

Dr. Rachid Bouabid

1987: State Engineer (MS) Soil Science. Institut Agronomique et
Vétérinaire Hassan II, Rabat, Morocco

1992: Soil Science, University of Minnesota, USA

1990-date: Faculty member at ENA-Meknes, Morocco
Department of Agronomy and Plant Genetics



Teaching

- **Undergraduate**
 - Soil Science
 - Soil fertility
- **Graduate**
 - Soil fertility and fertilisation for orchards
 - GIS and RS (ENA & Univ. Meknès - Geophysics)



Research current focus



Management of soil fertility and nitrogen fertilization response of potatoes (inorganic vs organic)



Yield response to N fertilisation from organic amendments (fish powder and compost)

Soil Nitrogen dynamics

Potato quality



Management of soil fertility and fertilisation in orchards



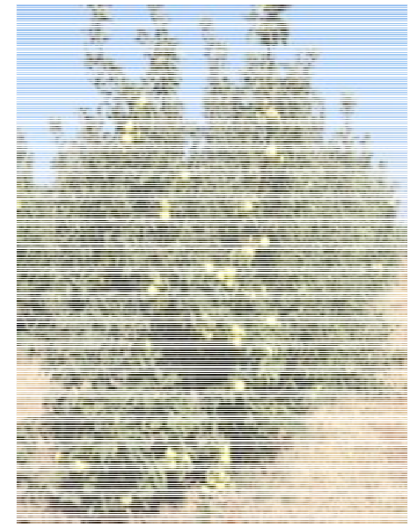
K/Ca nutrition and impact on bitter-pit on apples

Soil testing

Foliar and fruit analysis

Assessment of:

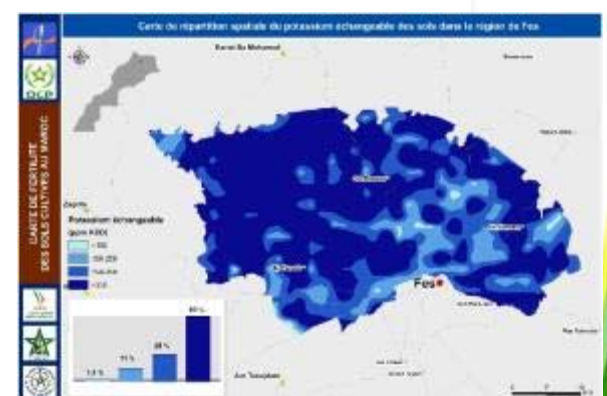
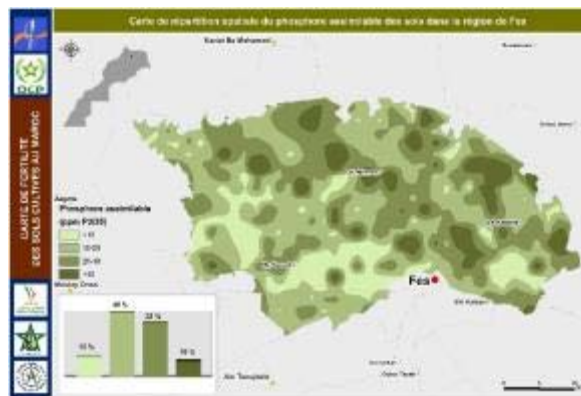
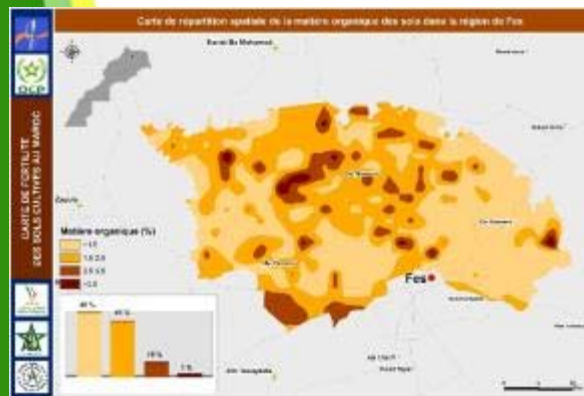
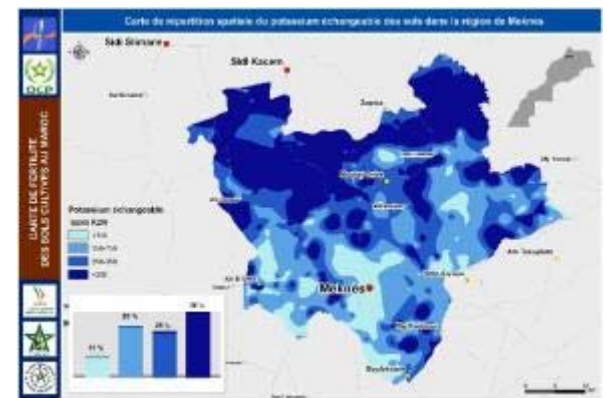
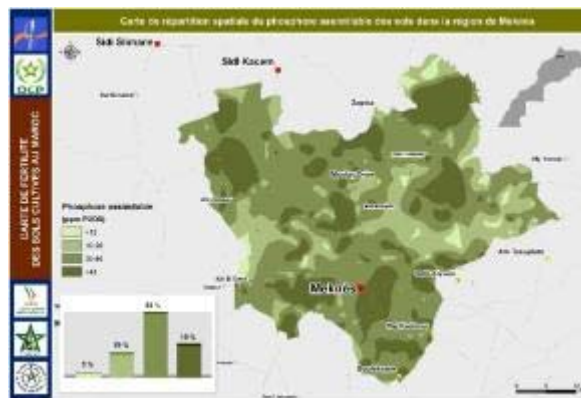
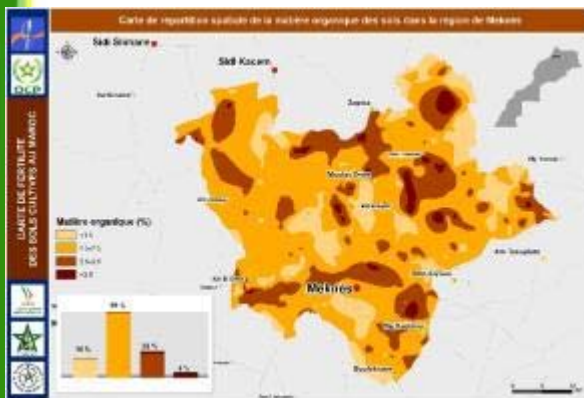
- Ca foliar fertilisation
- Ca wetting/dipping in Ca-solutions prior to cold storage

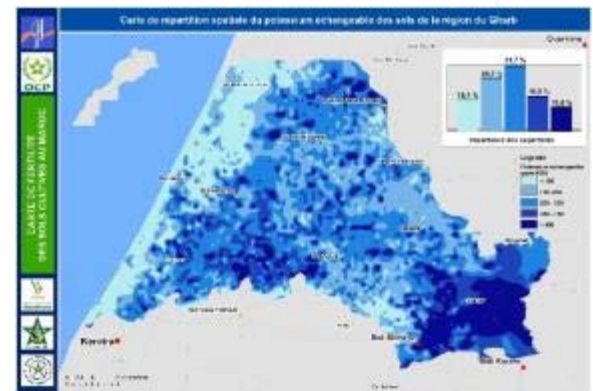


Soil fertility status – Revising fertilizer formulation
Web based soil information system



Status of soil fertility & fertilizer formulations (INRA/ENA/IAV Consortium – OCP/MA funds)





Web based soil fertility information system

- Geographic information
- Land and climate data
- Main soil data



- Soil test
- Crop Fertilizer recommendations

Carte de fertilité des sols cultivés au Maroc

FertiMap

Administratif

- Decoupage administratif
- Géographie

Fond de carte

- Google
- Données raster

Agriculture

- Sols
- Masse agricole
- Zones agricoles
- Zones d'étude
- Texture
- pH
- Matière organique
- K2O
- P2O5
- profils
- Vacation agricole des terres

Recommandations

| Élément | Besoin |
|-------------|--------|
| N (kg N/ha) | 137,7 |
| P (kg P/ha) | 158,47 |
| K (kg K/ha) | 0 |

Recommandations basées sur les formules disponibles :

- 3,52q/ha de TSP comme engrais de fond
- 4,17q/ha d'Ammonitrate comme engrais de couverture

pour un coût de 1387,43 dh/ha

Conseil en Fertilisation

Analyses

Données géographiques

Longitude: 5° 7' 21" W
-5.1255

Latitude: 34° 15' 30" N
34.2586

Région : FES-BOULHANE
Préfecture / Province : MOULAY YACOUB
Commune : SIDI DAOUD(R)

Données Fertilité

Type de sol: Sols calco-magnésiques, carbonatés, bruns calcaires

Texture globale: Limon argileux

pH: 8,03

Matière organique(%): 1,91

Phosphore assimilable (mg/kg P₂O₅): 20,2

Potassium (mg/kg K₂O): 428,2

Choisir culture: Olivier irrigué (Adube)

Rendement objectif : 8 T/ha

Commission royale et collaboration de la Carte de fertilité des sols cultivés au Maroc



Software for soil test interpretation
soil fertility crop fertilizer management



Interpretation and
recommandation based
on Excel Sheet
calculator

Calcul_besoins-fertilisation_Cultures_Application_Fertimap - Microsoft Excel

POMME DE TERRE

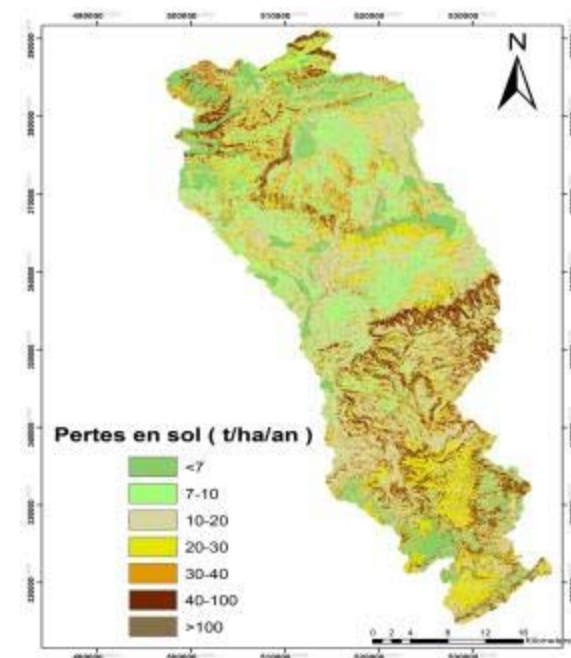
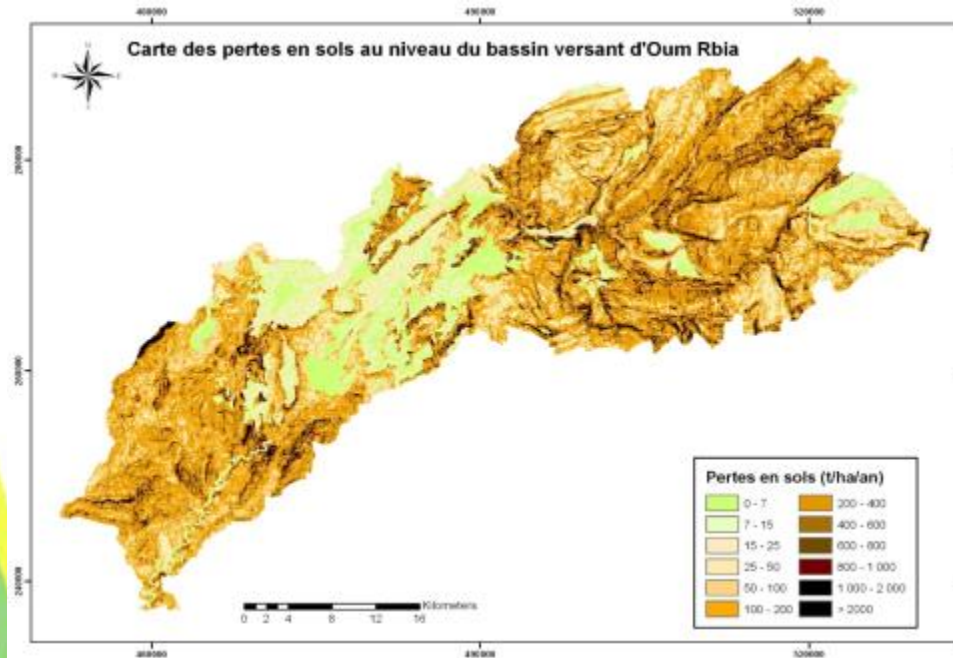
| P205 | K20 | NO3 | CaCO3 actif | MO | Rdt (t/ha) | Rdt min | Rdt max |
|----------------------------------|-------|---|-------------|---|------------|---------|---------|
| 25,0 | 200,0 | 30,0 | 7,0 | 3,0 | 70,0 | 10,0 | 100,0 |
| Texture | pH | CE | | | | | |
| g | 8,2 | 0,2 | | | | | |
| Azote | | Phosphore | | Potassium | | | |
| Limites de fertilité | | Limites de fertilité | | Limites de fertilité | | | |
| P1 | | P1 | | K1 | | | |
| 25,0 | | 25,0 | | 150,0 | | | |
| P2 | | P2 | | K2 | | | |
| 50,0 | | 50,0 | | 250,0 | | | |
| CeP | | CeP | | CeK | | | |
| 1,000 | | 1,000 | | 0,500 | | | |
| Besoin d'entretien P (BEP) | | Besoin d'entretien P (BEP) | | Besoins entretien K (BEK) | | | |
| -91 | | -91 | | 157,5 | | | |
| Marge de redressement de P (MRP) | | Marge de redressement de P (MRP) | | Marge de redressement de K (MRK) | | | |
| 0 | | 0 | | 0 | | | |
| Besoin de redressement P (BRP) | | Besoin de redressement P (BRP) | | Besoin de redressement K (BRK) | | | |
| 0,0 | | 0,0 | | 0,0 | | | |
| Apport N = | | Apport en P = MRP+BRP = | | Apport en K = BRK+BRK = | | | |
| 350,0 | | 113,8 | | 196,9 | | | |
| | | P1 = limite de redressement; P2 = Limite d'apport | | Si texture = g, then K1 = 180 & K2=250 | | | |
| | | CeP = Coefficient d'entretien | | Si texture = m, then K1 = 200 & K2=290 | | | |
| | | Texture: f= fine, m= moyenne; g= grossière | | Si texture = f, then K1 = 240 & K2=340 | | | |
| | | | | K1 = limite de redressement; K2 = Limite d'apport | | | |
| | | | | CeK = Coefficient d'entretien | | | |
| | | | | si redressement > 0,5 arrondir, sinon donner redressement par 2 | | | |



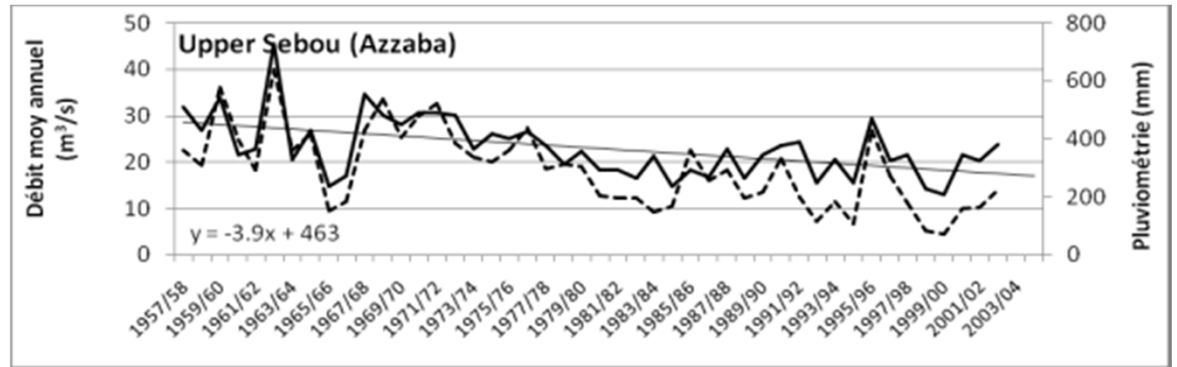
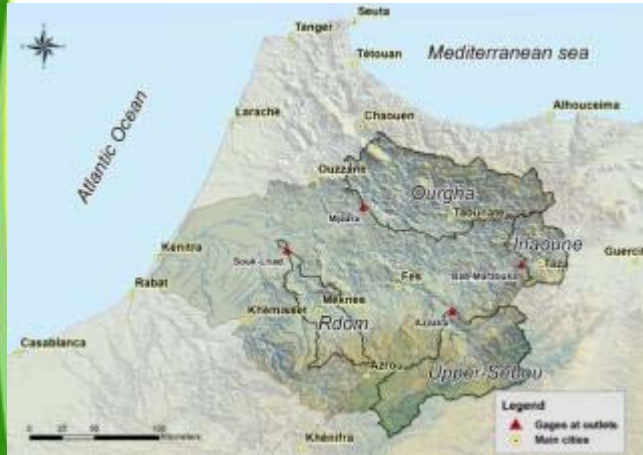
Modeling soil erosion
and stream flow (watershed) – climat change



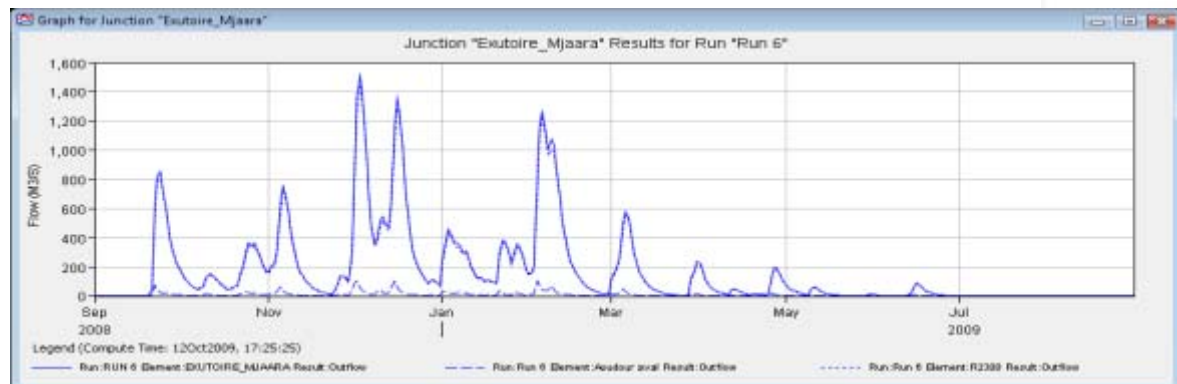
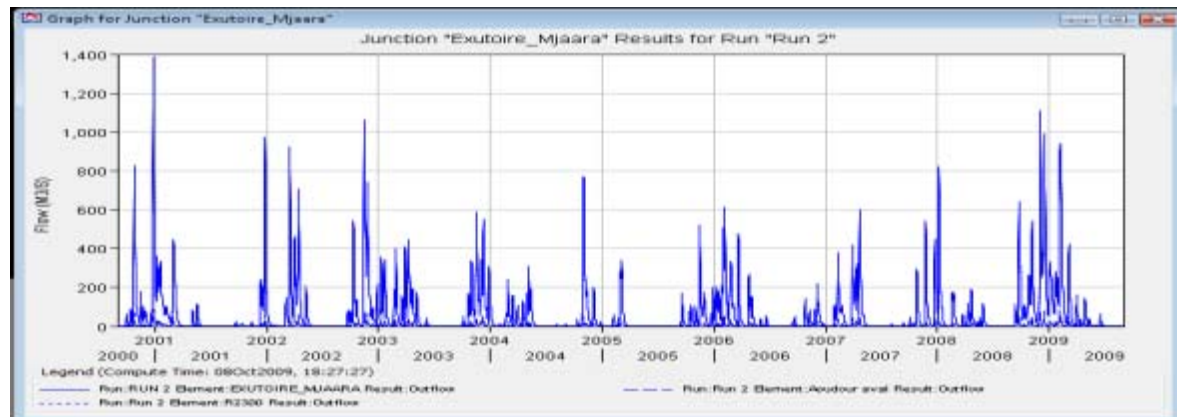
Assessment of soil erosion in several watershed



Stream flow response to climate variability in sub-watersheds of the Sebou river basin, Northern Morocco



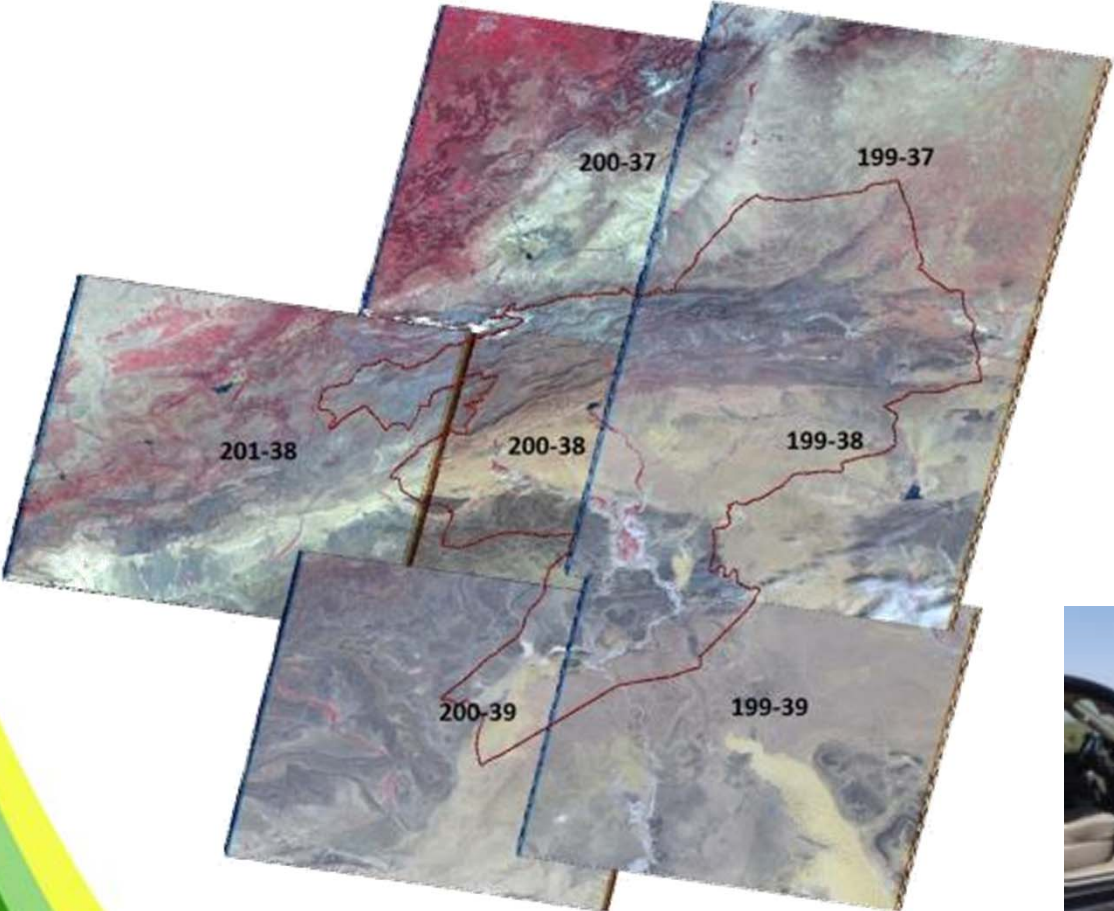
Study of climat data over 60 yrs
Stream flow modeling



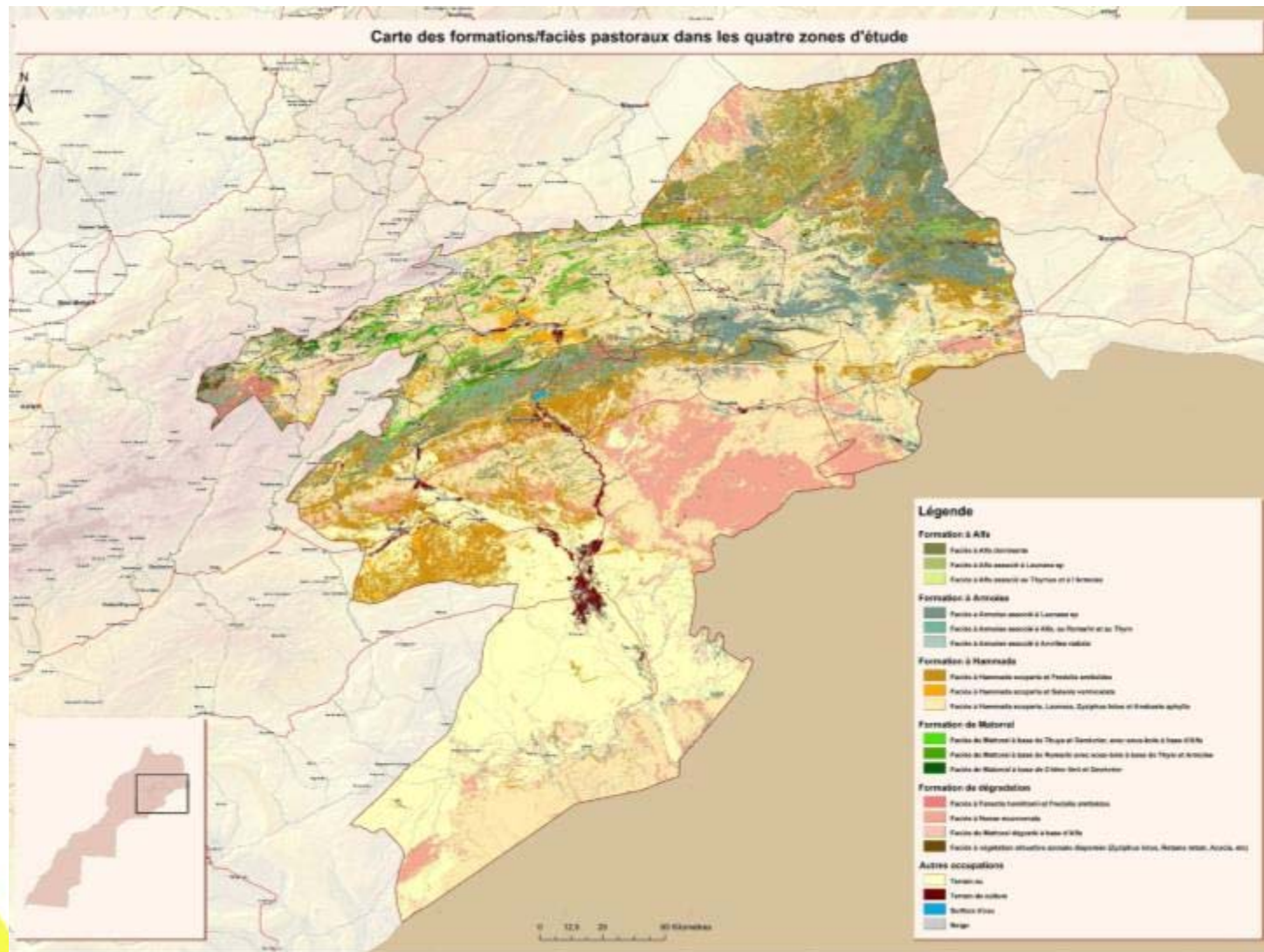
Range land vegetation mapping in the South Atlas Sub Saharian region (48,000 km²)



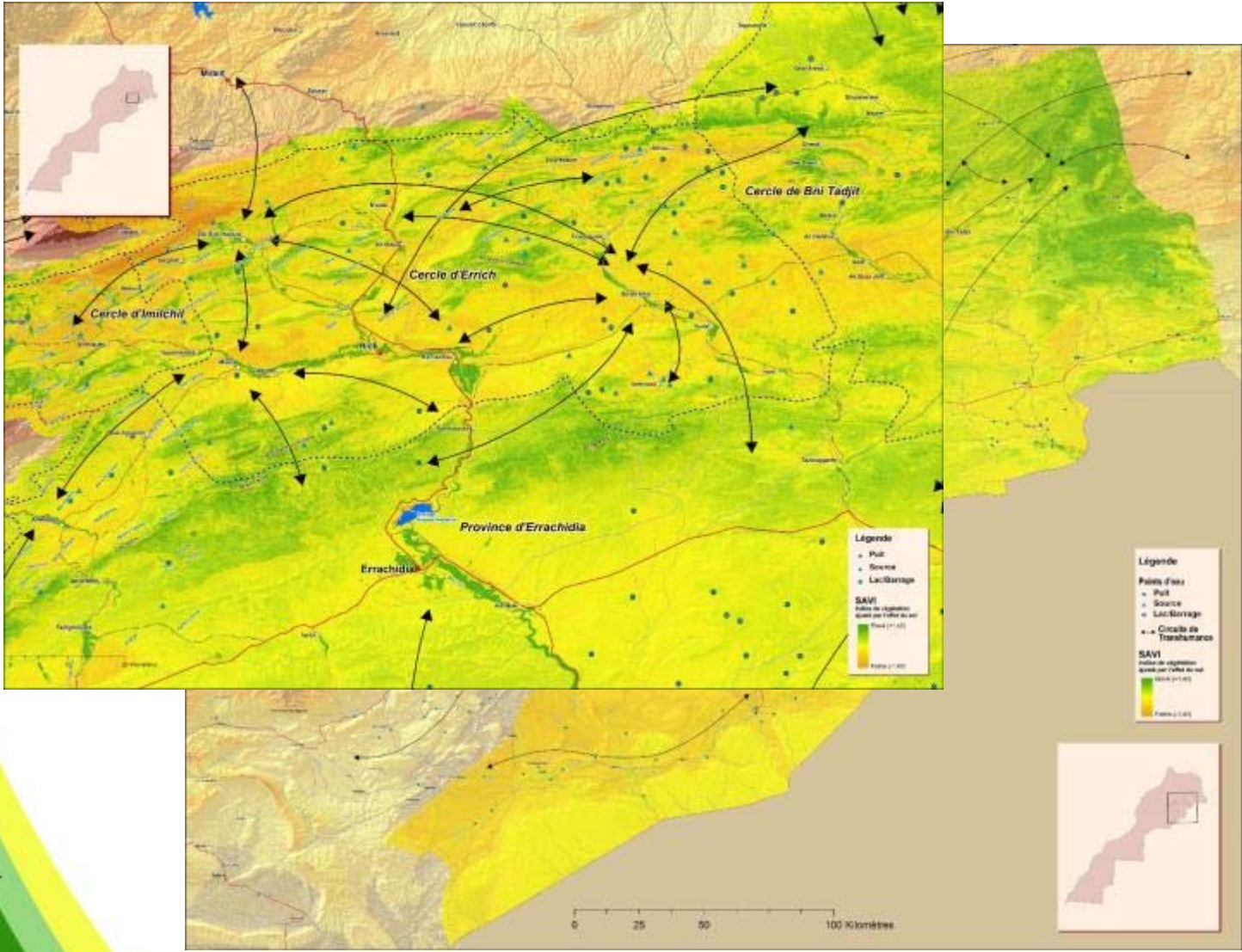
RS analysis of LANDSAT imagery



Map of main vegetation associations + biomass estimates



Transhumance mobility and sedentarisation of herder



Modeling climate change impact on cereale production (Collaboration with INRA-Meknes)

RS extraction of cereale land
Land suitability assessment



Outreach (extension)

Soil testing lab

- Providing soil-plant-water testing to farmers
- Providing (free) support and advise to farmers

Training

- Training to farmers and technicians (Extension/ONCA)
 - Requested by various Ag services
 - Requested by privates
- Training trainers



Areas of interest for collaboration

- Fertilizer (N-P) management for olive productivity and oil quality
- N-management in relation to onion productivity and storage/consevation
- GIS / Soil Information Systems
- Irrigation water use efficiency
- Soil degradation (erosion)
- Methods and tools for extension and information delivery

