WATER MANAGEMENT IN THE TIOUT OASIS, MOROCCO
FRICITION BETWEEN TOURISM DEVELOPMENT AND AGRICULTURAL IMPROVEMENTS

BARBE Audrey, Institut des Régions Chaudes
audrey.barbe91@gmail.com

Context of the study
Project Medi-Inn-Local: "Innovation and valorization of local specificities in Mediterranean uplands". Goal: the analysis of fast and profound mutations that Mediterranean countries are facing and more specifically uplands of areas greatly influenced by globalization (1). Resilience of rural territories when confronted with changes.

Issues & Methods

Study under various viewpoints:
- technics
- economic
- social
- institutional
- historical

Tools and methods:
- literature research
- historical research at the French Center of Diplomatic Archives
- collective & individual interviews
- flow measurements
- base map

To which extent is the water management system in the Oasis a source of tension between agricultural and tourism?

Characteristics of the Tiout Oasis

Facts & Figures
- part of the Souss basin, an area of 16200 km² (Fig. 1)
- 3948 inhabitants
- 440 ha cultivated area
- hydraulic heritage: 2 water storage basins, 2 khettaras
- valorization (argan, tourism)
- a divided landscape (Fig. 2)

Climate & water resources
- in a semi-arid area (Fig. 3)
- high ETP emphasized by the chergui
- 2 main watercourses: the River Tiout and the River Khazmat
- o very irregular hydraulic pattern
- o dangerous flooding

History and evolution of the oasis

It is impossible to date Tiout's creation but its Kasbah was built at the time of the dynasty of Saddiğian (1511 – 1669), just like Taroudant's fortifications. This dynasty led Taroudant to its height, stimulating its economy and most probably Tiout's as well.

Some elements show that both agriculture and irrigation were different in the past:
- importance of sugarcane
- Khettaras
- Water rights for farmers

Water management in the Tiout Oasis

Created in 1990, the Association of Agricultural Water Users (AAWW) gives a legal framework to water management. Users are responsible for technical and accounting management. The elected committee presents annual results during a general assembly, whereas farmers can suggest new projects and ideas.

Table 1: Distribution of resources according to the “water turn” and “on demand”

<table>
<thead>
<tr>
<th>Resource</th>
<th>Water turn</th>
<th>On demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>30% &amp; 70%</td>
<td>70% &amp; 30%</td>
</tr>
<tr>
<td>Land</td>
<td>15% &amp; 85%</td>
<td>85% &amp; 15%</td>
</tr>
</tbody>
</table>

Problems within the AAWU
- a lack of communication with farmers
- a lack of transparency in finances
- an association that plays favorites

Typology of agricultural productions

The land characteristics allow different agricultural possibilities (Table 2). It is also important to consider that a third of the lands are for rent and that inheritance rules are responsible for micro-plots scattered all over the oasis.

Thus, to make a living from agriculture, there is a need for:
- Land/Trees
- Water
- Workforce
- (Money)

Otherwise...
- Multiple job holding
- Look for a lucrative job
- Give up on agriculture
- Emigration

Tourism in Tiout

- Different types of tourism (Table 3)
- Various facilities
- 15 – 20 touristic guides
- Touristic guides = farmers
- Up to 4000 Dh/mo/month
- Donkey rental
- Random activity
- Source of pollution/damages
- Facilities: one major owner

Drip irrigation as a solution?

Goal: Conversion of gravity-fed irrigation to drip irrigation

After a diagnosis phase, they set up an evolution scenario. They chose the best one for economic improvements (Table 4), implying the following changes:
- In cereals and alfalfa surfaces
- in fertilizer usage surfaces
- development of market gardening
- keeping perennial crops
- improving agricultural techniques

Analysis of the situation

Inconsistency of the study
- Data, quality of interviews
- Water savings / new drilling site
- Preserving landscape / water pipes
- Use of inputs

Potential impacts on agriculture
- Increased labor (affairs) / shows
- High concurrency for market gardening (plan of Souss)
- Not obvious increase of income (loss of trees, water price, water consumption)

Who would really benefit from drip irrigation project?

Challenges behind the project
- Limit of this conversion: Amenas
- Unanimous support:
- Few interested landowners: right bank (lack of water), downstream parameters, influential/ powerfull
- Few expectations for others (land issues)
- Conflicts with tourism:
- Powerful people: not allow guest houses
- But tourism: better living conditions
- A solution for few inhabitants with a risk of paramount changes

Conceivable solutions for evolution perspectives

Institutions
- To prohibit working for the AAWU and the city committee
- To create: a powerful farmer association and a tourism management association (tax, "water turn")

Facilities
- To convert only a part of the irrigation in Zones 3 & 4
- To promote gravity-fed irrigation in Zone 1 only
- To use drip irrigation in Zones 3 & 4

Agriculture
- To promote market gardening (family consumption, restaurant)
- To use "abandoned" lands in a "collective" way
- To give a new start for palm trees (tourism)