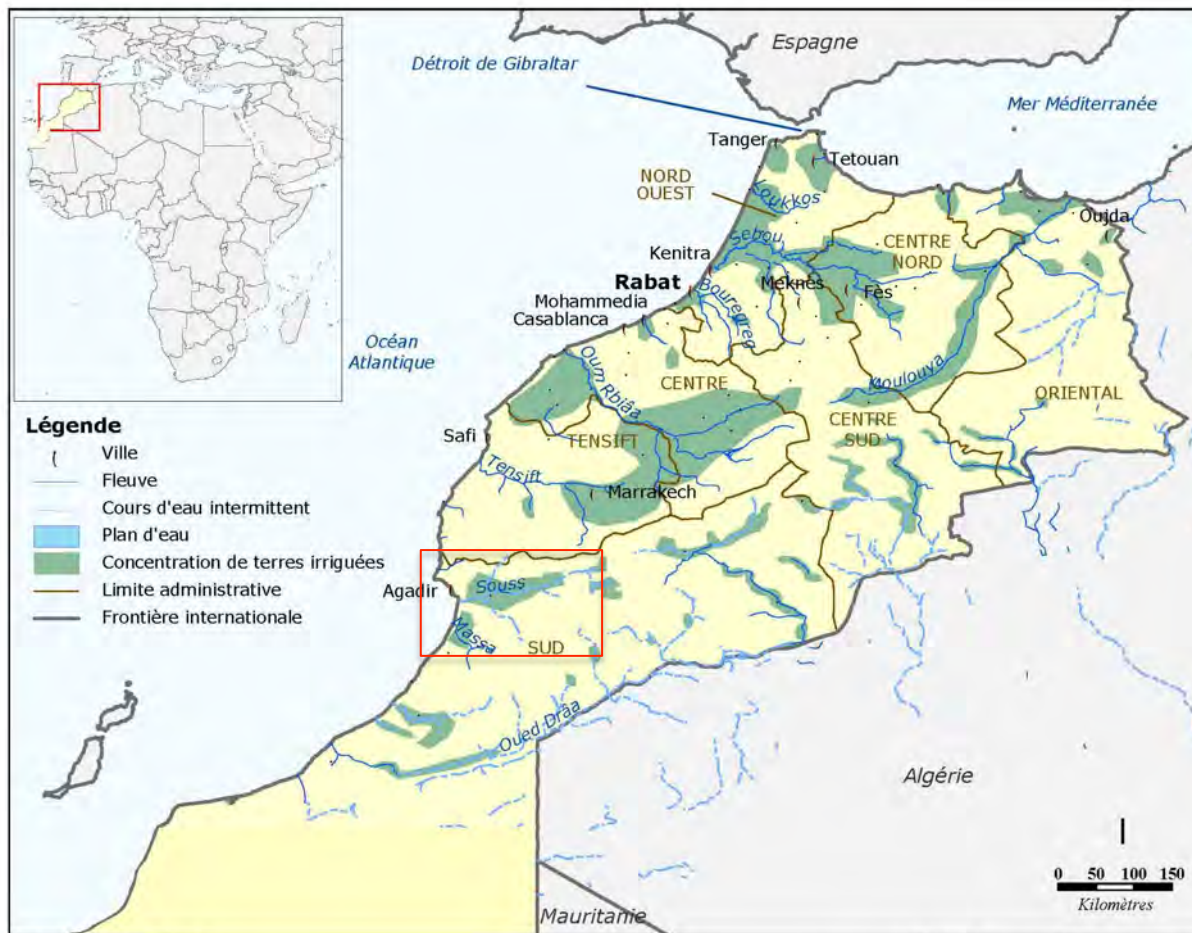




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1. The context of Guerdane



Déni de responsabilité
Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part de l'Organisation des Nations Unies pour l'alimentation et l'agriculture aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

1. The context of Guerdane

Several Irrigated zones and systems



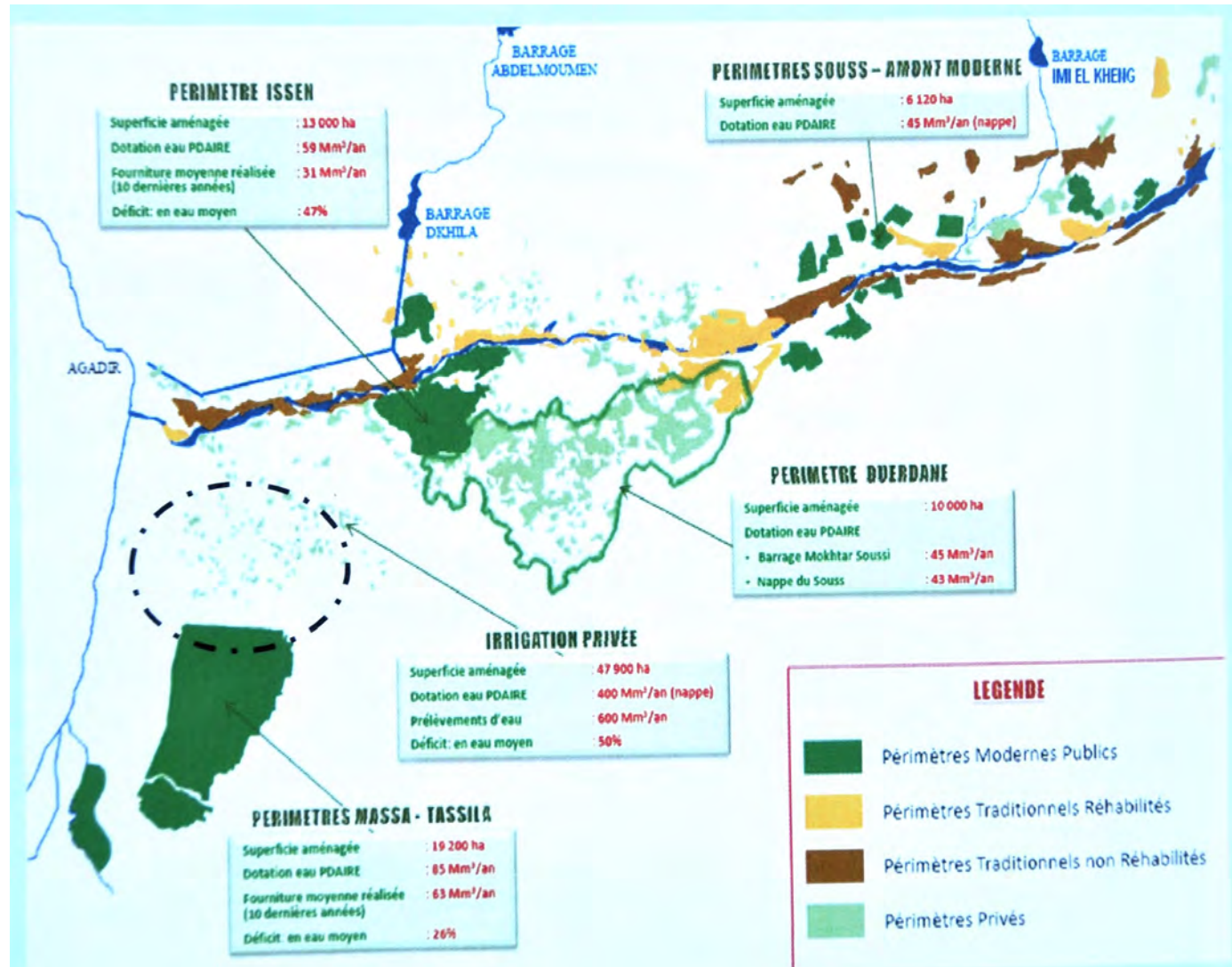
1. The context of Guerdane

A specific central scheme with orange trees



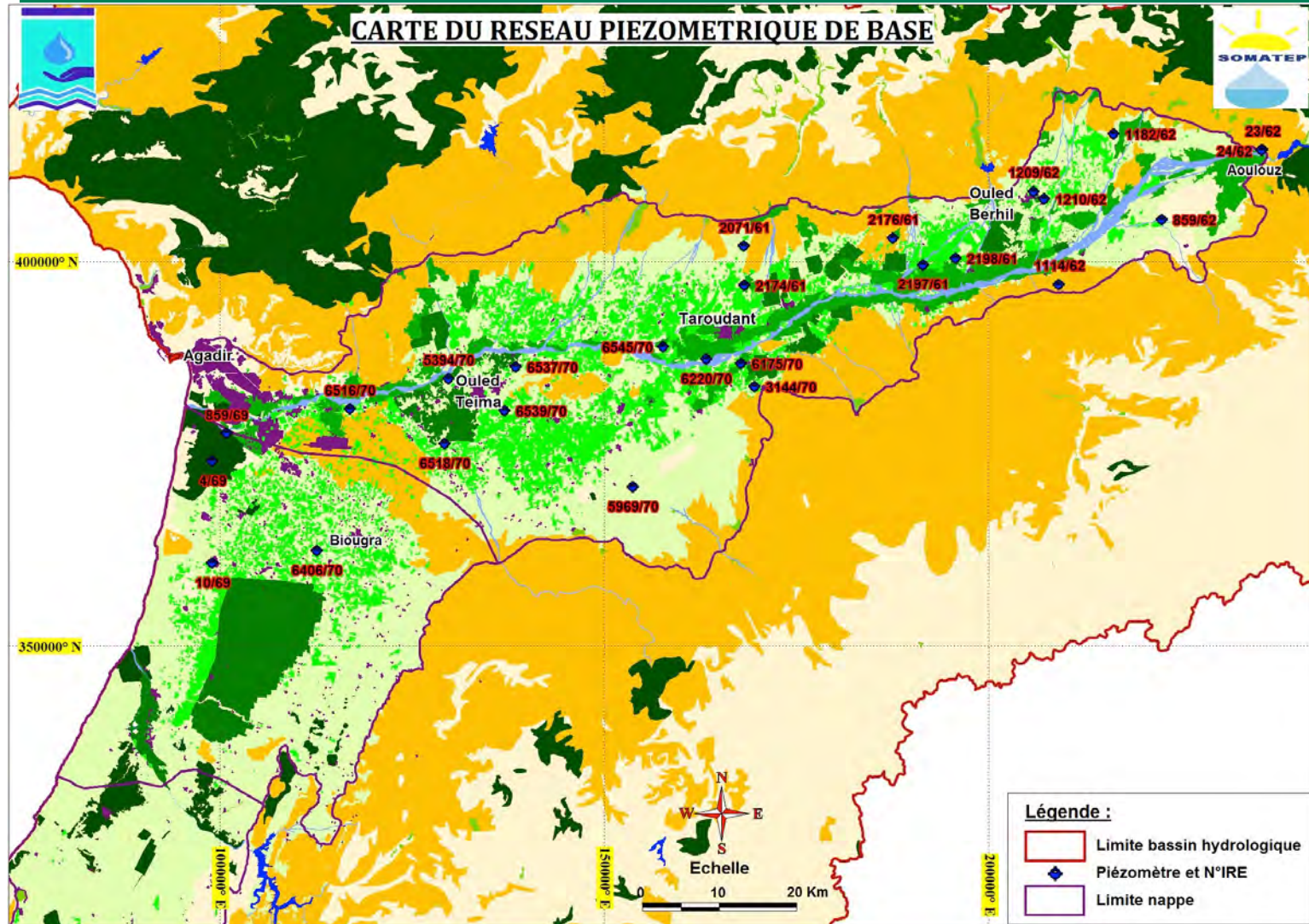
1. The context of Guerdane

Different water resources (surface and groundwater)



1. The context of Guerdane

A huge watertable with many users



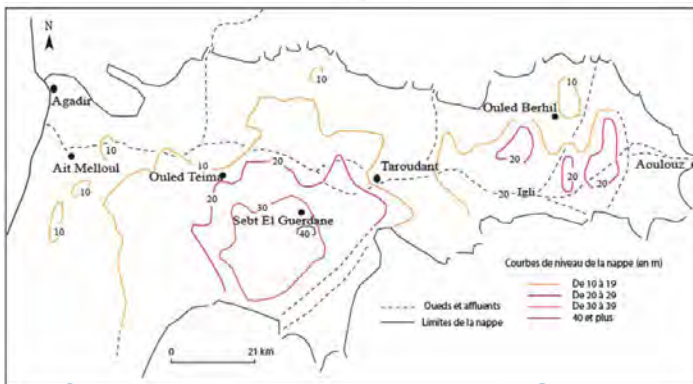
Puits



1. The context of Guerdane

A permanent overexploitation of groundwater

Bilan de la nappe calculé en 2003



ASKASSAY K., 2006

<i>Termes du bilan en Mm³/an</i>	2002-03
<i>Entrées</i>	
<i>Variation des réserves (déstockage)</i>	393.00
<i>Recharge</i>	251.44
<i>Alimentation par les bordures</i>	35.38
Total	679.82
<i>Sorties</i>	
<i>Variation des réserves (stockage)</i>	83.06
<i>Prélèvements</i>	575.53
<i>Pertes en océan</i>	20.75
Total	679.34
<i>Bilan des réserves</i>	-309.46

Enfouissement de la nappe du Souss entre 1968 et 1993. D'après Askassay et Najib, 2008

Source : ABHSMD

1. The context of Guerdane

A permanent overexploitation of groundwater

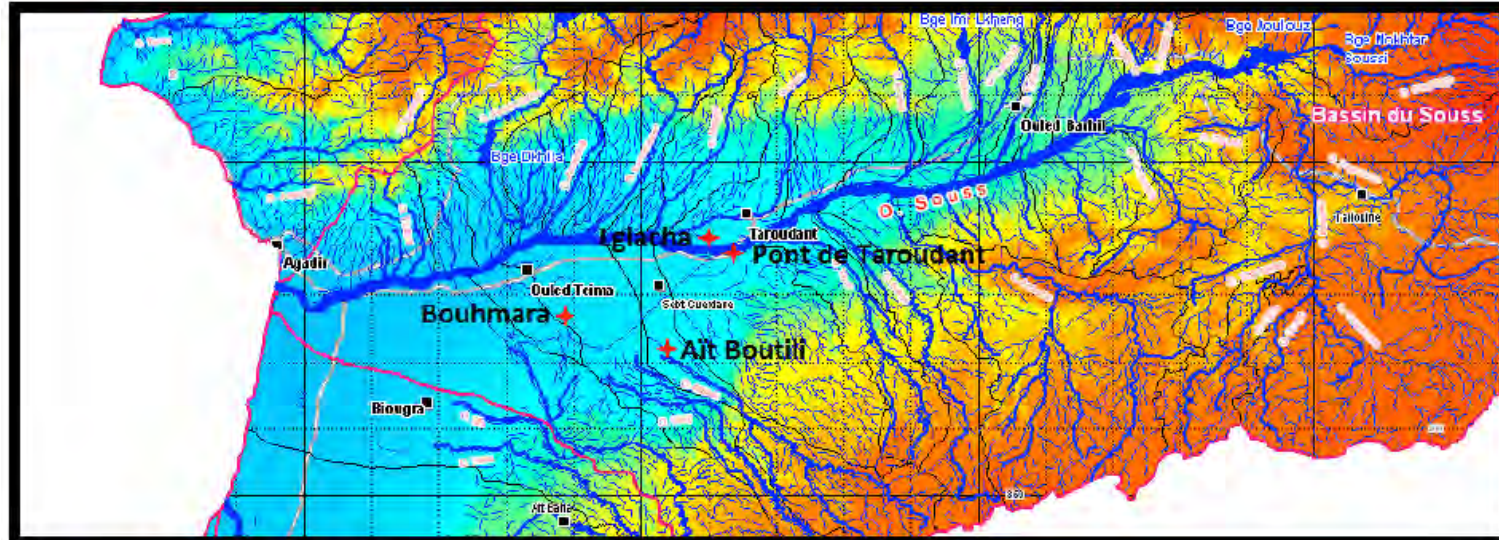


Figure 26 : Localisation des 4 piézomètres analysés

Source : ABHSM

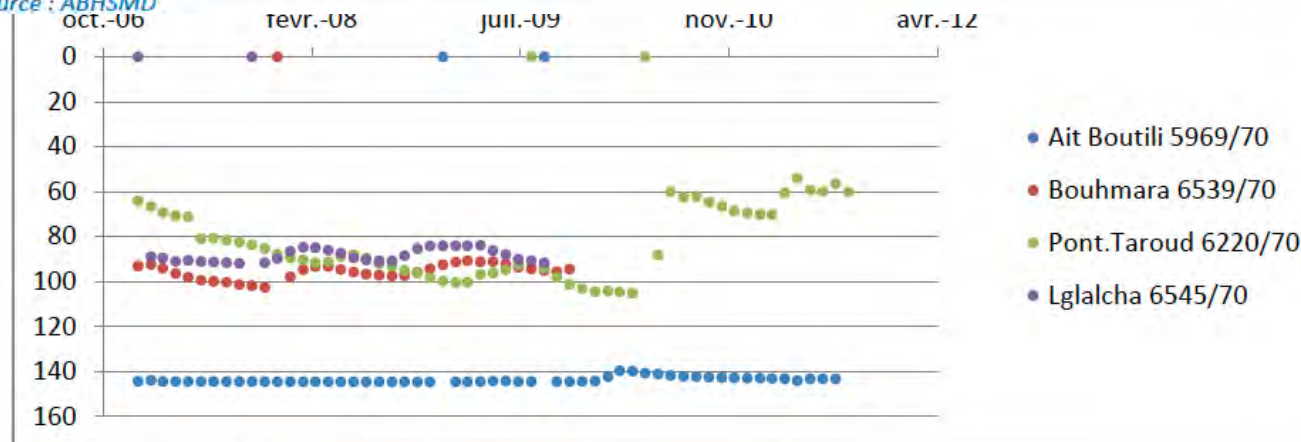


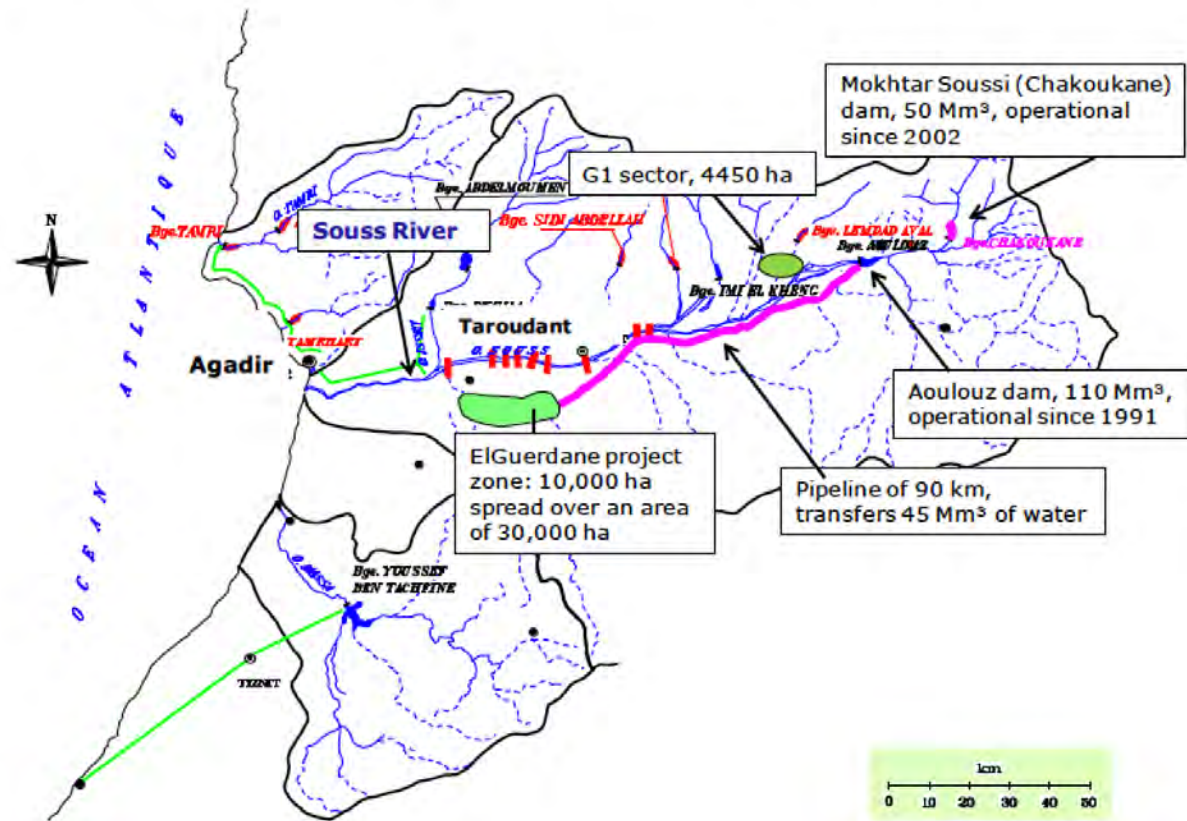
Figure 27 : Evolution du niveau piézométrique de la nappe entre 2006 et 2012

Source : traitement des données issues de l'ABHSM

1. The context of Guerdane

A new policy : save the trees with a specific dam...

Figure 1. Schematic presentation of the El Guerdane project in its regional setting.

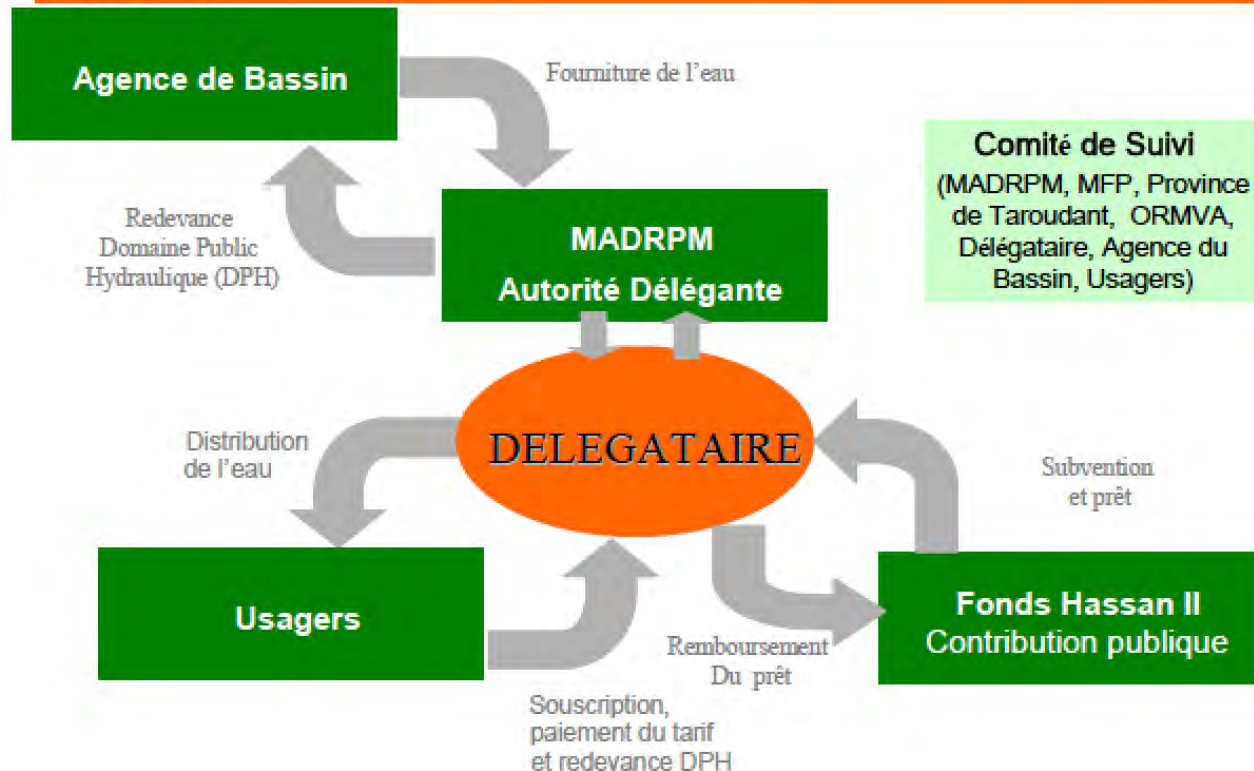


Source : Houdret, A. 2012. The water connection: Irrigation and politics in southern Morocco. *Water Alternatives* 5(2): 284-303

1. The context of Guerdane ... and experiment a private-public agreement for water management in the new scheme

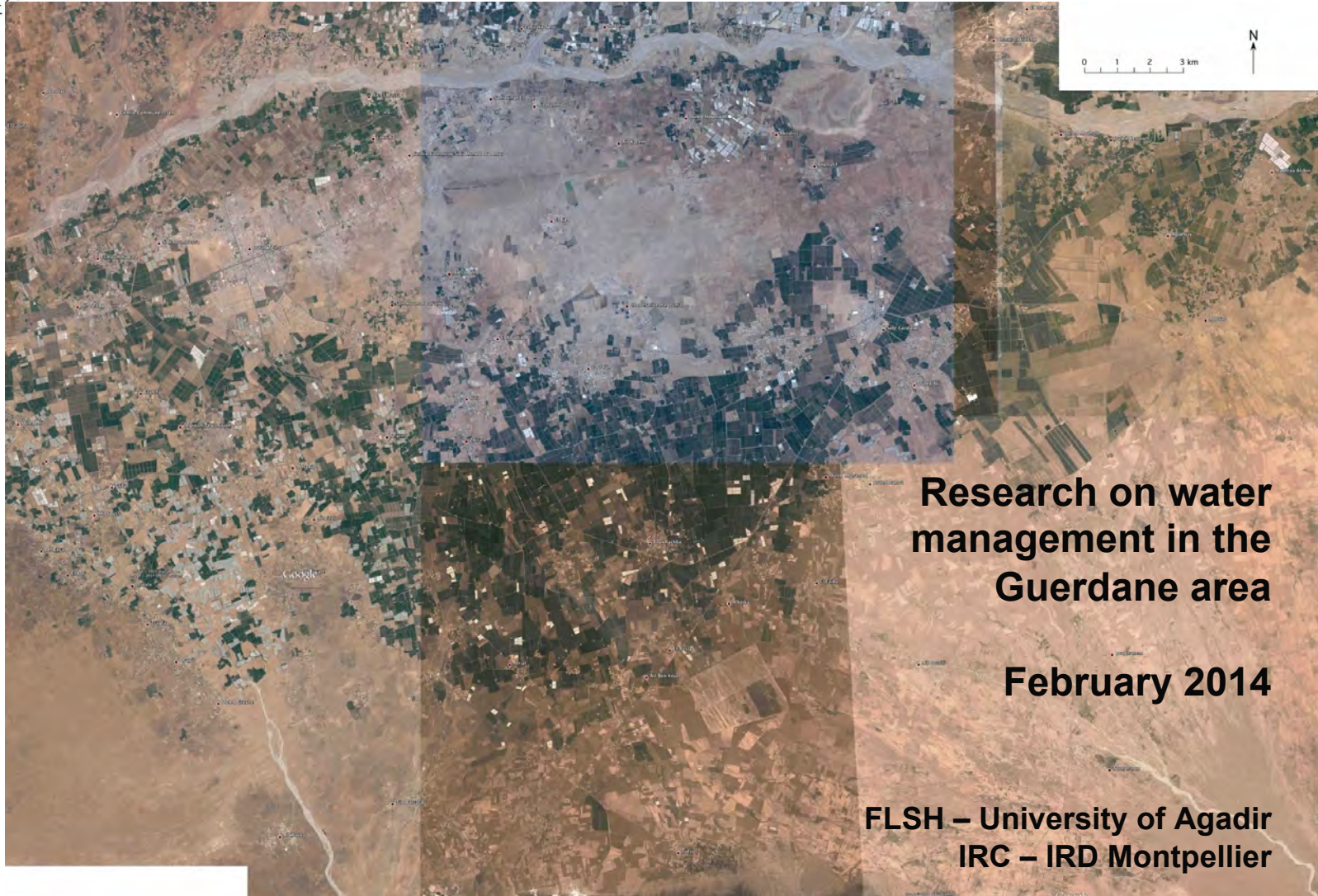


Acteurs du projet



1. The context of Guerdane

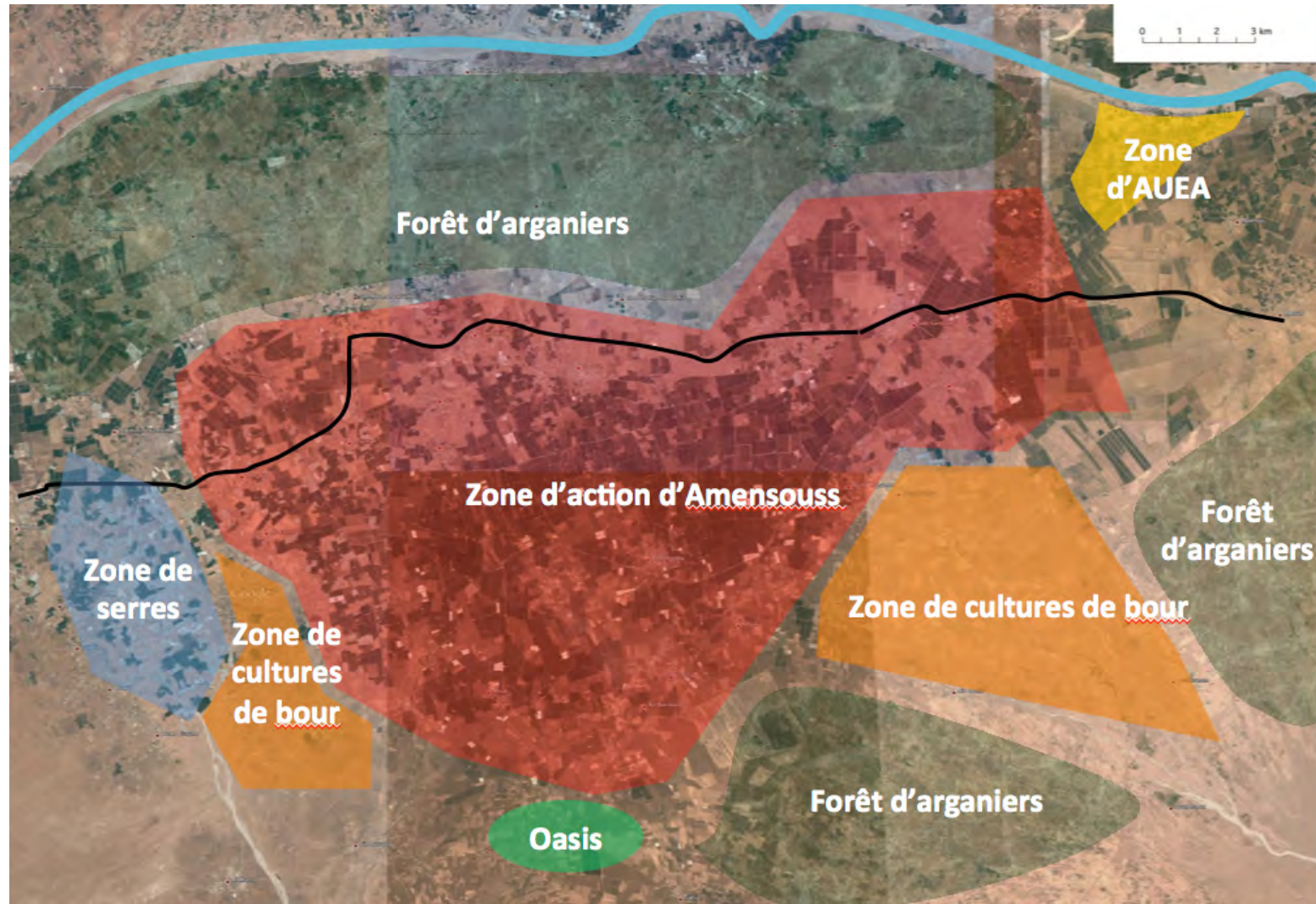
Questions of research : what happen ? Inside Guerdane project ? Around Guerdane Project ?

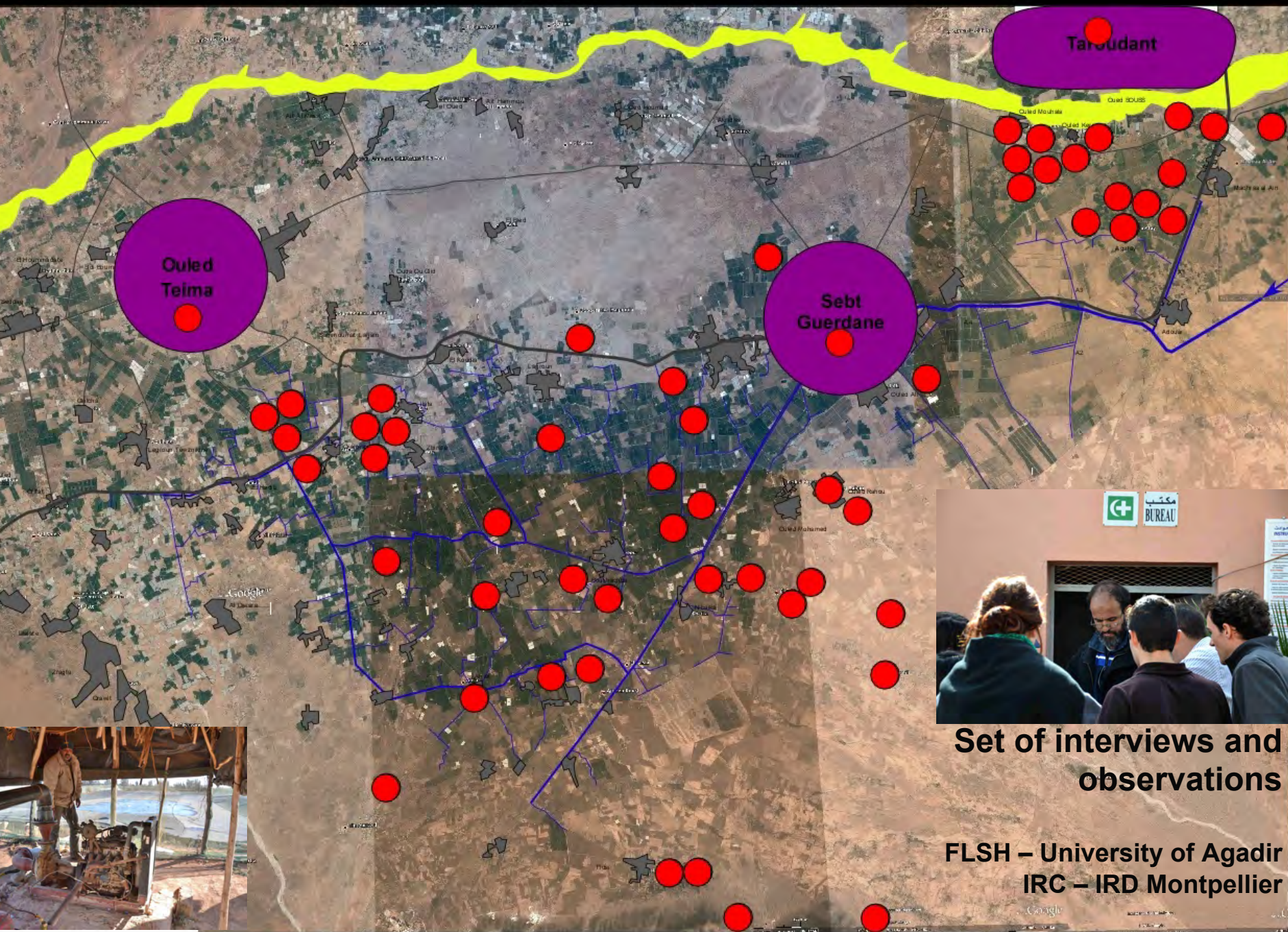


1. The context of Guerdane

Questions of research : what happen ?

Inside Guerdane project ? Around Guerdane Project ?





Set of interviews and observations

**FLSH – University of Agadir
IRC – IRD Montpellier**



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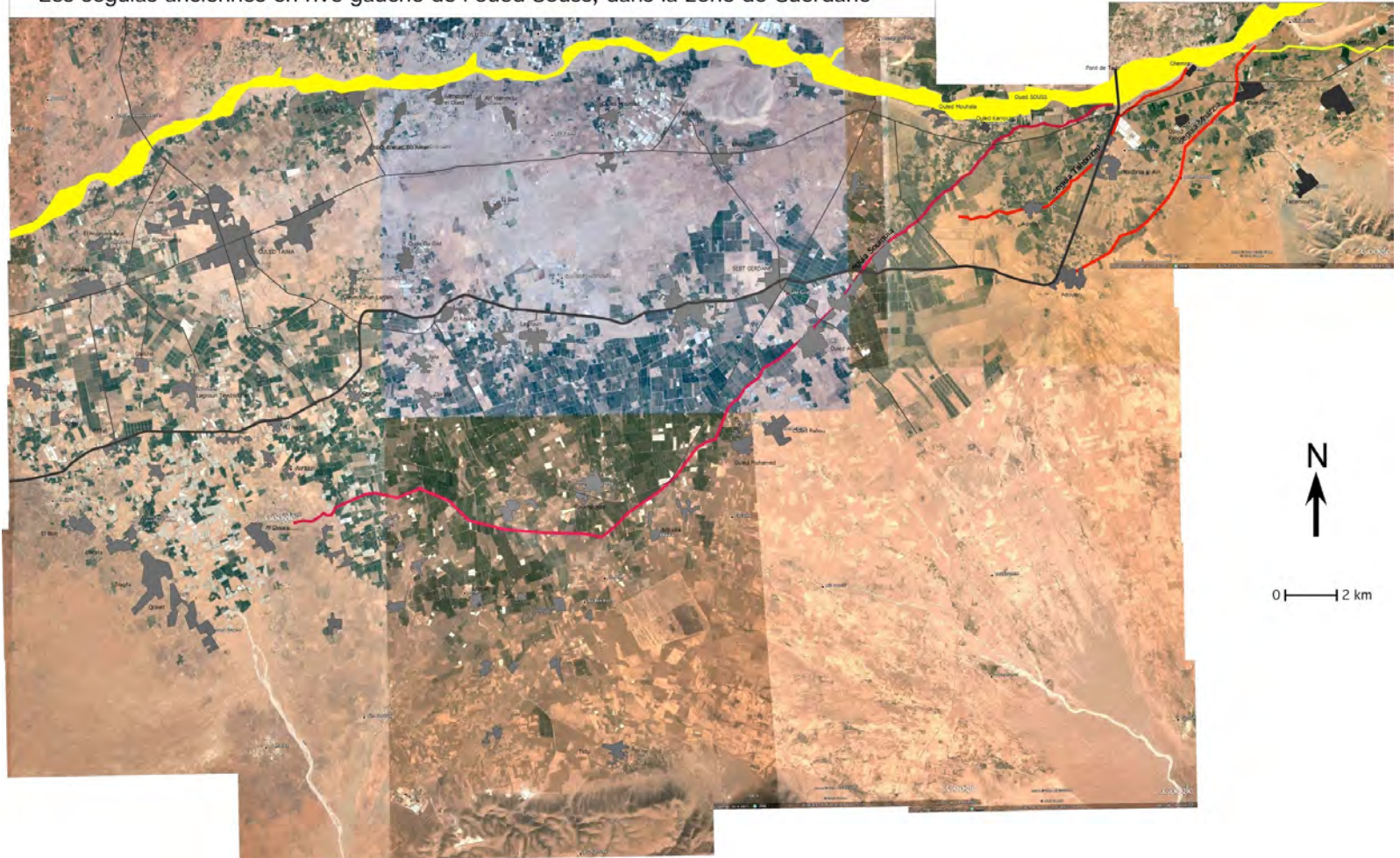
2. History of successive schemes



2. History of the schemes

A old set of canals depending of Souss river

Les seguias anciennes en rive gauche de l'oued Souss, dans la zone de Guerdane



archeology of modern hydraulic devices
The main seguia of Guerdane area





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2. History of the schemes

Examples of old hydraulic patterns



Système d'irrigation

- canal principal (ségua)
- canal secondaire (mesref)
- moto-pompe d'un débit de moins de 200 m³/jour
- moto-pompe d'un débit de plus de 200 m³/jour
- anciennes terrasses irriguées (envahies par l'oued)
- douar
- piste

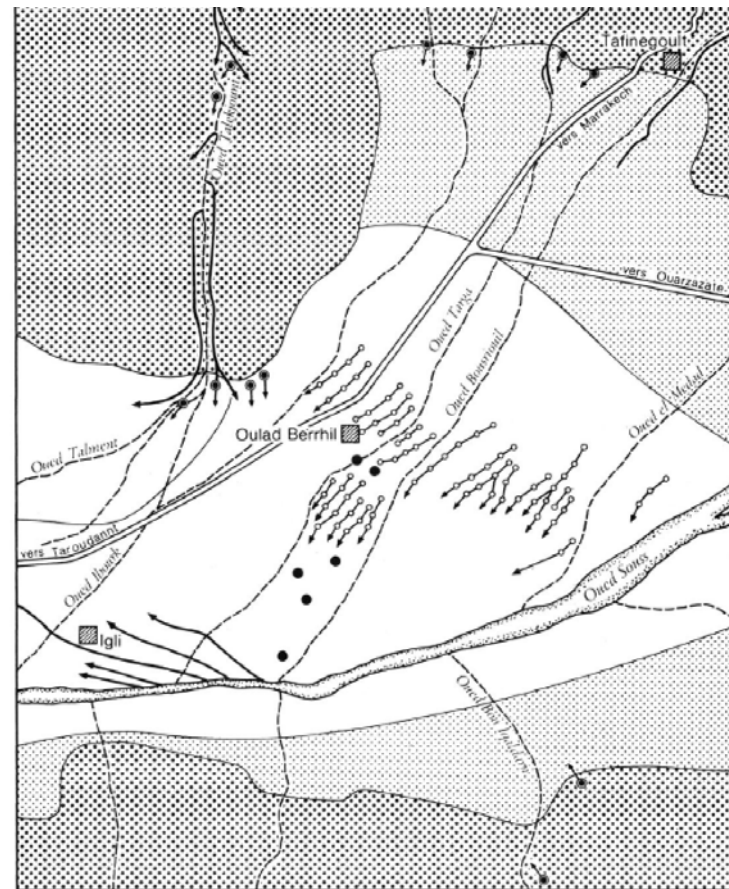
0 500 1000 1500 m

Occupation du sol (schématisée)

- dominance d'une utilisation extensive du sol, parfois irrigation de céréales (orge)
- formes d'occupation du sol qui diffèrent de ce trait général:
- agrumes
 - jardins clairs d'oliviers près des douars parfois aussi de grenadiers, figuiers et cognassiers
 - L luzerne
 - G maraichage
 - parcours

Source AZIKI 1983

Fig. 4 : IRRIGATION TRADITIONNELLE PAR SEGUIA CHEZ LES OULAD SEGHIR



Formes d'irrigation traditionnelle dans la région d'Oulad Berrhil

- zones montagneuses du Haut Atlas et de l'Anti Atlas
- zone sans puits dans la vallée
- station de pompage
- adduction souterraine de l'eau (rhettaras)
- adduction superficielle de l'eau (sığuias)
- source

0 2 4 6 8 10 km

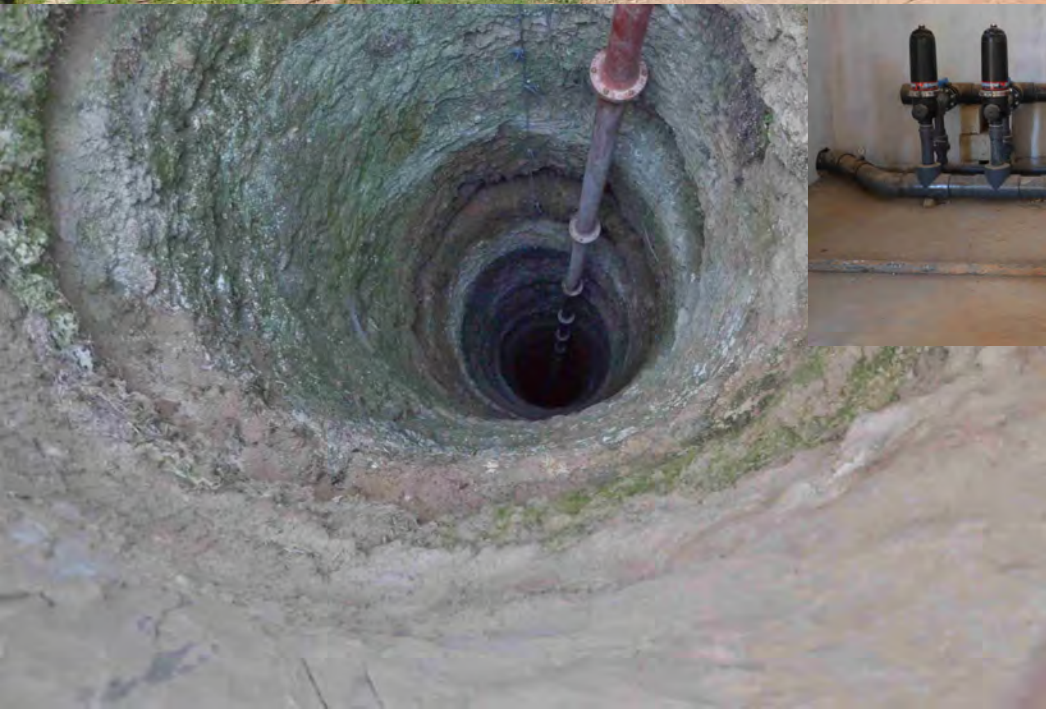
Source: documents de l'ORMVASM à Agadir

Source :
Popp, 1981

Tidsi, the last place with khattara and oasis organisation



The individual organisation of modern farms



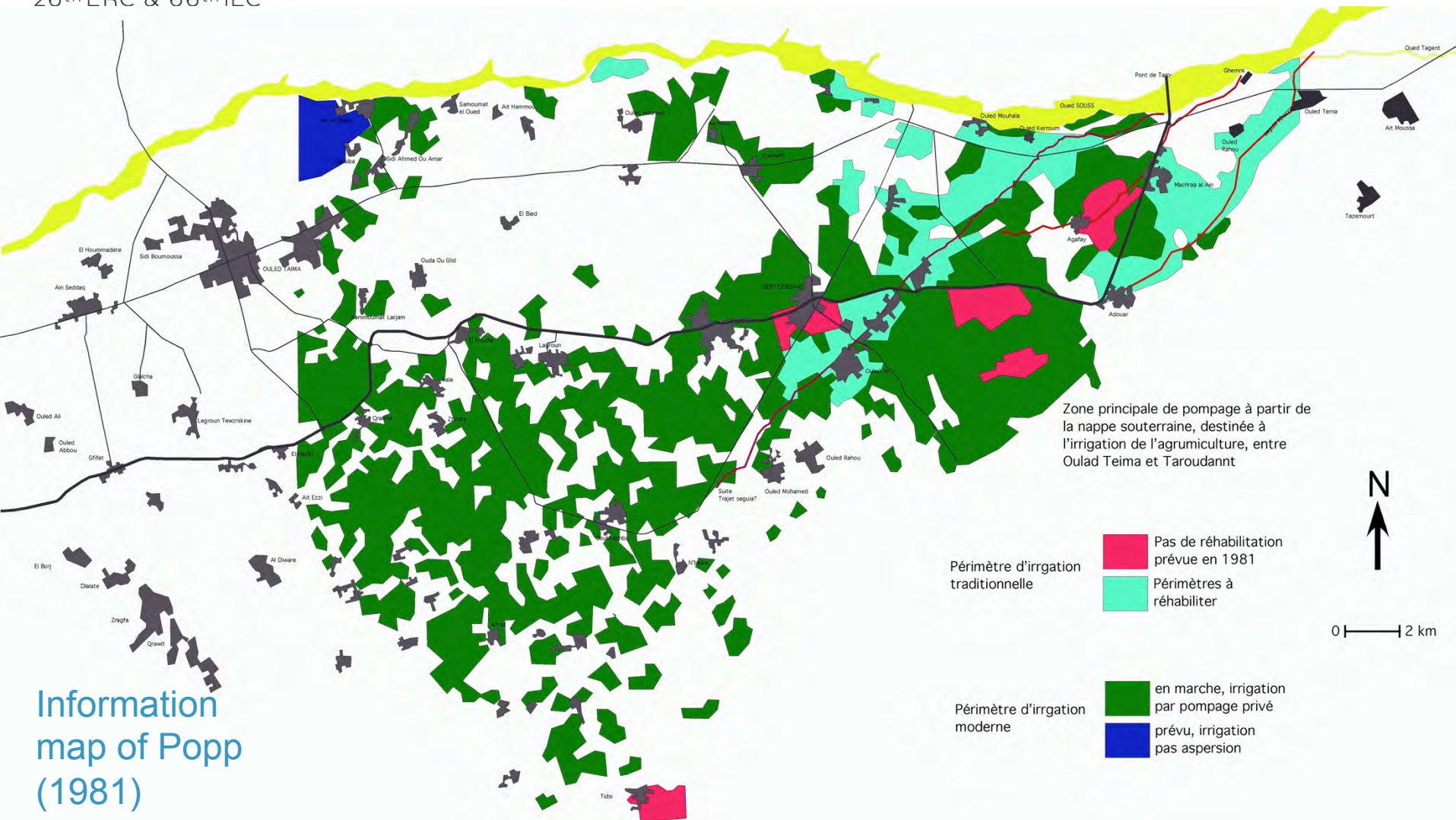


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2. History of the schemes

Changing strategies : the race of pumping for individual entrepreneurs



Information
map of Popp
(1981)

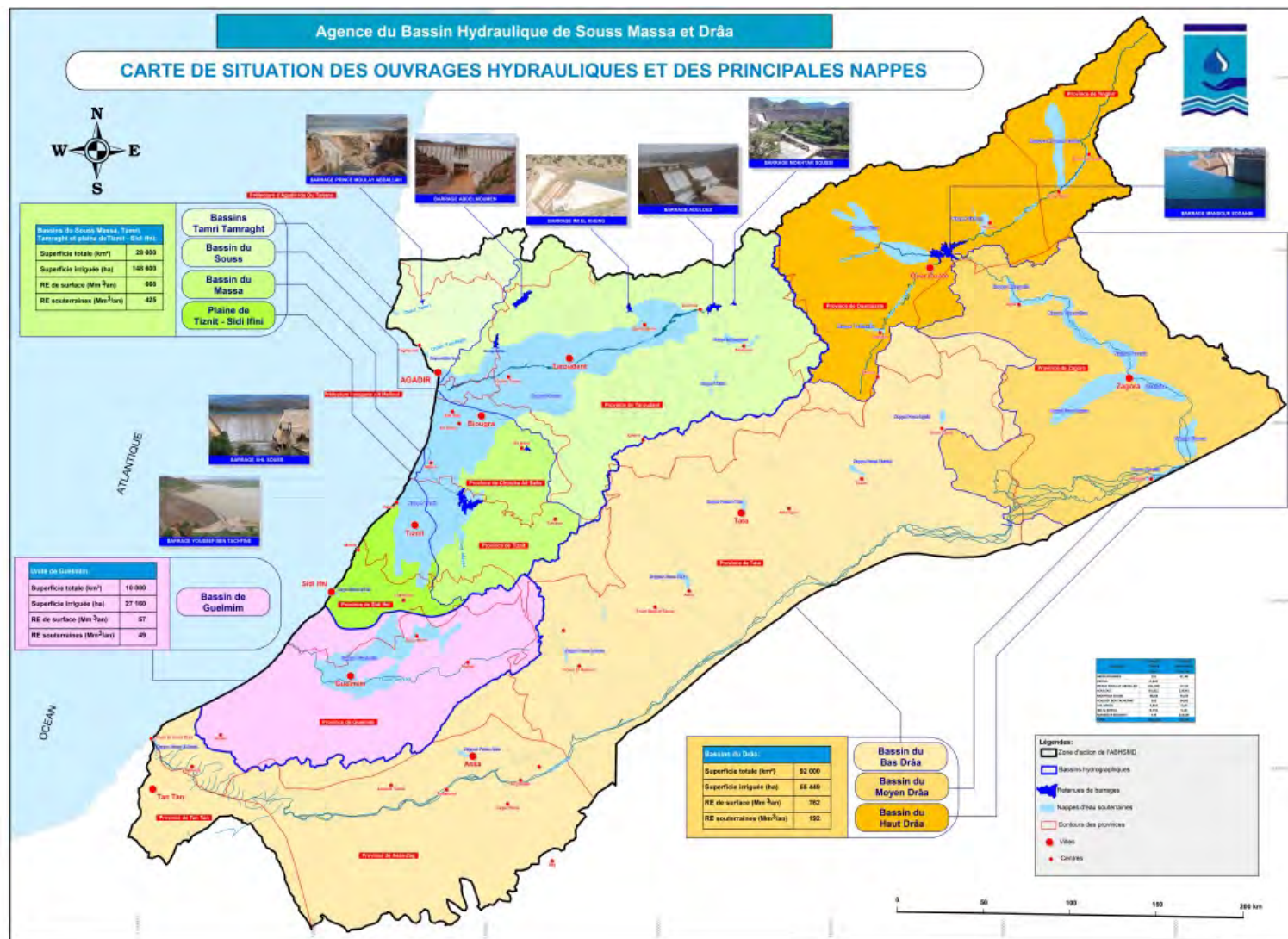


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2. History of the schemes

Changing water distribution through a set of dams, canals and pipes





How it was in the 1990



How it works nowadays





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2. History of the schemes

Surface irrigation in some places of the semi-old/modern scheme



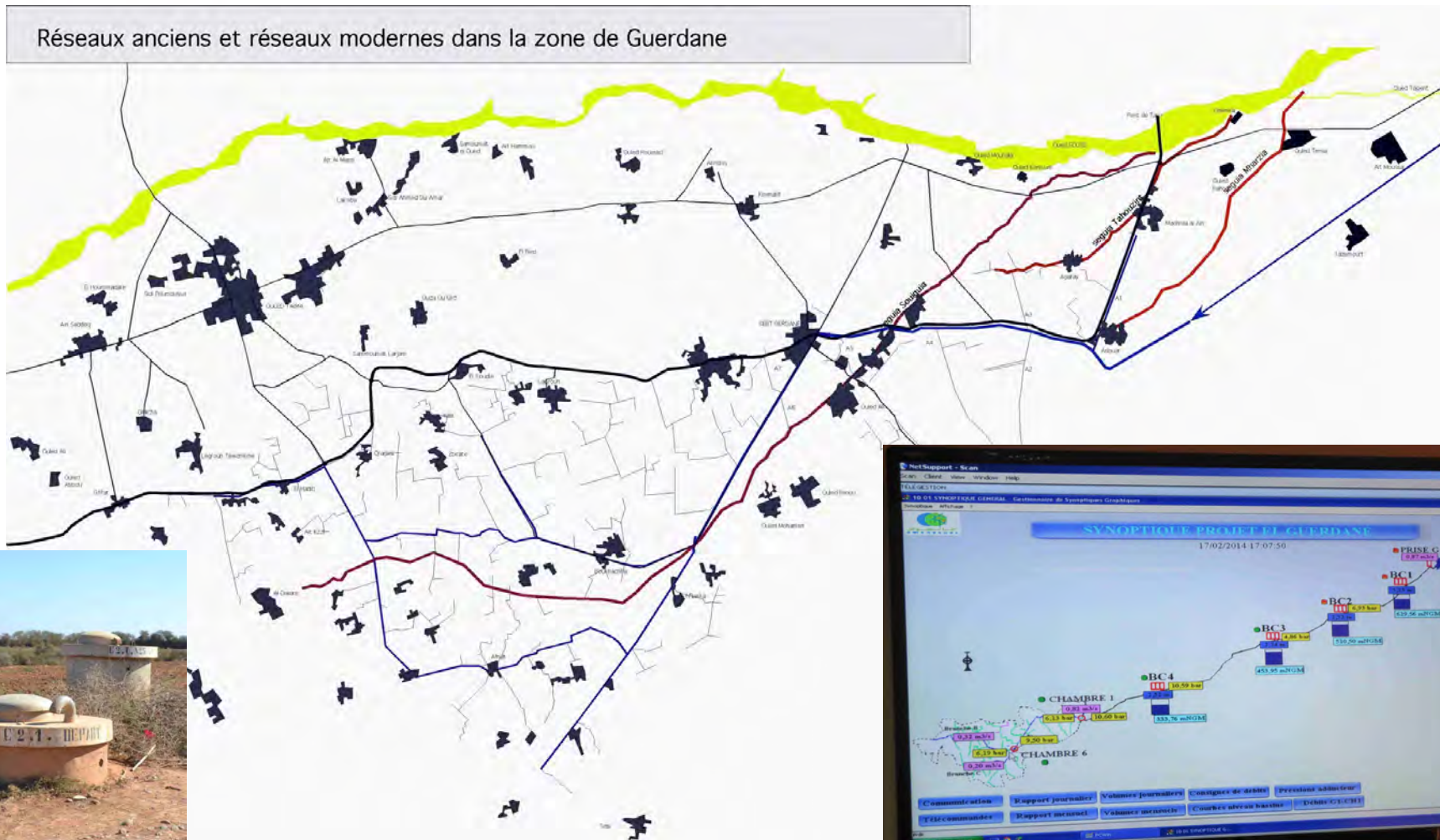


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3. The new project of Guerdane to save large orange production units with a new offer of water

Réseaux anciens et réseaux modernes dans la zone de Guerdane





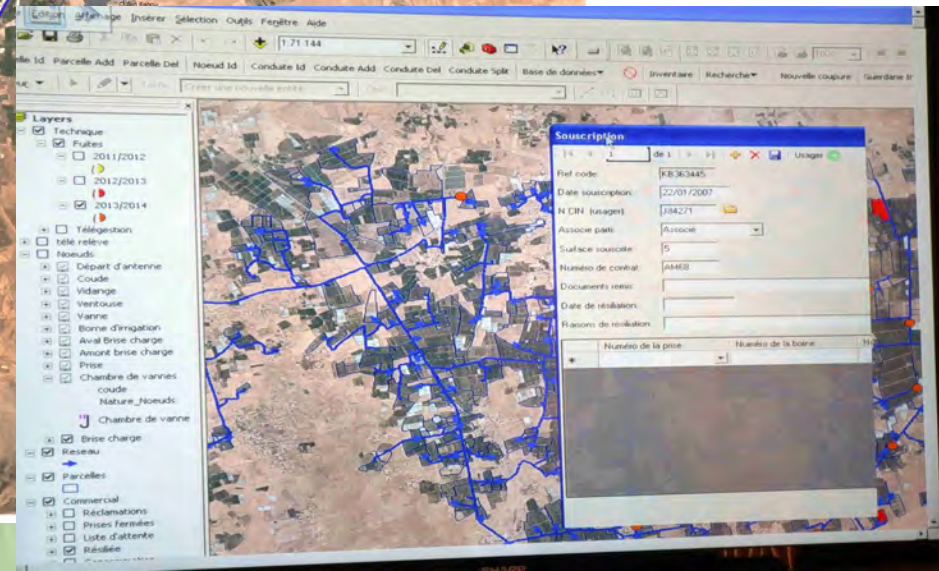
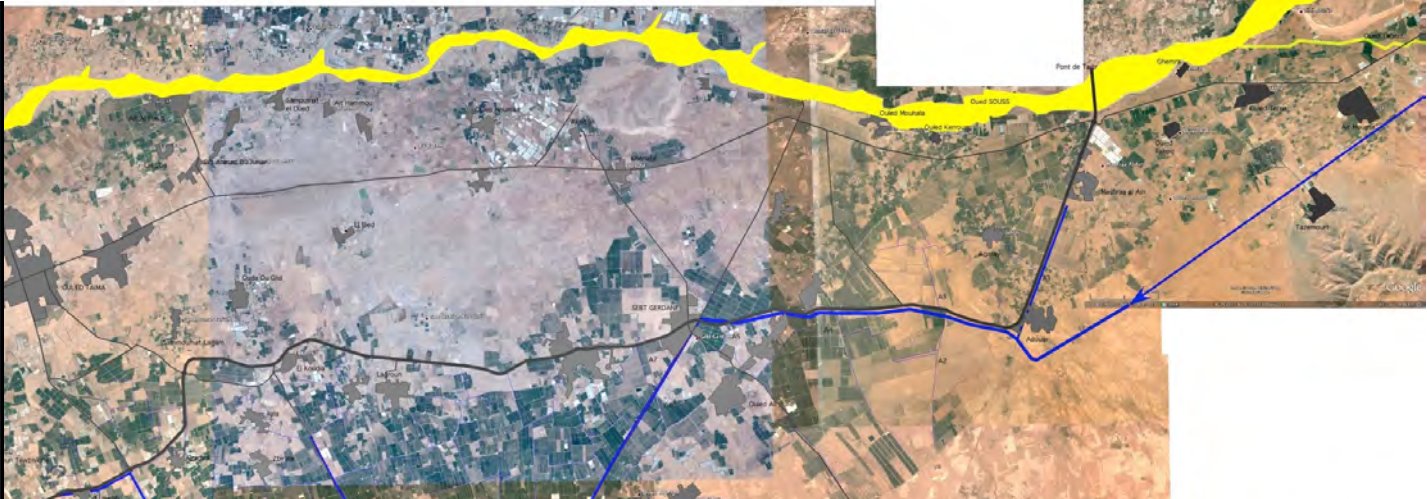
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3. The new project of Guerdane

And its implementation

Le réseau de tuyaux sous pression d'Amensouss, dans la zone de Guerdane





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4. Effects of the new paradigmes

رمز القطعة Réf-code	رقم العقد N° Contrat	الحجم السنوي Volume Annuel Allouée (m3)	الحجم المتبقي Volume Restant (m3)	البيان Ancien		البيان الجديد	الاستهلاك م Consommation m	فترة الاستهلاك Période de consommation
KB541682	AM340	148 000,00	37 390,00				31942	du 31/10/2013 au 23/01/2014
Prise	رقم العداد N° Compteur	Index		البيان Ancien		البيان الجديد	الاستهلاك م Consommation m	فترة الاستهلاك Période de consommation
333-1	10-00572	368904		336962			31942	du 31/10/2013 au 23/01/2014

Désignation	الحجم م Volume m ³	Prix unitaire DH HT سعر الوحدة			المبلغ Montant DH HT
		السعر المعتمد Tarif en vigueur	المعدل Taux	السعر المطبق Tarif appliqué	
Redevance volumétrique	31 942,00	1.66	80%	1,328	42 418,98

Historiques

CU

mois

Tenant compte de l'historique de vos factures, vous réstez redevable à Amensouss de :

Total HT	42 418,98
Tva 7%	2 969,33
Redevance ABH*	638,84
الواجب أدائه بالدرهم Total à payer DH (TTC)	46 027,14

* Redevance de l'agence du bassin hydraulique (tarif en vigueur de 0.02 DH TTC/m3)

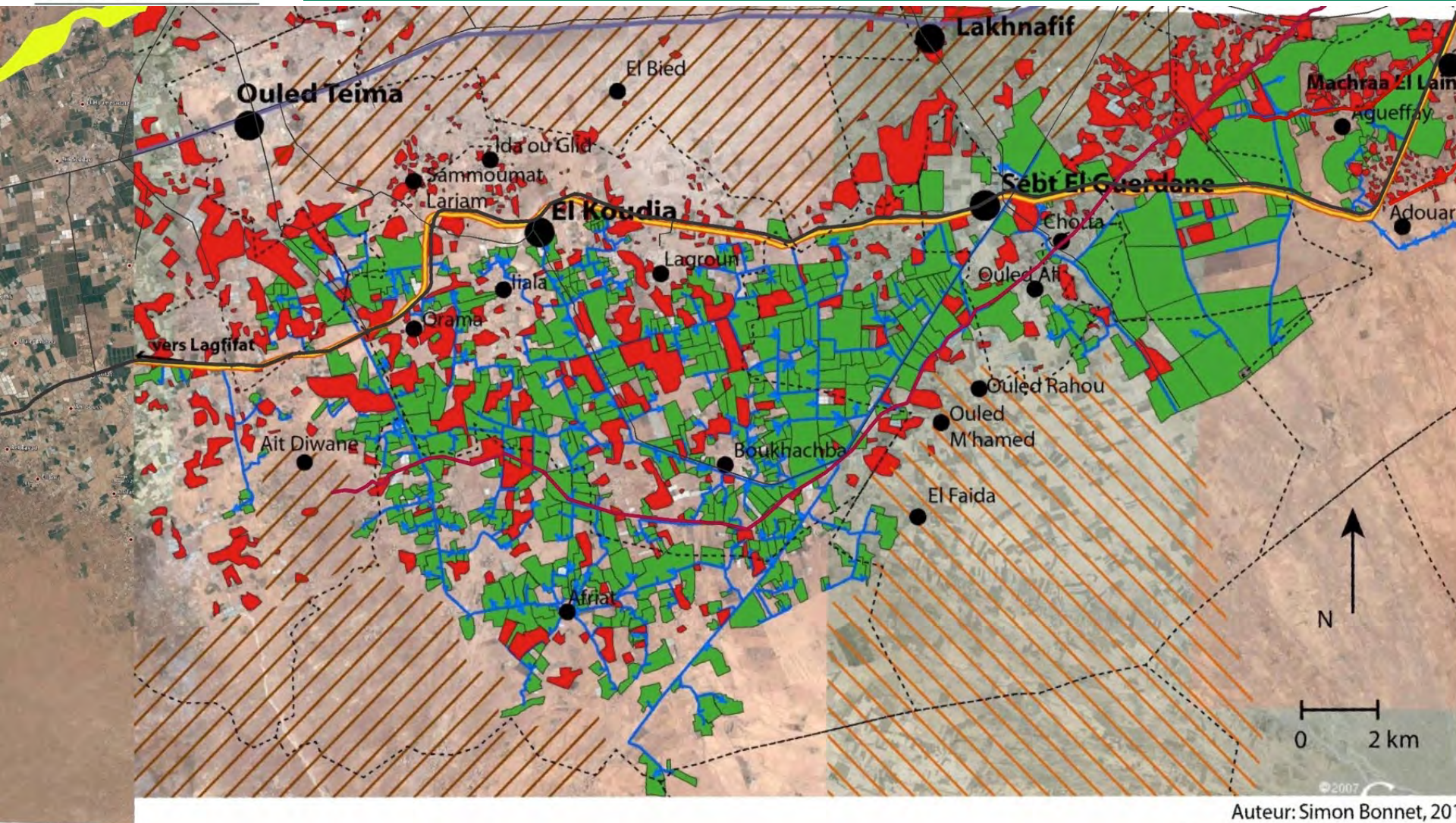
آخر أجل للاداء
Date limite de paiement 28/02/2014



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4. Effects of the new paradigmes

Discontinuity and new questions



Auteur: Simon Bonnet, 2011
Source: AmenSouss, Google Earth

4. Effects of the new paradigmes

Orange trees for always ? Water for orange ?





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4. Effects of the new paradigmes

New models with others demands

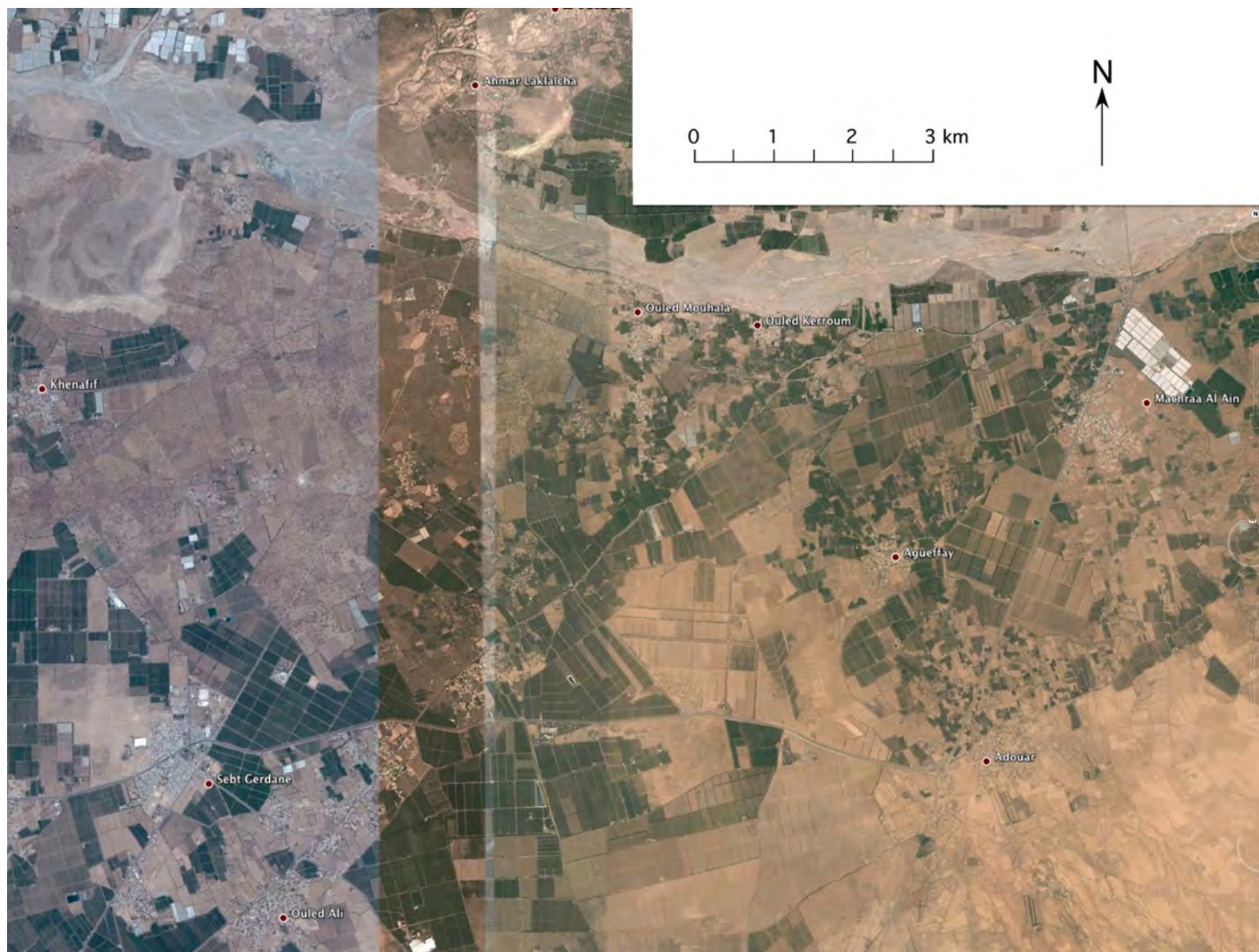




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5. Colateral projects for small farmers

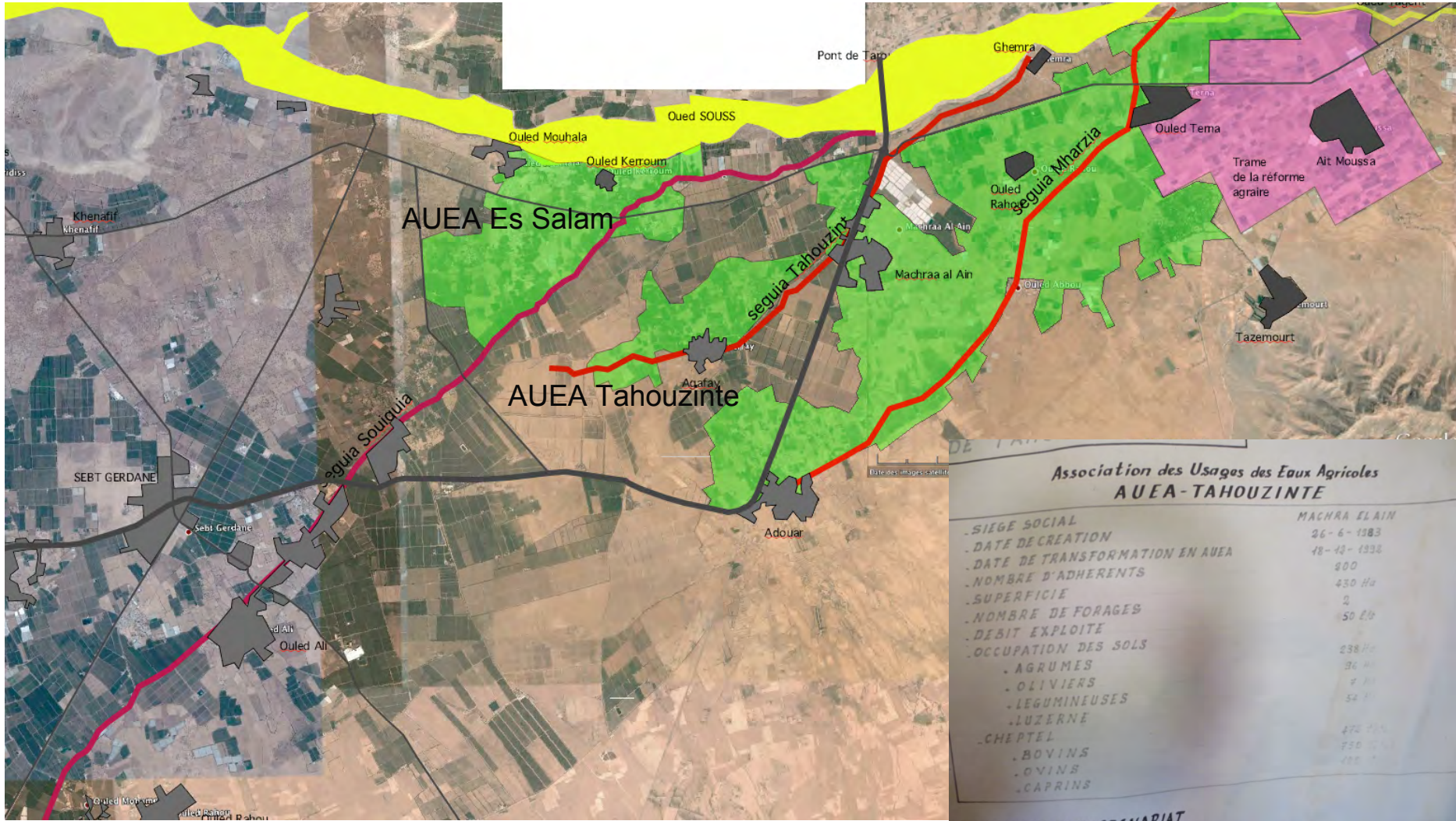




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5. Colateral projects for small farmers







5. Colateral projects for small farmers

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**USAID-SIWM
Drip Irrigation Pilot Project**

Conversion of a traditional Irrigation System to a Drip Irrigation System for Tahouzint Water Users Association

A. New technologies for water saving in Sous-Massa

- 1- Small and medium-scale farmers are organized under water users associations, which manage small irrigation perimeters.
- 2- Over 120 water users associations consume significant amounts of water for agriculture (112 Millions Cubic meters).
- 3- These associations are managing irrigation for more than 20 000 Ha.
- 4- All these associations are still using traditional flood-irrigation methods.
- 5- Introducing efficient drip irrigation technologies will result in 50% water savings (61 Millions Cubic meters).

B. The Pilot project objectives

- 1- Demonstrate that it is possible to introduce drip irrigation for a typical Water User Association that includes small and medium-scale farmers.
- 2- Demonstrate that the conversion of a flood-irrigation system to a drip-irrigation system results in significant water savings.
- 3- Identify institutional, financial and organizational constraints to drip irrigation technologies.
- 4- Disseminate the pilot project findings to other associations.

C. Water User Association Presentation

- Name = Tahouzint
- Total area = 430Ha
- Number of farmers = 206 farmers
- Beneficiaries = 2200
- Location = Souss valley

Drip Irrigation System



reservoir

Well Drilling

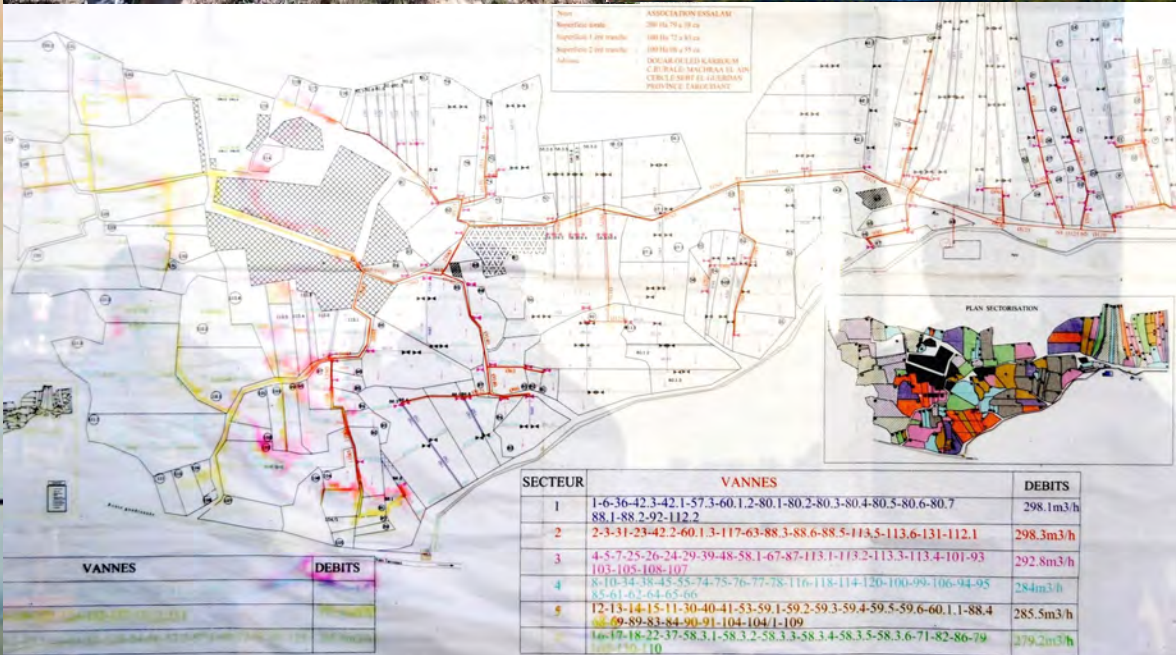
Equipment shelters and connections



Electro pump units and Automatic filtration systems



Field Training



Goutte à goutte







5. Colateral projects for small farmers

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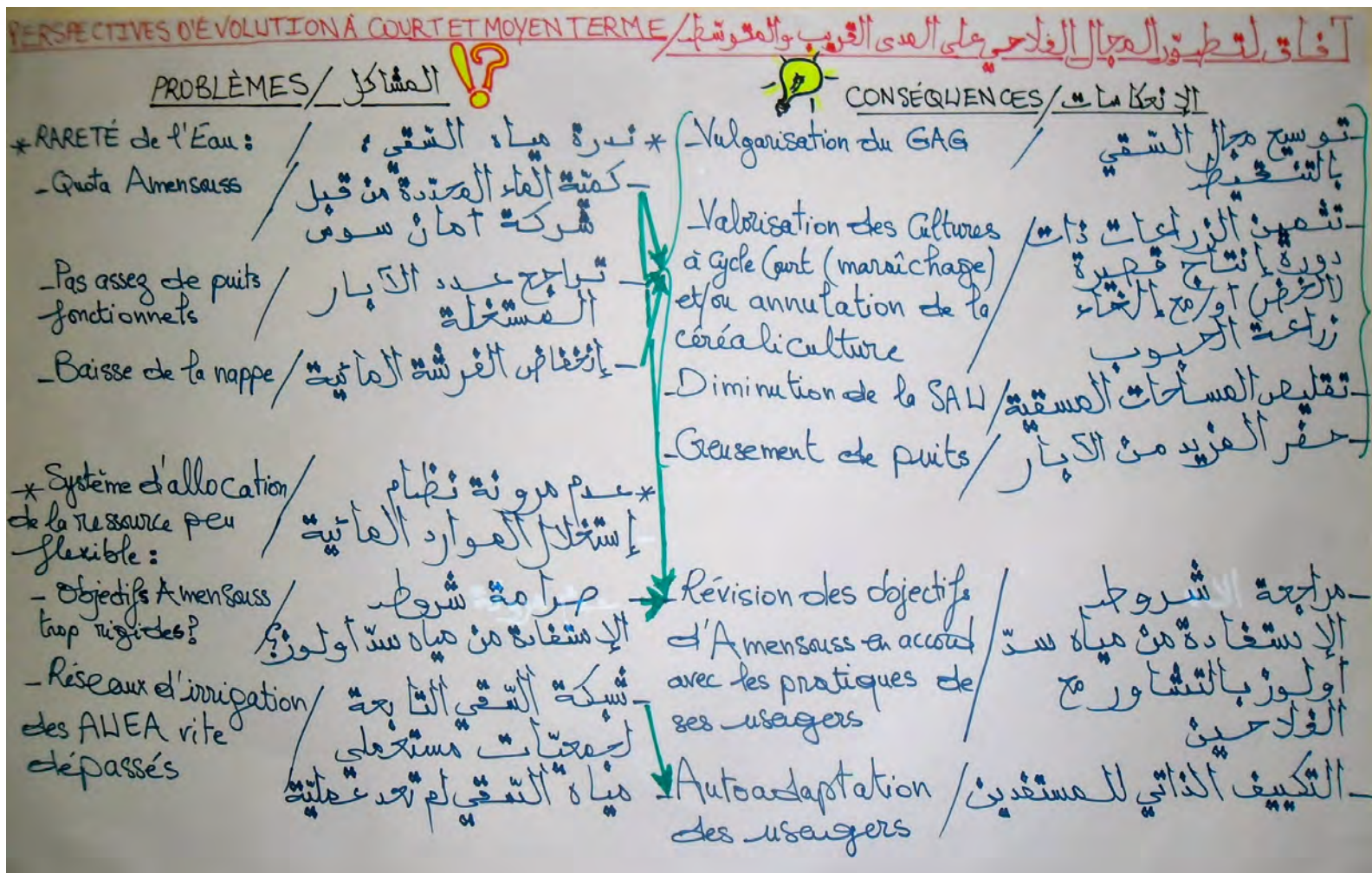
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رقم الملاحظة	التاريخ	رقم الختم	المبلغ المدفوع	نصت العتق	عدد الأطنان	العداد القديم	العداد الجديد	التسعير	ملاحظات
1	04/02/2014	154,8	1,10	138,7	6092	6092	6092	مساحة بوجمعة	خاله
2	04/02/2014	3,3	1,10	3,7	190	187	190	مساحة تابلرهم	خاله
3	04/02/2014	100,0	1,10	91,7	1204	113	1204	الموسى بن موسى	خاله
4	04/02/2014	156,2	1,10	142,7	5167	5025	5167	بعتين حمد	خاله
6	04/02/2014	113,3	1,10	103,7	3573	3470	3573	الرشيد احمد	خاله
8	04/02/2014	0	1,10	0,7	5522	5522	5522	أمزاز مبارك	خاله
9	04/02/2014	192,7	1,10	157,7	4380	4223	4380	فانجام الكبير	خاله
15	04/02/2014	128,7	1,10	117,7	1999	1882	1999	سنان بوجمعة	خاله
16	04/02/2014	5,5	1,10	5,7	3677	3672	3677	الموردى أحمد	خاله
19	04/02/2014	126,5	1,10	115,7	4161	4046	4161	بعتين حمد	خاله
20	04/02/2014	33,00	1,10	30,7	1161	1131	1161	العداد مبارك	خاله
21	04/02/2014	80,3	1,10	73,7	2522	2449	2522	الرواس الحبيب	خاله
22	04/02/2014	68,2	1,10	62,7	1900	1839	1900	منصير حمد	خاله
27	04/02/2014	17,6	1,10	16,7	2042	2026	2042	التوميرة العزیز	خاله
28	04/02/2014	32,4	1,10	29,7	3497	3413	3497	التوميرة العزیز	خاله
30	04/02/2014	19,8	1,10	18,7	1530	1512	1530	زايه مسر	خاله
31	04/02/2014	188,0	1,10	171,7	6974	6803	6974	العنول بوجمعة	خاله
32	04/02/2014	255,5	1,10	235,7	12953	12718	12953	العنول أحمد	خاله
32	04/02/2014	101,2	1,10	92,7	4277	4181	4277	أوريسه عابد الله	خاله
34	04/02/2014	0	1,10	0,7	6443	6443	6443	سود حشير حمد	خاله
35	04/02/2014	229,9	1,10	209,7	12958	12958	12958	سود حشير حمد	خاله
36	04/02/2014	0	1,10	0,7	5356	5356	5356	أمزاز العزیز	خاله
37	04/02/2014	0	1,10	0,7	4065	4065	4065	حضر مبارك	خاله
38	04/02/2014	59,9	1,10	49,7	2262	2263	2262	منصير حمد	خاله
39	04/02/2014	85,8	1,10	78,7	5240	5162	5240	زيد عمر (القرين)	خاله
40	04/02/2014	90,2	1,10	82,7	3241	3159	3241	الغريب الحبيب	خاله
41	04/02/2014	0	1,10	0,7	8116	8116	8116	أمزاز العزیز	خاله

عدد أطنان القمح: 12
 المساحة الملتصقة: 1897 ص
 مساحات الخبز: 134 ص
 إجمالي: 52600 ص 04/01/2014



Conclusion A complex future





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Some old thinks for new generations





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Some risks for many actors





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How to connect surface and ground water ?





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The story goes on. Some monthes later...





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Deeper and deeper races to get water

