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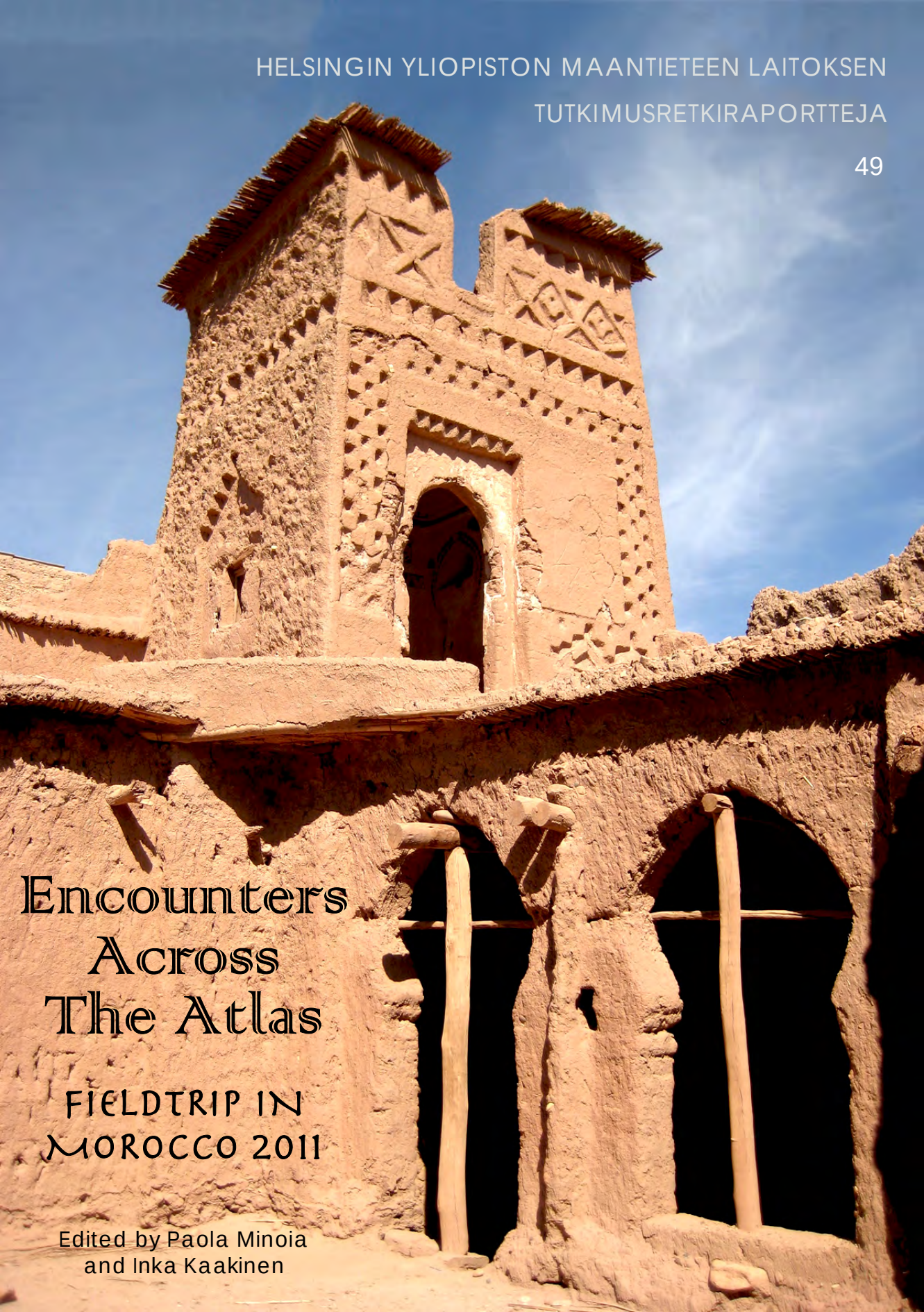

Encounters Across The Atlas

FIELDTRIP IN MOROCCO 2011

Edited by Paola Minoia
and Inka Kaakinen

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FOREWORD

Fieldtrips are fundamental experiences in students' lives, and differ from other curricular studies for the positive, and often overwhelming, involvement they are able to produce in students. Fieldtrips give students the possibility to fully immerge into areas and topics that are far from their daily routines. They also provide some rare occasions to practice theories and methods acquired in class, before the Master theses -work. Being part in a group allows sharing reflections, conceptualizing the events in real time and consolidating the lessons learnt. Furthermore, even the preparations for a fieldtrip abroad, and particularly out of Europe, are exciting. We could say that the trip already starts in class, when students start acquiring knowledge about new areas and getting familiarity with new names of places, populations, cultural practices, people (e.g. local contacts), etc. They start forming a group's common lexicon. In case the travel program is made in cooperation with local researchers, the trip also gives the opportunity to observe how the world is studied and described, and how different kinds of geographies are produced in various cultural and political environments. This is a way forward to a cultural openness or multiculturalism that is getting more and more importance in our lives.

This volume aims to report all these experiences, which we had in the occasion of a fieldtrip in Morocco between 4th October and 21st November 2011. The research fieldtrip

was part of the curricula in Geography and Regional Studies, and 15 Bachelor and Master students participated in it. This report is divided in 2 sections, the first one containing the contributions from three Moroccan researchers and the students' study reports; and the second one the daily travel diaries.

The trip was preceded by a seminar held in Helsinki in September, in collaboration with Inka Kaakinen. During the seminar, we presented an outline of Morocco from different perspectives: cultural, political, environmental, etc. The country is fascinating for the many changes that are currently happening there, and the many challenges that it is facing. Desertification, agricultural crisis, migrations, investments turn into a tourism-led economy, multiculturalism, and the *Arab spring* that had peacefully brought a new Constitution: these were among the many topics that were discussed during the seminar.

On the basis of my previous experiences in the country, I proposed two study areas: the Tafilalet region, on the Southeast border with Algeria; and the region of Marrakech. These two regions presented good case studies for the students. On the basis of their specializations, they could choose to focus on different issues, namely: water scarcity, soil erosion, rural-urban migrations, tourism development, heritage tourism, city planning, and transports.

The seminar also helped the students to familiarize with, or to recall, some research methods to be practiced in the field: mainly qualitative methods, involving observations, visual analysis, interviewing and reporting. The students had to present their field study plan and initiated their work by collecting literature references, maps and images.

As said, our "mission" was facilitated by the cooperation with three academic institutes: the Faculty of Science and Techniques of Errachidia of the University Moulay Ismaïl of Meknès; the Faculty of Letters and Human Sciences of the University Cadi Ayyad of Marrakech; and the Institute of African Studies of the University Mohammed V Souissi of Rabat. We are grateful to the deans and the colleagues of these universities for their hospitality and the generous support they have provided for our students.

We are particularly indebted to Professor Lahcen Kabiri from Errachidia, who organized the activities during the first week, guided an excursion to the dam of Hassan Dakhil, and responded to all kinds of questions regarding the environmental and social challenges in the oases. In Errachidia, we participated in an opening seminar on sustainable development challenges in the oases of Tafilalet, and our students had the chance to present their work hypothesis. After the seminar, our students had the possibility to work with students of the hosting faculty who had interests in similar topics and went together to some visits and interviews. The week was closed with

a workshop where students could share their preliminary results.

The second week was in the Marrakech region. Special thanks also go to Professor Hassan Ramou, from the University of Rabat, who accompanied us to the mountains of Imlil to explore the environmental and social changes induced by a shift from the traditional pastoralism to the tourism economy; and also to the coastal city of Essaouira, to observe productive activities and urban development issues. We are also thankful to Professors El Hassane Boubekraoui and Mohammed Ait Hassou, from the University of Marrakech, for holding a seminar and an excursion to explain us watershed-related problems and urban development issues in Marrakech. Their contributions are also presented in this book.

Finally, I hope that this overall experience can contribute to building bridges between Finland and Morocco, at least within our groups of students, researchers and professors. Morocco is not a typical country for Finnish bilateral relations, including scientific cooperation; and in general, our Moroccan counterparts told us that it is quite rare to have academic contacts with institutes from the Nordic countries. Our encounter was very interesting. It started, from our side, with questions inspired by the classical elements of *orientalism* that are part of the tourism *gazing and performing*; while, on the Moroccan side, questions were related to the typical components of an imaginative *finnishness* or at least *northerness*. My role, in most circumstances, was mainly as a translator, and I was considered as having a culture *in-between*, being from Southern Europe and *used* to both cultures. Anyway, the respective knowledge have got more complexity and become less stereotypical; and it is important to recognize that we have much in common, including scientific interests.

The field trip had quite a hectic schedule, but nevertheless it was also great fun. It was my first personal experience in guidance of Finnish students and I have personally learnt a lot from it. Now *Tutkimusretki* (research fieldtrip) as a course is not part in the study curricula anymore, but I hope to find energy and time to organize others in the near future, since I strongly believe that fieldtrips abroad are fundamental experiences for students in geography.

Helsinki, 15 September 2012
Paola Minoia

Part I

ARTICLES AND ESSAYS

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DESERTIFICATION TRENDS AND LOCAL ACTION IN THE OASES OF TAFILALT, SOUTH-EAST MOROCCO

Abstract

The oases of South-East Morocco are classified by UNESCO as World Biosphere Reserves since 2001. They are considered as anthropic spaces where communities have been able to cope with the continuous challenges posed by the difficult environment. At least until the mid 20th century there has been a sustainable relation between social activities and natural dynamics, but since the 1960s, various problems seem to have broken this delicate balance: climatic fluctuations, environmental shocks and socioeconomic pressures, to name but few. Overall, the situation of the oases is of great importance. Around the globe, it is estimated that approximately 150 million people live in oases and thus face livelihoods problems caused by environmental degradation trends.

The aim of this study is to understand how environmental degradation processes can deplete the very human development if local communizties do not implement sustainable adaptation measures. Moreover, this paper illustrates some solutions adopted by the oases' residents to mitigate these desertification trends. The paper is based on a case study in the South-East Morocco (Tafilalt region).

Keywords: oasis, water, siltation, desertification, damage, Morocco.

Introduction

20 years ago, the situation of the oases of Morocco was described as a situation of crisis, and today, the very survival of the oasis ecosystems and communities is threatened. This paper will analyse the main threats, and particularly the problems of water deficit, siltation and social change. The second part will illustrate some solutions that have been adopted by the local communities. This contribution is based upon baseline studies by Mainguet *et al.* (2010) and Alalcheikh *et al.* (2008), in terms of both social and environmental diagnosis of the Tafilalt oases.

Water, basic resource for the oasis ecosystems

During the cycle of the seasons, the Tafilalt region has to cope with two that are particularly challenging, as recurrent floods follow devastating rainfalls in the rainy period (the more recent one was in 2006, see figure 1); and as seasonal droughts make the living difficult during the summer months (Kelly & Mahboub 2006, Bousfoul *et al.* 2005, Boudad & Kabiri 2003, Kabiri 2003, 2004, 2005A, El Ouali 1999, Alalcheikh *et al.* 2008).

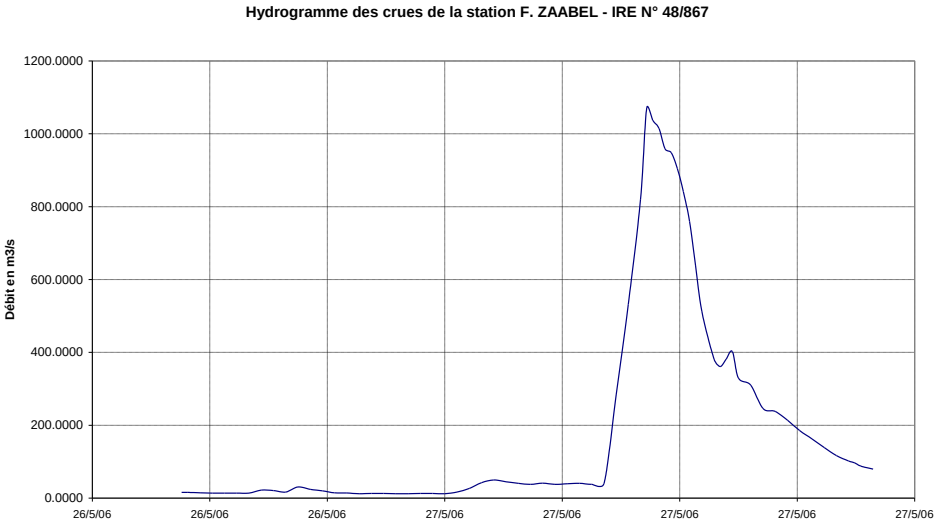

Figure 1. Hydrograph of the flood recorded in 2006 at the legionary tunnel Zaabel (IRE: 48/867).

Figure 2. Collapsed houses in Merzouga.

Figure 3. State of the road after a flood, at the entrance of Merzouga.

Figure 4. Location of Merzouga.

The first example is the case of the village of Merzouga (around 3 000 inhabitants) in the South-East Morocco. Its location at the basis of dunes and at mouth of El Beida watershed (figure 4), on lowlands, makes this village particularly vulnerable to flooding of the *wadi* (literally "valley"; also a seasonal stream or a river) El Beida, which drains a watershed of 106 km^2. El Beida river has its sources in the upstream dunes of Merzouga, and 28 km downstream it reaches the centre of Merzouga where it opens onto a wide *merdja* (wetland). Along its path, on both banks, several hostels have been built. At the east side of the dunes, the Beida basin is limited by the *wadi* Tisserdmine which drains an area of 1 160 km^2 (figure 5).

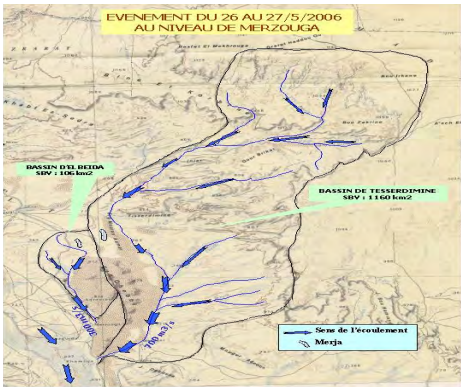

Figure 5. Floods in Merzouga in 2006 (DRH 2007).

As said before, the location of the Merzouga village makes it flood-prone. The last severe flood was recorded on the 26th of May 2006 after an intense rainfall (112 mm in three hours) on El Beida and Tisserdmine river basins (Kelli and Mahboub 2006). This amount of water is twice the average annual rainfall in Taouz and Erfoud. These rains produced heavy flooding with peak flows from 260 to 300 m^3/s in the *wadi* El Beida, and from 700 to 800 m^3/s in Tisserdmine (ibid.), and the water levels reached over 2 metres in some places. The flood damages were significant, with the collapse of 140 houses and hotels, deterioration of the road Taouz–Merzouga and of the ONEP (National Agency for drinking water and sanitation) water pipe feeding the villages of Merzouga and Taouz. As a means to overcome future problems, a site for a dam and a reservoir has been identified upstream of Merzouga in the El Beida watershed, and feasibility studies are in progress.

Other settlements affected by flooding in the Tafilalt-region are

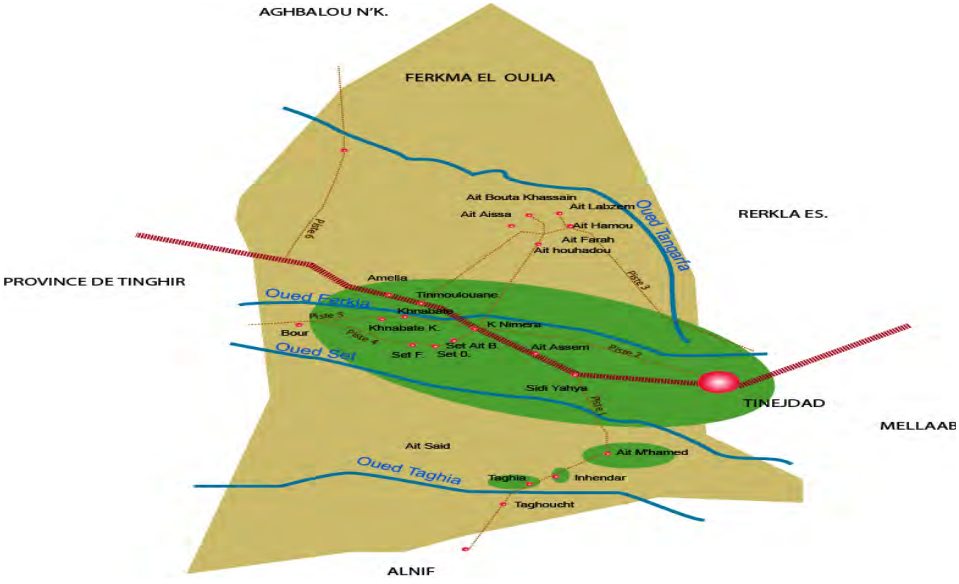

Figure 6. Localisation of Ferkla ksour and of the main wadis of the region (PCD Ferkla el Oulia).

the *ksours* (fortified villages; singular: *ksar*) d'Asrir in the Ferkla oasis, west of Merzouga (figure 6).

In fact heavy floods have hit the region in several occasions, as the *wadis* Ferkla and Tangarfa have overflown after sporadic rainfalls (summer thunderstorms), such as those occurred in 1948 and 1959, and especially in 1979, when the entire *ksar* Ait Aissa, much of the *ksar* Ait Frah and Ait Bouhadou were destroyed. For this reason, local residents abandoned their old *ksour* to construct new ones upstream, known as the Tamerdoult compound, along the main road Errachidia–Tineghir. Another part of this population currently lives the new *ksar* Sidi Yahya that is an extension of the old *ksar* Ait Assem.

Another devastating flood occurred on the 27th of May 2006 along wadi Tanguerfa, where more than 20 houses and the primary school of Asrir collapsed (Mahboob and Kelly 2006).

The Tafilalt oases also suffer severe droughts. The data recorded at the Eddakhil Hassan dam, built on the river Ziz in 1971 (with a capacity of 380 Mm^3 to serve an area of 27 500 ha, see figure 7) (Bousfoul *et al.* 2005; Kelli & Mahboob 2006) tells the following:

- The first drought was recorded between 1980 and 1989, when the water flow diminished, reaching its minimum in 1983. In two occasions, in 1983–84 and 1984–85, the surface water run-off was totally interrupted for several months. The reservoir was completely empty in 1983, and in 1986–87 the output rate was very low, around 30 Mm^3.

- The second severe drought occurred between 2000 and 2004, with average outputs of less than 100 Mm^3. In 2001–2002 the water deficit was most severe, with an output of less than 25 Mm^3.

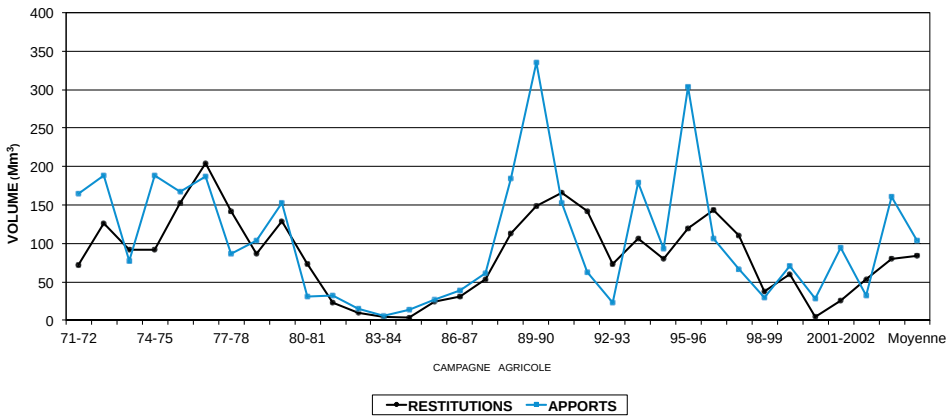

Figure 7. Intake and output at the Hassan Eddakhil's dam between 1971 and 2004.

The average intake at the dam between 1939 and 2005 shows a reduction and overexploitation of the resource. The average yearly intakes (Kelli & Mahboob 2006; Bousfoul *et al.* 2005) are:

- 1939–1971: 199 Mm^3
- 1939–2005: 146 Mm^3 (-24%)
- 1971–2005: 103 Mm^3 (-87%)

Despite these droughts, the water demand has remained high. The deficits in superficial flows have been compensated with a number of pumping stations, which have in turn lowered the water table (Boudad and Kabiri 2003, Kabiri 2003, 2004, 2005A, Alalcheikh *et al.* 2008). The data concerning the water table on the wadis Ziz and Tarda shows a general decline of the Turonian and the Quaternary aquifers (HR 2006) in different zones of Errachidia between 1991 and 2006. The drop is clearly observed between 1997 and 2001, from -7 m to -10 m (figure 8).

In brief, the droughts of the last two decades of the 20th century together with excessive pumping have led to the depletion of *khettaras*, old networks of underground channels that have been in use for centuries for irrigation purposes. *Khettaras* of the Ferkla oasis, 80 km south west of Errachidia, are not in use anymore. In Jorf, an area of 4000 hectares of land is still irrigated with *khettaras*, despite the recurring droughts between 1980 and 2000 that have left most of these dry and filled with sand; out of a total of 68 *khettaras*, only 16 still remain operational. Only 50 percent of the palm plantations receive irrigation water, which is provided either by gravity systems, via *khettaras* or *seguias* (surface channels), or by pumping (Mainguet *et al*. 2010). Small permanent dams are also sources of irrigation water, e.g. the small Tifounassine dam capturing spring waters from the Turonian limestone. However, problems of siltation reduce

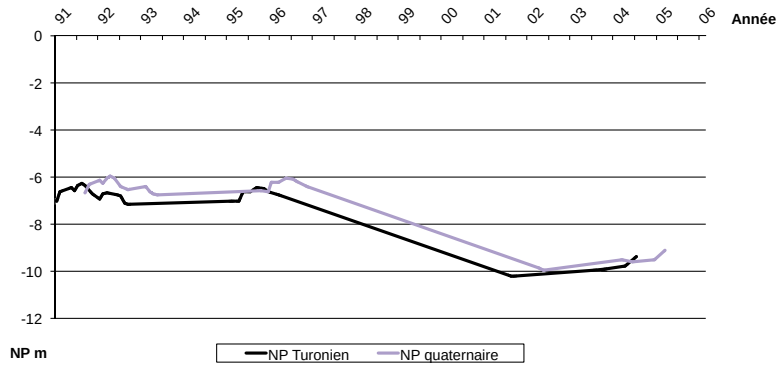

Figure 8. Fluctuations in the Turonian and Quaternary groundwater aquifers between 1991 and 2006 (IRE 1939/48. DRH 2006).

their storage capacity, while the impermeability of the reservoir basin diminishes the natural groundwater recharge.

An important contribution to the regional water supply is the dam Hassan Eddakhil, North of Errachidia. The dam was built after the Ziz flood of 1965 (5 000 m^3/s) that caused major damages to the palm groves of the Tafilalt region. The experience has shown that the dam has been effective in controlling the riverbanks' erosion and also in contributing to the groundwater recharge. According to the residents of Jdid Mdaghra, a village along the Ziz valley, the water releases from the dam immediately increase the water levels in their wells. The dam also supplies the entire palm plantations of Aoufouss with water, with the exception of some areas remaining uncultivated for flood control. Aoufouss-plantations are in fact the only ones that do not experience problems of water deficit, the limiting factor there being rather the lack of arable land. Further downstream, Erfoud is another area that the dam provides with water, but this time inadequately. Water is released 1 or 2 times per year in too short time periods and in insufficient amounts for the needs of the entire plantations – in July, for example, the water amounts are reduced, despite high summer temperatures and thus intense evaporation.

In other areas, floods provide the palm plantations with water but, naturally, the same kind of organised distribution is not possible as it is with the water reservoir of the dam. This is the case of the grove of Ouled Ghanen Essaouia (South-East of Jorf), where the floods irrigating the upstream do not reach the parts lying further downstream, making the plantations in these areas moribund (see figures 9 and 10).

Figure 9. Flood-irrigated palm grove of Ouled Ghanen Essaouia (Jorf).

Figure 10. Palm grove of Ouled Ghanen Essaouia (Jorf) not irrigated by floods.

However, deposits of silt carried by floods cause an elevation of the plots of land when compared to level of the *seguias* delivering water by gravity to

the fields (Kabiri 2004). Many groves are suffering from salinization of soil and water. The palms of Goulmima suffer from water salinity. Salinization is due to poor drainage of waters and to the lack of wastewater treatment, but also due to the type of the bedrock of the reservoir. In Goulmima, the infra-Cenomanian groundwater has a salinity of 0.7 to 2 mg/l, while it reaches 14 mg/l in Erfoud, making it unsuitable for irrigation. Fragmentation and dispersion of plots lead to the proliferation of electricity-driven pumps. The availability of water, its quality as well as more rational uses of water are the challenges that the populations of the oasis are trying to overcome. Siltation is yet another obstacle to sustainable livelihoods in oasis environments.

Siltation problems

The testimonies collected among the oases' inhabitants (Mainguet *et al.* 2010) tell of a threat these perceive as "recent" but not as serious as the water deficits. While siltation is omnipresent through dust and sand, it does not worry the local inhabitants unless it generates wind-borne accumulations (*nebkhas*) and sand patches on the agricultural fields. Since 2005, along the road from Errachidia to Goulmima it is possible to observe sand deposits just 17 km from the city of Errachidia on the northeast slopes and trapped in the axes of concentrated runoff. Particularly the wind called Saheli has a strong effect of sand transportation, and has produced since 2004 a *sif* (linear dune) on the northeast slopes and a series of nebkhas (oriented southwest–northeast 230°). In Tafilalet, the gateway of the aeolian transport is known as the "Yerdi corridor", where the dunes are about to cover up a part of the road Errachidia–Erfoud (figure 11).

Figure 11. The road Errachidia–Erfoud crossing the « Yerdi corridor », a tract of intensive wind transit, where the road is regularly sandy.

The winds blow predominantly from three directions: NE–SW (Chergui), SW–NE (Saheli, the dominant wind), and NW–SE (Mainguet *et al.* 2010; Benmohamadi *et al.* 2000; Kabiri 2005a). These winds that move the sandy strip produce *ghourds* (pyramid-shaped dunes) and *barchan* (arc-shaped) formations with the dynamism of reverse dunes.

A chain of cement fences running in the NW–SE direction (figure 12) was erected in 1981, but it is now completely buried in the

massive amounts of sand carried SW to NE by the *saheli*-wind. Along the road from Alnif to Rissani, at the foot of Jebel Amelane, up to 2-meter-high *barchans* have been formed in a SW–NE axis. The attempts to fix the sand with a green belt have proved inefficient, as the main wind directions were not taken into consideration when the belt was planted, and as it has been left without maintenance ever since (figure 13). As a result, sand continues to accumulate by the road and the protection works of the 1980s are in acute need of rehabilitation.

Siltation of the fields has increased considerably since 1979, when FAO conducted a study concerning the phenomenon (Mainguet and Chemin 1979). Farmers of Chtam confirm that silting began 15 years ago and now threatens the traditional palm grove, forcing them to displace their cultivations. The *saheli*-wind has formed new 3.5-meter-high *barchan* dunes. The Aeolian material comes from the *wadi* Sat that was flowing until the 1970s. After the river dried up, the former riverbed has become a source of sand. Increasing volumes of moving sand have also caused the disappearance of *barchan* formations in Bouia-Kraïr in 2006 (Kabiri *et al*. 2003). As palm groves form natural barriers to Aeolian transport, they become privileged sites for dune formation. In Ait Ben Omar, to give an example, walls have been built to face the *saheli* and thus to slow down the dune accumulation. However, these walls are already

Figure 12. Cement fences erected in 1981 are broken and buried in sand (N31°32'80 O4°10).

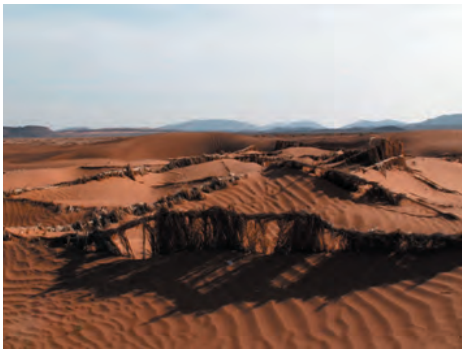

Figure 13. Grid protection along the road Rissani–Alnif.

Figure 14. Protection wall against the siltation of the palm grove in Aït Ben Omar (Ferkla).

covered by sand and cannot anymore protect the plots from siltation (figure 14). In Boudnib, silting threatens even the local school, whose entrance has to be shovelled clean of sand daily. A perforated cement fence erected 5 years ago by the Regional Office of Agricultural Development of Tafilalt (ORMVA/TF) runs parallel to saheli, the dominant wind, but it is already in bad condition, submerged in sand deposited on its both sides in equal amounts, and rather facilitates the movement of the sand instead of blocking it. Another attempt to stop sand encroachment, completed in 2005, was the construction of a huge west–east grid by the Forestry Commission. Nonetheless, the works proved inefficient after three months only, as the grid was not perpendicular to saheli-winds.

Even if the main problem for the inhabitants of the oasis continues to be water scarcity, as they themselves define it, the Aeolian risks do exist. Faced with these problems, the inhabitants aim to find better and more efficient uses for the scarce water resources. As a way of example, some solutions supported by local community based organizations, like the Association for the Environment and the Heritage of the Ferkla Oasis (AOFEP), include the construction of a hillside dam at a distance of 25 km from Tinejdad, which provides 30 percent of the irrigation water needed for the palms; the construction of an irrigation channel that captures run-off water; the construction of a small dam at the foot of the slope to form pools and small terraces to control water erosion; and the collection of rainwater for irrigation.

Another thing that we consider of particular interest, and that forms an integral part of the current strategies of the oasis' inhabitants in their struggle to maintain their livelihoods and protect their environment, is their will to develop collective projects carried out by local associations. In Erfoud, the inhabitants of thirty three ksours have united their forces and propose various actions, e.g.: to build a bypass channel of 20 km from Tazougart between *wadi* Guir and *wadi* Ziz; to protect the groundwater by pump-monitoring; to drill artesian wells; to create artificial lakes as water reservoirs and as sites for groundwater recharge; and to derive the Gheris river to reach the Douira as a means to make sure that the four to five annual floods do not get lost in the desert. Associations currently encourage practices of "drop-by-drop" irrigation, which the Moroccan state subsidizes up to 100 percent within the frames of Green Morocco -strategy.

Conclusions

The fragile oasis habitats, on the one hand, and the people living in them, in the other, face both man-made as well as natural challenges. Two types of solutions are proposed to overcome these problems: first, associations that collect and revitalise the best local

practices of the rural communities with their traditions deeply rooted in the oases of southern Morocco. These associations try to counteract the rise of individualism at the cost of common survival strategies. Individualism, namely, is incompatible with the sustainable management of the oasis ecosystems and, indeed, threatens their very existence.

Second, there is a need for economic activities that can provide interesting employment opportunities for the locals, including young graduates. At the moment, such opportunities are few and the common solution to the problem is to migrate to the urban centres of Northern Morocco and even of Europe. Yet, while migration might work out for an individual, it is not a solution as regards the development of the oasis environment or the continuity of the oasis culture. Even so, special attention has to be put in the sustainability of the possible alternatives; eco-tourism, for example, may seem appealing but only provides a partial solution, since the oasis is, by definition, a fragile ecosystem in need of protection.

References

Alalcheikh, C. H., Kabiri, L. & A. Khattabi (2008). *Evaluation de l'ecosystème oasien de Tafilalet selon l'approche de l'evaluation des ecosystèmes pour le millénaire, rapport final*. Pp. 148. ONEM–PNUE.

Benmohammadi, A., Benmohammadi, L., Ballais J. L. & J. Riser (2000). Analyse des inter-relations anthropiques et naturelles: leur impact sur la recrudescence des phénomènes d'ensablement et de désertification au sud-est du Maroc (vallée de Drâa et vallée de Ziz). *Sécheresse* 11: 4, 297–308.

Boudad, L. & L., Kabiri (2002). Désertification et crise de quelques oasis dans les bassins versants de Ziz et Ghèris (Errachidia, Maroc). *Revue de Géographie du Maroc* 20: 1–2, 97–106.

Bousfoul, M., Babakhouya, A. & A. Abaouz (2005). Gestion intégrée des ressources en eau: une nécessité pour la préservation des oasis du sud est marocain. Cas du Tafilalet. *Actes du symposium international "Développement agricole durable des systèmes oasiens"*. INRA-Maroc. 7.–10. Mars 2005. Erfoud, Maroc.

Bouhlassa, S., Alechcheikh, C. & L. Kabiri (2007). Origine de la minéralisation et de la détérioration de la qualité de la nappe quaternaire du sous-bassin versant de Rheris (Errachidia, Maroc). *Sécheresse* 19: 1, 67–75.

El Ouali, A. (1999). *Contribution du haut Atlas central au sud de Midelt dans l'alimentation des aquifères profonds du bassin crétacé d'Errachidia, Maroc*. Thesis d'Etat. Pp. 177. Université Mohammed V, EMI. Rabat, Maroc,

Kabiri, L., Boudad, L., Krimou, A., Khardi, A., & L. Elmrani (2003). Etude préliminaire de la dynamique des dunes continentales dans le Sud Est marocain. *Sécheresse* 3: 14, 149–156.

Kabiri, L. (2003). *Rapport scientifique final du projet "MAB" 2003. Impact des changements climatiques et anthropiques sur les ressources en Eau dans l'Oasis de Ferkla (Tinjdad, Errachidia, Maroc)*. Pp. 52.

Kabiri, L. (2004). *Contribution à la connaissance, la préservation et la valorisation des Oasis du Sud marocain: cas de Tafilalt*. Thèse d'habilitation universitaire. Pp. 262. FSTE-UMI, Maroc.

Kabiri, L. (2005a). Gestion des ressources en eau dans les oasis de sud marocain: cas de Ferkla (Tinjdad, Errachidia, Maroc). *Actes du symposium international sur le développement durable des systèmes oasien*, 497–506. 8.–10. Mars 2005, Erfoud, Maroc.

Kabiri, L. (2005b). Contribution a la connaissance de la dynamique éolienne dans les oasis du sud marocain : cas du Tafilalt (Errachidia, Maroc). *Actes du symposium international sur le développement durable des systèmes oasiens*, 202–212. 8.–10. Mars 2005, Erfoud, Maroc.

Kelli & Mahboud (2006). Ressources en eau dans la région du GUIR-RHERIS-ZIZ, *Actes du colloque international "Avenir des oasis face à la desertification*" FSTE, UMI, Septembre 2006. Errachidia, Maroc.

Mainguet, M., Dumay, F., Kabiri, L. & B. Rémini (2010). Prodromes of desertification in the oasis of Tafilalet in Morocco and specific local solution. *In* Kameri-Mbote, P., Chourou, B., Dunay, P. & J. Birkmann (eds.): *Hexagon series on human and environmental security and peace 5. Section A: climate change*, 901–919.

Mainguet, M. & M.-C. Chemin (1979). *Lutte contre l'ensablement des palmeraies et des oasis dans le Sud marocain. Rapport technique. : Étude préliminaire de l'avancement du sable*. Pp. 32. FAO, Rome.

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PROBLEM OF WATER MANAGEMENT IN THE WATERSHED TANSIFT

Abstract

Water is a fundamental resource, particularly in arid and semiarid regions. Issues related to this resource in the watershed of Marrakech center on its availability, its distribution, its mobilization, management, and social dimension. However, since about two decades, the imbalance is undoubtedly becoming more and more alarming because water resources, both surface and underground, record unprecedented massive exploitation, facing the dramatically increasing water needs and a high degree of wastewater discharge in the natural environment. However, this reality poses a serious threat to the region and undermines the issue of sustainability of water resources and hence that of sustainable human development.

Introduction

The problem of water in the watershed area of Marrakech occurs on two main scales. The first relates to the scarce and erratic water supplies; the second, more recent, focuses on the impact of the socio-economic and demographic future of water resources in the region. Indeed, the imbalance is arguably becoming more worrying in several respects: water resources, both surface and underground record unprecedented and massive exploitation, due to the increasing need for water on the one hand,

and a significant level of wastewater discharge in the natural environment, on the other. However, this reality poses a serious threat to the region and undermines the issue of sustainability of water resources and hence that of sustainable human development. Based on these considerations, our article discusses some aspects of the following questions:

1. The physical characteristics of Tansift watershed;

2. Water resources and their management in the watershed of Tansift;

3. Water quality and production potential of waste water in Marrakech;

4. Tendency towards the beginnings of a global crisis of water in the region.

Physical characteristics of Tansift watershed

Physiography of Tansift Watershed

LOCATION

Located in west-central Morocco, Tansift watershed (figure 1) covers an area of 24 800 km^2, or 3% of the country. It is divided into four geographical sets as follows:

- The High Atlas Mountains to the south, containing the highest relief of Morocco, whose highest peak reaches 4 165 m (Toubkal);

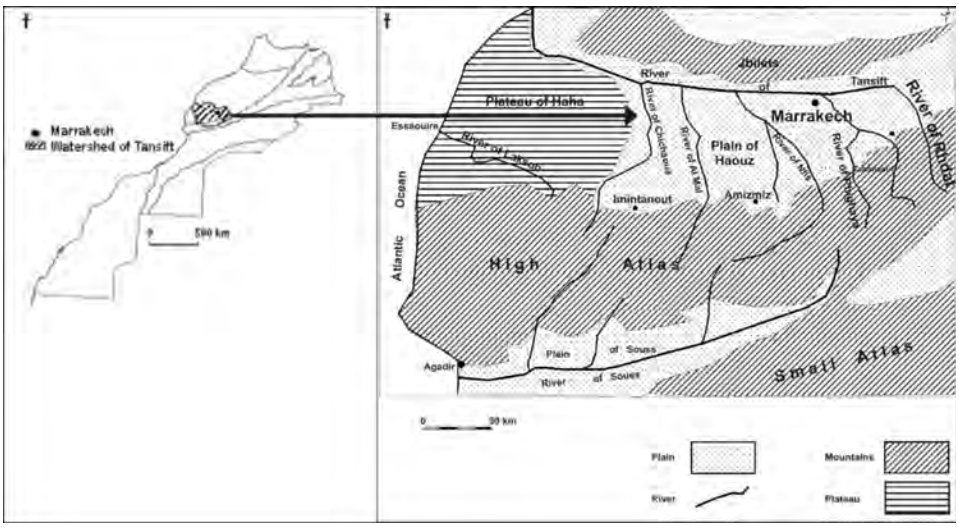

Figure 1. Physiography of Tansift watershed (Boubekraoui, 2011).

- The plain of Marrakech or Haouz (480 m average elevation, about 6 000 km^2), is mainly drained by the tributaries of the left bank of river Tansift in its regional base level;

- The Jbilet Mountains to the north, low altitude (700 m average);

- Essaouira Basin, Chichaoua in the west, consists of a vast undulating plateau ensuring the transition between the interior plains of Morocco and the High-Atlas.

HYDROGRAPHIC WATERSHED TANSIFT

The watershed Tansift (figure 2) consists of 6 sub-basins (from west to east):

- Nfis, Rhighaya, Issil, Ourika, which are characterized by medium altitudes up to 2 150 m, and steep slopes (20%);

- Zat and Rhdat, whose altitudes are lower (average 1 500 m) and slopes of about 15%.

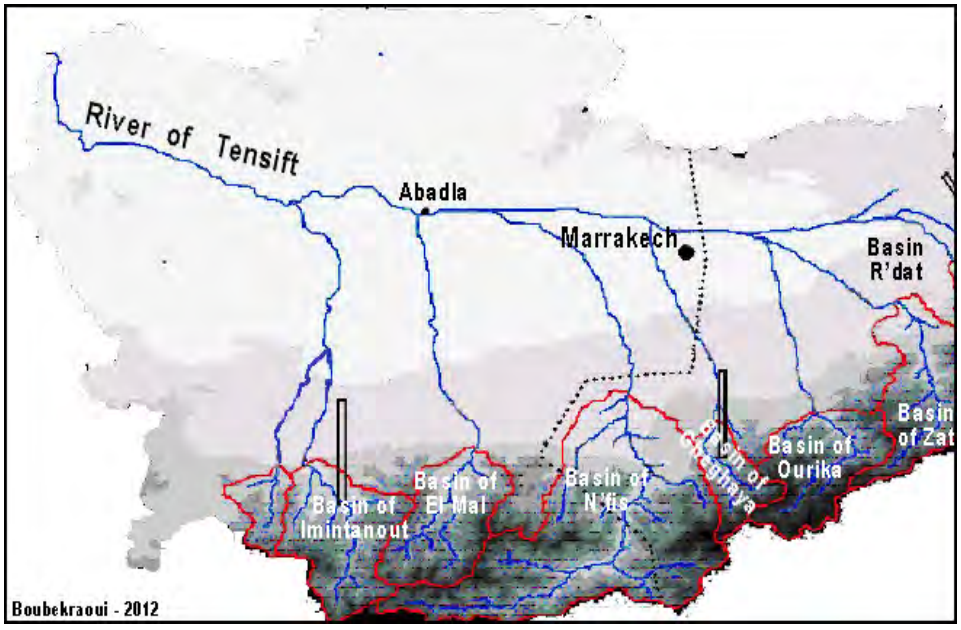

Figure 2. Location of watersheds of Tansift.

THE BIOCLIMATIC CONDITIONS

The bioclimatic conditions in the area of the basin range from arid in the plain to semi-arid in the piedmont and humid foothills of the ocean basins. They are characterized by:

- Low and erratic rainfall in time and space, because the rainfall averages between 240 mm/ year in Marrakech and 700 mm on the summits of the Atlas. There are two main seasons: a wet season (October to April), contributing 95% of the total annual rainfall, and a dry season (May to September) with less than 10% of the annual amount.

- Average annual temperatures calculated over the last 40 years range from 18.5° to 20° C. Humidity is generally low; it is 40% on average in August and 70% on average in January. The average evaporation varies too; it is 2 640 mm and 1 830 mm in Marrakech in the mountains.

WATER RESOURCES AND THEIR MANAGEMENT IN THE WATERSHED OF TANSIFT

Water Resources

SURFACE WATER

Water is irregularly and unevenly distributed. Most rivers have their source in the High-Atlas; the plain is a transition zone where the surplus waters are discharged through the rivers of the Tansift watershed, until the Atlantic Ocean. Some data about these rivers are reported below (Table 1).

The flow regime varies from one basin to another. Based on various sources (ORMVAH, DRE, ONI), we find that the flows show serious seasonal, annual and interannual variations. Indeed, the low water period occurs in August, but in September and February the rates gradually increase, peaking between March and May. These flows generally fluctuate over time following the rate of precipitation. In 32 years

Table 1. The main features of major flows (Pascon P, 1983, p. 44).

River	Length (km)	Surface (km2)	maximum hight (m)	slope (%)	rainfall (mm)
Nfis	150	1703	1600	17	560
Rhirhaya	36	324	1680	21	676
Issil	20	94	1000		534
Ourika	46	574	2100	21	760
zat	50	496	2000	18	696
Rhdat	50	552	1718	14	

(1970–2002), the average annual contributions by the various Tansift river is an estimated 768 Mm^3. These contributions range from 76 Mm^3 to 2 700 Mm^3. In addition, the plain of Marrakech has a transfer of water from the basin of Oum Er-Rbia via the channel of Rocade (300 million m^3) whose function is to supply the city of Marrakech with drinking water (40 million m^3) and irrigate the central Haouz region (260 million m^3). The breakdown of contributions by major sub-basins Tansift is as follows:

Table 2. Contributions by major sub-basins Tansift (ABHT, 2006, débat national sur l'eau, p.7).

Watershed	Intake Millions m3		
	Average	High	Low
Nfis	13	504	174
Rheghaya	47.8	117	47.8
Ourika	156	618	155.8
Zat	104	278	104
Rhdat	73	264	73

GROUNDWATER

The water table of the plain of Marrakech stands in the Plio-Quaternary alluvium and Neogene formations whose global power ranges from 50 m to 80 m local and can reach 120 m. The groundwater recharge occurs:

- either with flood water seeping at irregular intervals in the river beds or in flood areas regularly along the irrigation canals in the ground (*saguia*);
- or directly with the precipitations that occur on the plain.

The groundwater level generally ranges from 10 m to 80 m. The overall water balance is shown in table 3 on the following page.

Management of water resources in the Tansift watershed

The severe climatic conditions occurring in this area do not allow the practice of irrigated agriculture. It is a space that can actually be divided into two zones: one dominated by the upstream surface irrigation, the other downstream dominated by mine water. Indeed, for centuries, the first developers of the plain of Marrakech have used their expertise to collect water and to irrigate thousands of hectares by traditional means.

THE SAGUIAS (UNLINED EARTHEN CANALS)

They allow the diversion of water from rivers towards the plain. Indeed, nearly three-quarters of the area of Marrakech Haouz are irrigated by this system (approximately 100 000 hectares). According to P. Pascon (1983: 85), this system takes an average 411 million m^3/year of the 567 million m^3 of the four main rivers crossing the plain. The water of each main *saguia* is distributed by distributors (*masrefs*), which in turn are divided into a micro-hair lines (*r'bta*).

Table 3. Global assessment of the Haouz groundwater (Agence du Bassin hydraulique du Tensift, 2006).

Inputs	outputs m3 (Mm3)	Balance Sheet (Mm3)	Resources mobilized (Mm3)
516	701	-185	472.5

THE KHATTARAS

A *khattara* (figure 3) is a drain of the water table, where the slope is lower than that of the water and of the natural terrain, hence the drain ends up flushing open waters and can deliver downstream to irrigate the gardens (Pascon 1983: 105) More than 650 *khattaras* were built in the plain from the time of the Almohads totaling nearly 700 km linear, providing a 5 m^3/s speed, approximately, to meet the needs of the population with drinking water and for irrigation of about 20 000 hectares. The whole system is now dry from lack of maintenance and especially because of the lower level of the groundwater under the influence of intense pumping and the imbalance of the catchment area, source of water supply.

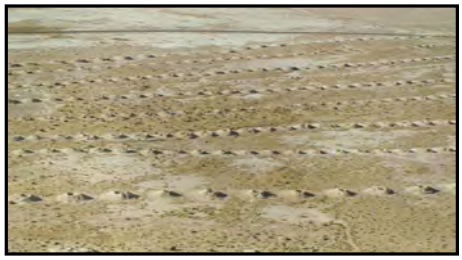

Figure 3. Khattaras seen from above.

WELLS

The importance of wells is small compared to other irrigation systems, as they are often privately owned, making it difficult to know their number, their debit, and the area they irrigate. Traditional techniques of khattaras and wells have been gradually replaced by water pumping. The majority of wells is private and their number is estimated at about 10 000, especially in the Nfis.

WATER QUALITY AND PRODUCTION POTENTIAL OF WASTE WATER IN MARRAKECH

Water quality

SURFACE WATERS

Measurements made on this subject show that:

- The water quality of the tributaries of the left bank of Tansift is generally good, with the exception of some sections

of the river Imintanout, Sidi Rahal, Amezmiz and Chichaoua;

- The water quality of Tansift ranges from average to poor due to mineralization and organic pollution and bacteriological pollution related to wastewater from the city of Marrakech.

GROUNDWATER

Most layers are from moderate to good except for in areas contaminated by sewage or affected by the chemical nature of aquifers.

Generation potential of wastewater in Marrakech

Nationally, the production of wastewater is roughly 586 million m^3 in 2006. Projections for 2020 are about 900 million m^3, which shows that our country has a large potential of wastewater that will be needed to reduce the problems of water stress experienced by our country. Domestic liquid waste produced in the region of Marrakech Tensift Al Haouz is approximately 1 347 l/s, that is a daily volume of 116 381 m^3. 63% of this flow is produced in the city of Marrakech, that is 73 000 m^3/day (2004), and 120 000 m^3/day in 2010 according to the official projections. All centers of this space discharge their wastewater, called effluent, without any treatment in the receiving waters as rivers, gulches, soil or subsoil and sea. These discharges generate organic and bacteriological pollution in the form of oxidizable materials.

USE OF WASTEWATER

The areas of Al Azzouzia (2 000 ha) and Azib Layadi are the sectors most affected by the use of wastewater. These are conducted by collectors divided into open concrete channels or earthen serving space used by the inhabitants of villages (douars) for survival and for supplying Marrakech with agricultural products. These waters, legally owned by the city council are sold each year to farmers (auction). The water is conveyed by a large network of sanitation – 1 300 km, including 130 km in Medina Intramurals. The flow rejected by the city is 850 l/s with 7% of industrial origin. The number of households that are served is 125 559. The rate of connection to the sanitation is about 80%, the remaining 20% are constituted by the peri-urban Douars that are not cleaned, or 60 000 inhabitants and the area Annakhil (tourist area and high standard) that use septic tanks. Finally, the majority of the sewerage system is 86% individually designed. The analysis by the Agence of Tensift Hydraulic Basin on water samples taken at the application area of the city of Marrakech has shown that these waters are of very poor quality.

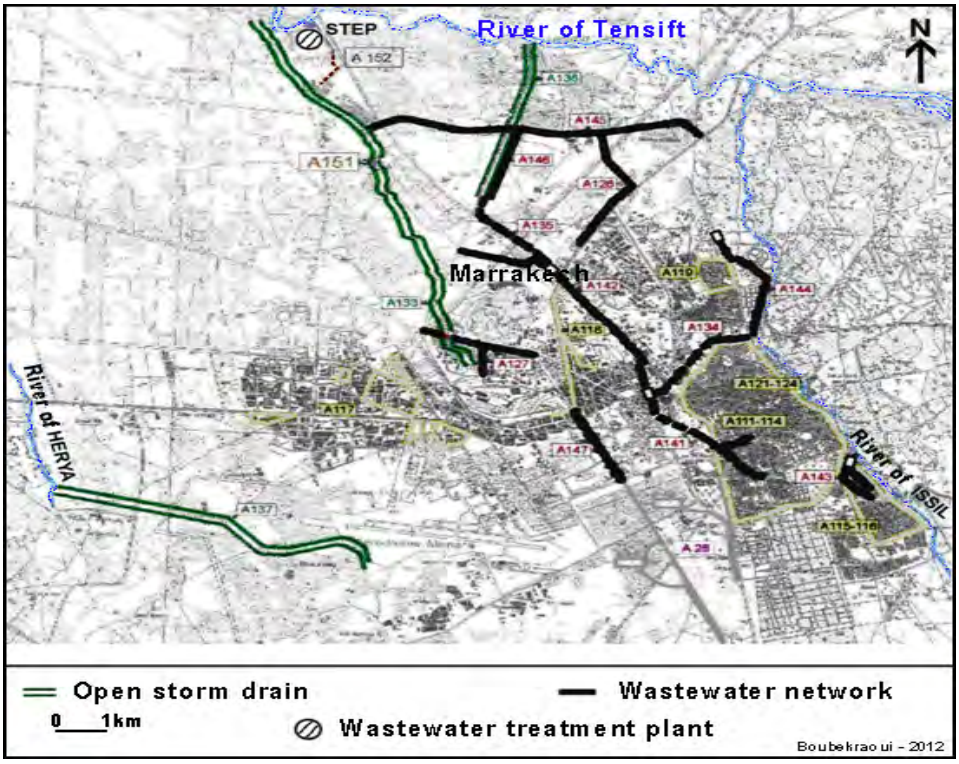

Figure 4. Location of the wastewater treatment plant of the city of Marrakech (WWTP).

REACTION-GOVERNMENT: THE NEED TO CREATE A WASTEWATER TREATMENT PLANT

In order to find solutions to various violations affecting the environment and the urban landscape of Marrakech, including the impact of wastewater use on population, the government of the city and its partners have chosen to place a water treatment of this wastewater. The project started in 2004, and the studies plan a treatment with activated sludge technique for 1 m^3/s, almost all waste water produced in the city of Marrakech, on a 11 ha site located in the north of the city on the left bank of the River Tansift. Two clusters (DEGREMONT - Morocco SOGEA OTV France - OTV Operations - Compagnie Générale des Eaux - Amanor) known for the construction and operation of this type of treatment works have been asked to complete the project in 18 months (2008). The commissioning of this wastewater treatment plant in the city of Marrakech will have positive impacts on the environment; the most important impacts are:

1. Impact on energy consumption
   Energy recovery from biogas (cogeneration): sludge digestion results in the degradation of organic matter in the mud and the formation of biogas with a calorific value of about 5 500 Kcal/Nm^3. Digestion of sludge (500 m^3/day) leads to the recovery of biogas per day 11 000 Nm^3, that is an equivalent of 48 000 Kwh/day of gross energy. Energy recovery of biogas involves the production of electrical energy from the fuel by an internal combustion engine coupled to a generator rated 750 kW. One-third of gross energy is used to produce electricity. Some of the heat energy is used for the boiler and the rest is dissipated as heat losses. For reasons of reliability, a second generator of the same rated power will be installed. A desulphurization unit will be installed to reduce the sulfur content in the biogas and to ensure the sustainability of the generators. The potential annual energy available is 5 million KWh, which theoretically allows to fully cover the electrical needs of the station during the first phase, which is approximately 3.5 million kWh.

2. Impact on the urban landscape
   The architectural appearance of the station is designed to fit into the site of the great Marrakech; the local architectural style will be reproduced on the elements of the proposed wastewater treatment plant. Indeed, the existing plantations, especially olive and palm trees will be replanted on the same site. Other positive impacts of the implementation of STEP include the removal of outfalls scattered north of the city, including the confluence Issil and Tansift, the area of Al Azzouzia and of Azib Layadi. This will open new areas to the urban north of the city, once the application areas not valued and operation of application areas after the delivery of water to the WWTP to accommodate recreational areas (sports parks). This will relieve pressure on the land of the city of Marrakech city;

3. Valuation of urban areas north of the city
   The implementation of the wastewater treatment plant will enhance tourism infrastructure north of the city and the tax base, reducing the pressure of the expansion of the urban (2 000 ha in 1974 to about 9 000 ha in 2007).

4. Improved Water Quality
   The station will in the first stage (primary treatment) improve the quality of wastewater once released into the environment, which will preserve the surface water resources and groundwater and reduce the negative impact of waterborne diseases and odors associated with water pollution. Treated wastewater, at this stage, will be discharged directly into the Tansift.

However, RADEEMA is discussing with "Le Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification" the ability to set up a forestation project of the area surrounding the proposed station, which could be irrigated with treated wastewater. Other proposals lean towards the use of treated wastewater of the second phase in watering golf fields and parks of the city of Marrakech.

Trend towards the premises of a water crisis

The overall water balance is in deficit, because the indicator "natural water resources per capita" barely exceeds 618 m^3/hab/year and will be around 475 m^3/inhabitant/year by 2020 (note that the water transferred from the basin of Oum Er-Rbia is already below the critical treshold and indicates water scarcity and forthcoming water crisis). Problems are:

- The increased dependence on drinking water as well as water for irrigation from the catchment area of Oum-Rbia. Even the new dams (Addahbi Mansour to Wirgane, Talmest to Tensift and Taskourt to Assif Al Mal) with their extra supply of water (500 million m^3) are not enough to provide sufficient quantities to meet these needs.
- The degradation in the basin ranges from about 200 to over 3 000 tonnes/km^2/year. R'dat Basin is one of the most degraded basins of the Kingdom. The capacity of the dam Lalla Takerkoust, for example, has decreased from 90 million m^3 to 57 million m^3.
- Taken the scarcity and competition between different water users, the government is requiring a new policy aimed to cement political and social stability; however, the development of urban areas at the expenses of irrigated fields, intensifies the rivalries over water uses, especially those between domestic uses and tourism.

Intensification of competition between different users of water: domestic use and tourism

INCREASING SOCIAL DEMAND FOR WATER

This increased demand is closely linked to the increasing population of Marrakech and its hinterland. Table 4 on the next page shows the average annual increase of 2.4% between 1960 and 2004.

There is high social demand for water by the current population of Marrakech (around one million inhabitants). According to RADEEMA, the rate of water connections has been increasing, as shown in table 5.

Table 4. Evolution of the population of Marrakech between 1960–2004 (HCP, General Census of Population and Housing 2004).

Census year	1960	1971	1982	1994	2004
Total	222.479	328.730	482.500	676.800	843.575

Table 5. Changes in the number of subscribers to drinking water in Marrakech (Régie Autonome de Distribution d'Eau et d'Electricité de Marrakech, RADEEMA, 2009).

Année	2005	2006	2007	2008	2009
Number of subscribers	155 828	165 786	177 945	191 585	201 957
Subscription rates (%)	87	91	92.7	93.5	94.3

Drinking water is provided by the National Office of Drinking Water (ONEP) on behalf of RADEEMA that deals with its distribution to its customers from the treatment plant, which is located 20 km west of Marrakech. 86% of the total water is channeled through a bypass from the two dams, Hassan the First and Sidi Driss watershed of Oum Rbia to 118 km east of Marrakech; while the remaining 14% is provided by groundwater.

INTENSIVE WATER USES IN TOURISM

Marrakech is the first tourist destination in Morocco, accounting for 30% of the total accommodation capacity nationwide. Tourism is, in fact, the engine of economic development of this city. According to the Regional Centre for Investment (CRI), 1 767 tourism projects were approved between 2003–2009 with a total value of 300 billion dirhams, including 24 projects of new golf fields by 2015, against five at present. These new infrastructures will require the mobilization of at least 39 millions m^3 of water. While the average daily consumption of water by a citizen of the city is only of 119 litres on average, the tourism sector is requiring four times more. According to the Office of Drinking Water (ONEP), consumption by type of accommodation is shown in table 6 on the following page.

The estimated consumption of 3 500 m^3/day by golf courses is equivalent to the consumption of a small town of 7 000 inhabitants. According to a regional development scheme, the water requirements for the tourism sector (in millions m^3/year) will change as depicted in table 7.

Table 6. Estimated consumption by type of accommodation (liter/night) (ONEP, Office of National Drinking Water (ONDW), Direction, Strategy and Development, Medstat II, 2009).

Super Hotel *****	Hotel *****	Hotel ****	Hotel ***	Riad/ guest house	Villa	Resort Village	Apartment
600	500	400	300	500	300	350	180

Table 7. Water requirements of the tourism sector (Royaume du Maroc 2009: 112).

Year	2010	2015	2020
Structure Hosting	33.6	38.3	46.1
Golf cources	6.4	30.5	34.4
total	40	68.8	80.5

The issue of sustainable water management

The problems that Marrakech faces in the management of water quantity and quality concern all the stakeholders, as they relate to the preservation of the environment, including water and its sustainable use. A sustainable management must be based on the following principles:

- To base the development projects on modeling and simulation of both surface and underground waters.
- To implement structural measures such as dams custody, diversion works, and management plans, particularly during cyclical shortages.
- To review the planning policies of the High Atlas mountains of Marrakech, because the acute environmental imbalances affect the watershed dynamics, thus resulting in new problems as flooding.
- To sensitize the various water users towards the principles of water conservation and sustainable use and the risks related to its waste.
- To evaluate the potential of non-conventional resources.

Conclusions

The problem of managing water scarcity remains a central issue that threatens the future of the city of Marrakech and its surroundings. However, such management must, in our opinion, be based on the management and development of supply on the one hand, and on finding compromises between the various users in the context of good governance on the other. The utilization of wastewater and creation of awareness on water conservation are important components of this sustainable strategy.

References

Abourida, A., Errouane, S., Leduc, C. & G. Chehbouni (2004). Impact de la modernisation agricole sur l´evolution piézométrique de la nappe phréatique du Haouz (Maroc central). Projet INCO-WADEMED, Actes du Séminaire Modernisation de l'Agriculture Irriguée, 19–23 avril 2004, Rabat.

Alexandre, O. (2005). Lorsque la pénurie fait ressource: étude géographique de la notion de ressource, l'exemple de la politique de l'eau au Maroc. *Geocarrefour* 80: 4, 263–272.

Boubekraoui, E.H. & Yahyaoui (2008). La station d'épuration des eaux usées de Marrakech: quels impacts sur l'environnement? *Espace périurbain de Marrakech, Etudes Spatiales* 2, 143–157. Imprimerie Al watania, Marrakech.

Fathallah, D. (2004). *Agendas 21, profil environnemental de Marrakech*. Pp. 124. PNUD- Maroc.

Jouve, A.-M. (2006). Les trois temps de l'eau au Maroc: L'eau du ciel, L'eau d'état, L'eau privée. *Confluence Méditerranée* 58, 51–61.

Laouina, A. (no date). *L'eau au Maroc*. UNESCO, FLSH, Redamed, Rabat.

Ministère de l'Aménagement du Territoire, de l'Eau et de l'Environnement (MATEE), Agence Japonaise de Coopération Internationale (JICA) & Agence du Bassin Hydraulique du Tensift (ABHT) (2007). *Etude du plan de la gestion intégrée des ressources en eau dans la plaine du Haouz. Rapport intermédiaire*. Pp. 138. Pacific Consultants International, Japon.

Pascon, P. (1983). *Le Haouz de Marrakech*. 2 tomes. Éditions marocaines et internationales, Tanger.

Royaume du Maroc (2006). *Débat national sur l'eau, L'avenir de l'eau, l'affaire de tous*. Pp. 25. Agence du Bassin Hydraulique du Tensift (ABHT), Marrakech

Royaume du Maroc, SDAU de Marrakech (2008). *Rapport diagnostic et analyse, Atelier de Recherche, d'Etudes et d'architecture (AREA)*. 287p.

Salama, H. & Tahiri, M. (2010). La gestion des ressources en eau face aux changements climatiques. Cas du bassin du Tensift (Maroc). *Larhyss/Journal* 8, 127–138.

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URBAN GROWTH, TERRITORIAL AND SOCIAL REORGANIZATION IN MARRAKESH

Abstract

Like any other large city of Morocco, Marrakech has been developing and increasingly expanding due to its own potentialities and its relations with other cities, both close and afar. Marrakech is a city in constant change. Nonetheless, the absence of urban policies and adequate interventions, especially by the state, together with the chronically unfavourable socio-economic situation has raised a series of problems, which have led to continuously declining living conditions for a great number of urban inhabitants.

One of the main problems is the housing shortage, a phenomenon that figures as a structural problem in the urban areas of Morocco in general, and of Marrakech in particular. This housing shortage is characterized primarily by a growing deficit of social housing and by the proliferation of an unhealthy habitat.

The urban territory of this city is also marked by spatial and social diversity, which reflects the various interventions carried out over time by multiple actors. Among these, the state figures as the most prominent, whereas the influence of the private sector and the local communities has been more modest. Therefore, an analysis of the spatial and social restructuring of Marrakech, a rapidly growing city, necessarily revolves around the question of the changing role of the state in the production of housing as well as the state's contribution to the re-planning of the urban territory. The state has, namely, the responsibility over the decisions concerning housing and urban planning, and it also has the last say in these matters, despite the liberal vocation of the Moroccan economy.

Introduction

Since the independence, the urban areas of Marrakech have been subject to experiments to plan, control and manage the process of urbanization. Interestingly, though, the urban policies carried out by the Moroccan state in the early decades of independence focused primarily on the countryside; the idea was to develop the rural areas, and by doing so, to fix the rural population and slow down the rural-to-urban exodus.

The state's interventions in the urban areas had more the character of short-sighted, hastily carried out emergency-operations, which limited their effectiveness and at times ended up favouring the upper social categories that could afford housing-credit. In parallel, since the independence, the state had pursued laissez-faire economic policies that allowed the elites to increase their fortunes. Holding the strongest position among these elites, the landowners played quite an important role in town development, by the means that they facilitated the creation of a number of illegal estates. These estates have in fact contributed in some way (even if rather marginally) to relieving the housing crisis and to establishing a new type of territorial structure in Marrakech.

It is in this context, then, after the independence, that the urban areas have evolved in Marrakech and elsewhere in Morocco, which serves to explain the social and spatial diversity and heterogeneity that characterizes them. The aim of this analysis is to examine the evolution and the functioning of the urban territory. In addition, it aims at unravelling the mechanisms of social and territorial reconstitution induced by the public housing policies for Marrakech.

Housing crisis guiding the extension of the city

For over half a century, the housing crisis has been a structural feature of the Moroccan urban areas. Political independence was not a sufficient condition to overcoming this issue, which has, in fact, only aggravated in the last years, making it a major concern for the Moroccan society today.

High population growth

The high rates of population growth have naturally increased the residential demand on land and, consequently, put more pressure on the territory of Marrakech. As the city planning authorities have not been able to control this development, the housing crisis has exacerbated. Marrakech has recorded higher rates of population growth than any other city of the kingdom as the result of an internal demographic increase, a positive migration balance and the integration of peripheral suburbs in the new urban

Table 1. The Evolution of the Population of Marrakech (1960–2004) (Direction des Statistiques 2004).

Census Year	1960	1971	1982	1994	2004
Size	222.479	328.730	482.500	676.800	843.575

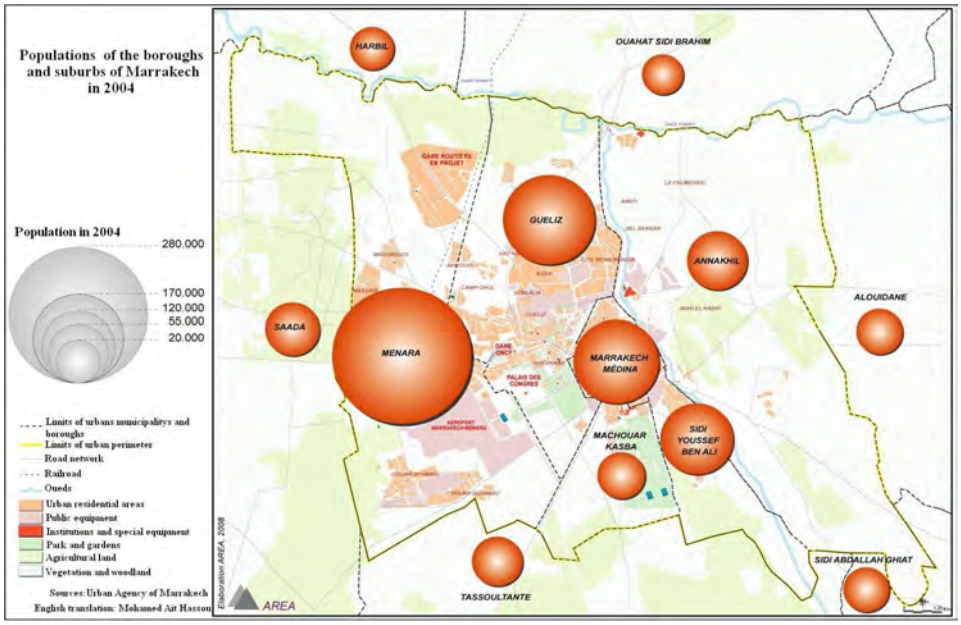

Figure 1. Population of the boroughs and suburbs of Marrakech, 2004.

area. As the result, the morphology of the city has changed dramatically.

The city of Marrakech is the fourth largest city of Morocco, with a fast-growing population nearing one million people. The annual population growth in this city is higher (2.4 percent) than the national average (2.1 percent). A large part of its population struggle with problems of insecure incomes and insolvency. Over 60 percent of the households have very low incomes that do not enable them to access the housing market.

The lack of decent homes is enormous and rapidly growing. The cumulative deficit in housing is estimated to be some 30 000 units, while the annual deficit caused by the imbalance between housing supply and demand is around 10 000 units.

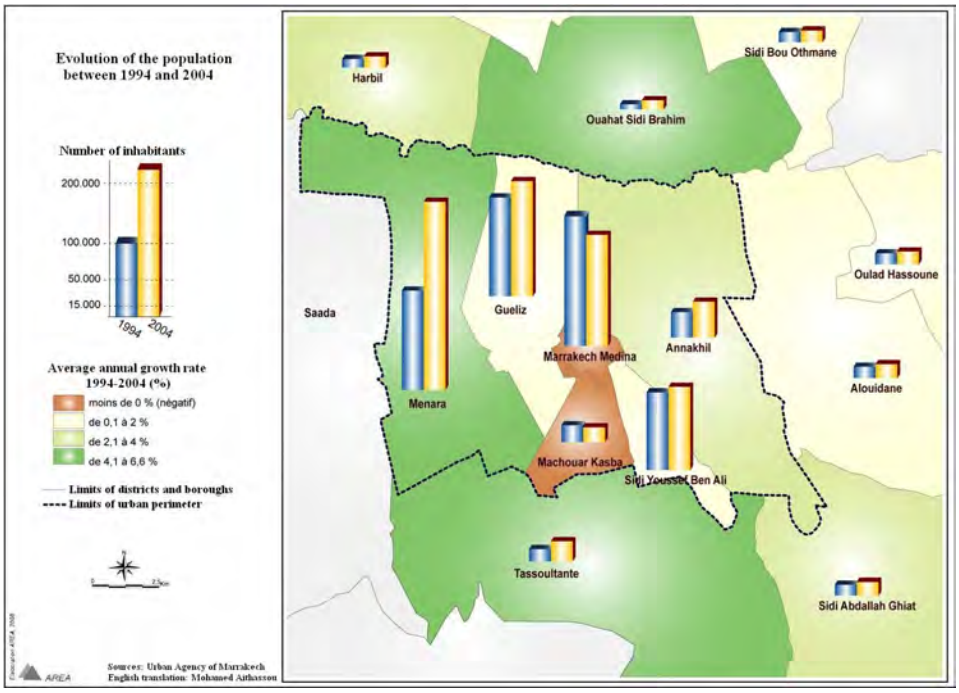

Figure 2. Average annual growth rates of the population of Marrakech, 1994–2004 (%).

In addition, 50 percent of the population is concentrated in 5 percent of the territory of the city, mainly in Medina and in the neighborhood of Sidi Youssef Ben Ali. In this respect, the gap between supply and demand for housing continues to increase. Indeed, some 13 000 households (approximately 65 000 people) live in unhealthy conditions.

Half of the population of Marrakech is under 20 years old, and most are poor – 50 percent of the active population has an average income below 1 500 Dhs per month. These citizens are largely excluded from the formal offer of accommodation, and this constitutes the main cause of the housing problem in Marrakech.

Housing deficit is an urban crisis

Briefly put, the urban crisis has two main components: the growing deficit of new state-sponsored housing and the proliferation of slums. Currently, the shortage of social housing is enormous and it would be impossible to fill the gap in the short term. Furthermore, the housing sector is influenced by a liberal trend in the governmental economic policies. The government is in fact withdrawing from any direct

responsibility over the social sector services, especially in financial terms.

The housing sector in Marrakech is currently experiencing an unprecedented rise in the prices of houses and building plots. Despite the prices per square meter (for social public housing 2 800–3 000 Dhs; for the middle classes 6 000–7 000 Dhs) the demand is very strong.

The prices for land, in turn, have doubled within a matter of two years only. Their price levels vary according to the location and size of the plot on sale, but those over 800 m² for example are sold at prices oscillating between 10 000 and 12 000 Dhs/m².

All in all, the growth and future development of Marrakech seem to be guided by the logics of the ever-aggravating housing crisis and the chronic need for land. Other problems are the deterioration of existing green areas as well as the proliferation of small agglomerations of marginal habitat, and the consequent spatial and social segregation of the population. Furthermore, the production of emergency housing is far from reaching the real needs of the populations concerned here.

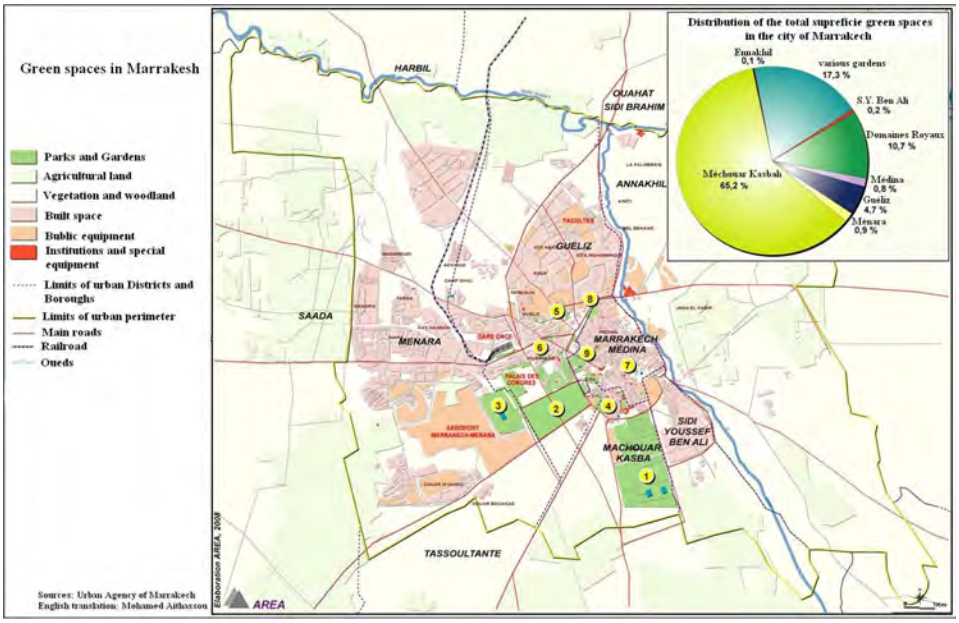

Figure 3. Green spaces in Marrakech (Urban Agency of Marrakech 2008).

Forms of urban expansion and territorial social restructuring

Following the different phases of urbanization of Marrakech since its creation by the Al-Moravides through the colonial period to the present day, we may distinguish four residential areas representing different forms of state intervention. This distinction is based mainly on the morphology and the social composition of the residential areas in question, namely:

- the old town (Medina) and the district of Sidi Youssef Ben Ali
- the douars
- the European city (Guéliz and Wintering)
- the extension of the city dating after the independence.

A closer look at the urban, architectural and social characteristics of each area helps to assess the impact of the various endogenous and exogenous factors that contribute to the reshaping of the urban social and spatial territory of Marrakech. The state's urban policy tends to favour a specific urban form over the others, that is, a so-called "modern Moroccan" morphology. This tendency is confronted with the quest for a traditional type of urban living expressed by a great share of the population having access to public and even private housing offer.

Asphyxiation of the medina and foundation of the European city

The Medina consists mostly of a traditional type of urban habitat that has its roots in the local building techniques and materials, local social organization, social practices, family life, religion, climate, etc. (Elhajjami 1986). This building type does not exceed two floors, which keeps the skyline uniformly flat. The houses are simple with plain exterior walls, giving the Medina a uniform appearance, with no visible signs of wealth or poverty. These features can be explained by the strong impact of tradition and religion, which cement residents' unwillingness to expose their private living spaces to the public.

Overall, the grouping of homes and services in the Medina is not limited to the built environment or the walls, as it includes large open spaces. Some areas have been occupied by large gardens (i.e. Jhanat, Arsat); others constitute places of public entertainment (e.g. Enzaha) for most city dwellers.

Ultimately, this is the largest North African Medina, with 9 km of walls and a network of roads connecting it with the outer city zones as well as with other large cities, passing through

one of the large gates within the walls (i.e. Bab Hmar, Bab Doukhala, Bab Aghmat). The inner city has a radio-concentric plan, characterized by the absence of spatial disparities among the homogeneous, primarily residential neighbourhoods.

When the first settlers arrived, the integration of the capitalist mode of production in the national economy speeded up the population growth and resulted in an over-densification of the built environment, which in turn led to a remarkable deterioration of open spaces within the Medina. Since then, the social composition of the city has gone through various changes.

The creation of an industrial zone outside the Medina attracted large flows of new workers from the rural areas to the residential city centre. (Note that the rural exodus was also partly induced by the deterioration of living conditions on the countryside, by family conflicts, and other factors.) The big social changes of this period were uprooting, on the one hand, and proletarianization, on the other. These had harmful consequences on the built environment and on the lifestyle of the people of the Medina, but any attempt at regulating the state of overpopulation resulted ineffective. Also, given the scarcity or the outright absence of any sort of social housing, sales prices and rental fees saw a dramatic increase. Consequently, rural newcomers suffered from a double eviction: first, from rural areas to the Medina and second, from the latter towards the peripheral douars surrounding the walls of the Medina.

In the early 1920s, Marrakech started to extend beyond its walls to the west side. This process produced significant differences in the organization of the new, planned urban space (still nowadays defined as European, Western or modern city) as compared to the old Medina, and resulted in the social and spatial division of the city. This duality came into being as the result of the policies pursued by local authorities, much the same way that has happened in many other cities of the Arab world. In Marrakech, this policy produced a fundamental break in the spatial and social organization of the urban territory and is speeded the process of spatial and social segregation.

The type of habitat in this new urban space had a very distinct feature from the one of the Medina. It is more similar to the Western model with villas and higher buildings. With time, the differences have been nonetheless levelling down, with the creation of a new hybrid architecture that mixes the elements from both European and Arab tradition. This hybrid character has been recognised as a new type of housing called “modern Moroccan”.

Meanwhile, the majority of the Moroccan population had been neglected by the local planning authorities, and the result was a continuous densification of the medina and a population overspill towards the douars. The gap between supply and demand for housing began to rise dramatically.

In conclusion, the on-going process of urbanization that started in the early colonial times has not followed the same patterns of development throughout the city space of Marrakech. The housing crisis that results from these different forms of urbanization has affected different social groups unevenly.

Spontaneous extension of the Medina and the proliferation of marginal habitat

The district of Sidi Youssef Ben Ali (SYBA) is a spontaneous extension of the Medina towards south and beyond the city walls. It has almost the same urban and architectural characteristics as the Medina. During its emergence, it was a marginal area deprived of any infrastructural facilities required for a normal urban life. Today it is the largest district of the city of Marrakech after the Medina.

From 1939 to 1943, this neighbourhood has undergone a drastic change, because of the increasing pace of the rural exodus. Despite its large extension, this district has not been able to attract the attention of the local authorities until 1948, when a flood caused widespread devastation (Mandleur 1972). As a means to avoid future damage by floods, local government officials laid out plans to restructure the district. They aimed at reconstructing much of the dwellings in form of public housing estates, and acquired land for it through expropriation.

The SYBA sector currently consists of two urbanistically and architecturally distinct divisions. Unplanned or spontaneous, the first division is dominated by the so-called traditional habitat. These are the residencies of the impoverished population. The other division, in turn, has an urban plan that follows contemporary urban planning rules. The buildings do not exceed 150 m² in extension, or three floors in height. While this part of the neighbourhood has been planned to offer its inhabitants normal living conditions, it is worth mentioning that the unplanned part of the neighbourhood records, to date, high levels of inadequate living conditions and of insecurity. The same applies to other peripheral douars that were later incorporated into the city.

There are many reasons that contributed to the overspill of the Medina and to the creation of the small, spontaneous towns (*douars*), some of which have already been mentioned earlier: the gradual increase in demand for housing, the weakness of the public supply, the high rental payments and the disengagement of the public authorities during the colonial times. Under these circumstances, expelled from the official housing market and from the Medina, people searched for a place to settle down. The risks nothwithstanding, they occupied pieces of neighbouring farmlands in the hope of building there their

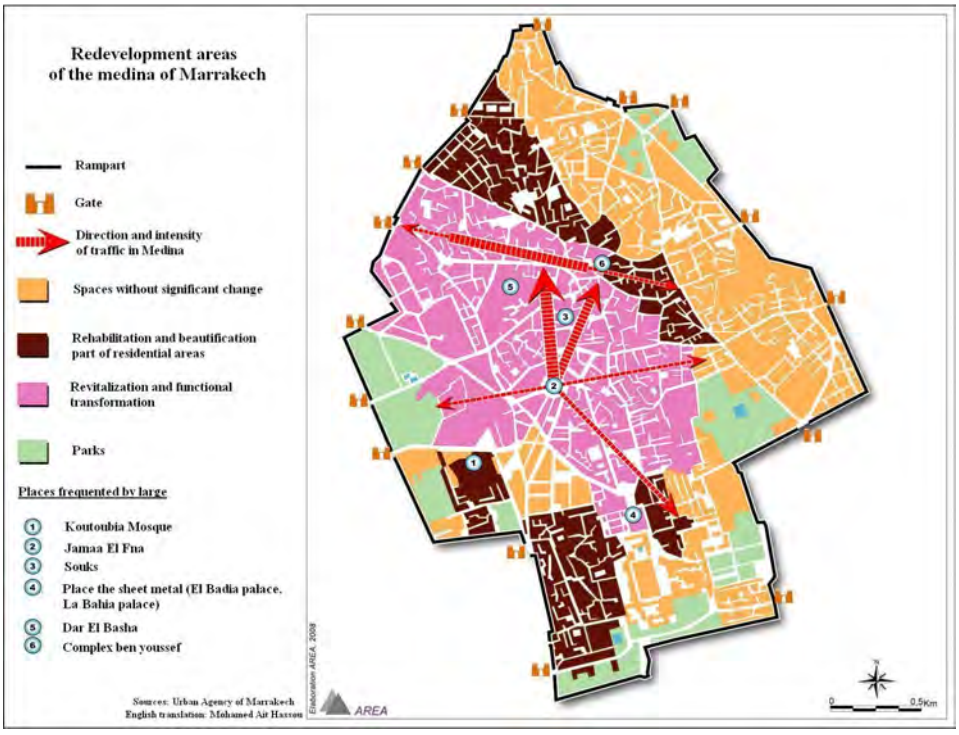

Figure 4. Redevelopment areas of the Medina of Marrakech (Urban Agency of Marrakech 2008).

modest homes and, eventually, being able to own the land under their shelters. Subsequently, in order to feel safe and protected, the occupiers paid a few family members to settle nearby and these, in turn, invited others. This triggered a demographic movement, still mostly unstudied, to the farmlands that mainly belonged to the elites of the city.

According to Mandleur (1972), the appearance of peripheral douars was the second phase of urbanization in the precarious Marrakech, from 1926 onwards. The first period between 1930 and 1950 was characterized by the illegal and provisional installation of the first inhabitants in both private and state-owned fields (*guiche*). Over the years and with the steady influx of newcomers, the precarious constructions grew in size and became more solid. This is when the first constructions in cob and stone started to appear.

Small towns were created before the public authorities would express their discontent. These towns were soon regarded as unhealthy environments with an almost total absence of basic socio-economic facilities. The douars were not officially

registered or even recognised by the authorities, which explains their lack of intervention. The big landowners, in turn, were active: taking advantage of their privileged position and oft-representative functions within the local authority, they did not hesitate to turn their farmlands near the city perimeters into housing areas for people in desperate need of a place to live in. The landowners divided plots of land into small parcels ranging from 40 to 120 m² in size, and quickly sold them, without providing them any infrastructure that would make them suitable for housing. Families who bought into these developments accepted these conditions, as they often considered it to be a transitional step in the process of adapting to the urban lifestyle and of acquiring a decent home in the city once their savings would allow it.

The marginalization of the douar population and its classification as non-urban is largely due to the type of habitat that does not fill the standards set up by the urban planning services. The households that originated from the countryside have developed in the peripheral douars a new type of habitat that is classified as semi-urban, or semi-rural. The households originated from the Medina, in turn, constructed these spaces according to the traditional or Arab-Muslim habitat model.

As said before, the douars figured as places where the rates of unsafety, insecurity, underemployment, unemployment and crimes were high. In addition, these neighbourhoods highlighted the problems of poverty and of social discrimination. Those inhabitants who managed to enter the job market could increase their fortunes, while those who did not, could hardly afford basic goods for living. This resulted in the hierarchization of the population of the city, with the emergence and dominance of a materialistic, separatist and segregationist ideology.

Planned extension of post-independence

Since the independence, the urban landscape of Marrakech has changed, with the establishment of a more complex urban structure in which it was difficult to distinguish the traditional from the modern, the endogenous from the exogenous. In its official discourses and in certain specific interventions, the state has promoted its willingness to adapt the city to better respond the requirements of the contemporary urban life, all while reconciling the traditional and the modern. Yet, this type of territorial reorganization constituted in reality a similar trend of reconstruction that already begun during the colonial period, inspired by the French architect and urbanist Ecochard. It is also continuation of the model used in the planning of the "European" extension of Marrakech characterized by very regular, less dense built space, with wide lanes, infrastructure and modern equipment. Characteristic of this extension is its mix of urban and architectural styles

of modern European and traditional or Arab-Muslim habitats. It is also inhabited by people of different social strata, which is reflected in the type of housing, where certain social and functional diversity coexist.

As explained in the previous, the creation and growth of the planned extension of the city was accompanied by the illegal extension (douars) that has contributed in some way to alleviating the housing crisis, but that has become, nowadays, a real challenge to tackle with. The difference between the average growth rate of the built space (approximately 4 percent), and the population growth rate (around 2.6 percent per year) indicates a land-extensive pattern of growth. More importantly, while the extension of the urban area was 2 100 ha in 1945, today it exceeds 18 400 ha.

Development prospects of the cosmopolitan city

Marrakech offers an urban landscape in that has come into being with an almost total disregard of any planning documents and guidelines. As a matter of fact, in 2007 the city had already consumed the land reserves under the SDAU to cover its needs until 2010. The plans to reorganize the city around the Medina have not been respected, since Marrakech continues to develop rapidly in the west and northwest, and selectively in the south and southwest, in areas reserved for large foreign investments in tourism, mainly composed by hotels and luxury residences. These trends accentuate the city's social segregation.

Despite the creation of a new town at the fringes of Marrakech, the urbanization front continues to move towards the shores of Tensift, and borders the palm grove from the north and the south, thus posing a serious threat to the survival of this important ecosystem. Parallel to this enormous spread, we witness the degradation of the existing built environment especially in the historical heritage zone. In the Medina, the deterioration of the infrastructure, the problems of traffic congestion, as well as social issues systematically undermine both the centrality and the attractiveness of the historic core as a place of residence. In addition, the process of gentrification is also underway, particularly through the restauration and reuse of riads.

The urban area of Marrakech is growing (according to the opportunities of land and real estate property, e.g. exemptions) beyond the city limits, creating diffused urban-rural boundaries. Several studies show how the urban sprawl draws on towards the agricultural space, endangering the traditional urban and agricultural habitat in the periphery. The city has a multidirectional growth clustered on successive roads radiating from Marrakech, despite the lack of infrastructure, inadequate social facilities and the lack of secondary centres in these areas. The need to

expand the city has to follow a new approach that can ensure a sustainable growth. There is a need to activate urban planning *with* the people, not just *for* them, by participatory planning and participatory management of the city.

Conclusions

Marrakesh is a city that has rapidly changed its appearance. This change has many urban and architectural as well as socio-economic and cultural implications. The current urbanization represents a break with the city's past, characterized by its density, its social relations, and its so-called traditional way of living. It represents the beginning of a new era in urban planning which mainly reflects the fight against an acute housing crisis. In the absence of an effective intervention by the state, the crisis worsens the living conditions for broad masses of the population, day after day. The state interventions have been highly insufficient and thus the housing needs remain far from satisfied. Interventions from abroad, "imported" planning models, as well as their direct application without a minimum adaptation have all constituted failures. Highlighting the myriad of needs and opportunities can help achieve a better planning structure and ensure a coherent and sustainable development in this rapidly changing urban space.

References

Abdelmalki, L. (1987). *Housing in Morocco: technical change, industrial strategies, and social issues*. Toubkal, Lyon.

Ait Hassou, M. (2003). *The state involvement in the housing Sector in Morocco, Marrakech, including the case of Hay Al-Massira*. PhD thesis, Laboratory of Human Geography, Faculty of Science, Université Libre de Bruxelles (ULB).

Ait Hassou, M. (2007). Public land policy and housing production in Marrakech. In *Regional Management and Tourism Development*, 37–49. Al Wataniya, Marrakech.

Bahi, H. (1982). *Housing and urban social space: Contribution to the analysis of the housing crisis in Morocco, Marrakech*. The Third Cycle thesis, EBU CRUCIBLE Law and Economics, University of St. Etienne.

Boullali, M. (1986). The die land in Marrakech. Proceedings of seminars on "Building with local materials", Ministry of Housing, Marrakech on 25 and 26 April 1986.

Chraibi-Bennouna, S. (1994). Spatial development policy and regionalization: the case of Morocco. *Management and Society* 22, 81–89.

Clement, J.-F. (1994). Lyautey in Marrakech. *North African Horizons: The right and the memory* 23–24, 15–22.

Clement, J.-F. (1994). Lyautey in Marrakech. *Horizons Maghrebins : The right and the memory* 23–24, 15–22.

Debbi, F. (1991). The Problem of slums in Morocco. *Cahiers de l'Agence Nationale de lutte contre l'Habitat insalubre*, June 1991.
Management of social housing and land affairs (2008). Cities Without Slums -Programme, Genesis and implementation. Marrakech, May 8, 2005.
Elhajjami, A. (1986). The traditional architecture and urbanism in Morocco. *National journal of architecture and planning*.
Lezham, A. (1994). *Urban Housing in Morocco: Households and the state face the homeownership and rental*. Toumi, Rabat.
Marrakech Urban Agency (1995). *The Greater Douars of Marrakech*. Ministry of Interior, May 1995.
Mandleur, A. (1972). Growth and urbanization of Marrakech. *Journal of Geography in Morocco* 22, 31–59.
Mauret, E. (1986). Urban planning and housing the largest number in Morocco in 1947 and independence. *"Al Omrane" National journal of architecture and urbanism*, November 1986.
Pegurier, J. (1981). *Urban Spaces in training in the Tensift*. Publishers Moroccan society together, Rabat.
Pinson, D. (1994). Morocco: habitat westernized "subverted by" tradition. *Arab World-Maghreb-Mashreq*, 190–203.
Zaoui, A. (1997). The urban housing in Morocco: needs-demands and action strategies, empirical case Zouagha Top. Memory for the Diploma of Graduate in Economics, Faculty of Juridical, Economic and Social University Sidi Mohammed ben Abdellah, Fez.
Zriouli, M. (1997). Investment in housing, public intervention. *Journal of economic center of Morocco* 16, 32–36.

Katri Heiskala & Turo Hjerppe

ENVIRONMENTAL IMPACTS OF SOIL EROSION: METHODS TO CONTROL EROSION IN TAFILALET

Abstract

Soil erosion is a serious environmental problem in Morocco. This study focuses on erosion control in the Tafilalet region. The problem was addressed through a literature overview, field observations and personal interviews. Erosion control methods used in the region were divided into 5 categories, among which the social sector had the most important role.

Introduction

The aim of the study was to find out the problems related to soil erosion in Tafilalet region, southern Morocco. Also some practices for soil erosion control are introduced. The whole Morocco is classified as dry lands, characterized by a climate marked by spatial and temporal irregularities (Mrabet 2011). The oasis of Tafilalet is entirely located within the valley of river Ziz, south of the eastern High Atlas Mountains. The Tafilalet-region is richest and most populated in valley in this mountainous area. The river Ziz meanders 200 kilometers trough a ribbon of olive trees, date palms, cereal and alfalfa fields. The river is 30 to 60 meters wide and varies in depth. In fall and spring the river is subject to flash floods that damage property and fields. The oasis of Tafilalet is an alluvial plain and it is the most important palm

Figure 1. Factors causing desertification (Mainguet et al. 2011).

grove of the region (Ilahiane 1996). The soil is very sensitive to erosion, and desertification is considered as the main environmental problem caused by several factors: natural events, anthropogenic deterioration and psychological mechanisms (figure 1). There is specific need for soil protection in order to avoid desertification, as soil plays a critical role in food production.

Soil Erosion

Soil erosion in its many forms has been reported to be one of the most remarkable environmental problems in Northern Africa. Erosion is the removal, transport and sedimentation of soil surface material. The transporting agent of erosion can be wind, water, ice or gravity. In the case of Morocco the transport of the material is caused mainly by moving air and water. In Morocco, 53 percent of total national territory has been estimated to be prone to human induced soil erosion derived by water. 17 percent of the land area has been estimated to be prone to wind erosion (UNEP 2000).

The human impacts that induce soil erosion are cutting off vegetation, intensification of cultivation, plowing previously uncultivated area, overgrazing and overuse of available water. All these factors together with drought, topography, soil and vegetation overuse contribute to desertification in semiarid climates (Malaki *et al*. 2009)

Siltation of water reservoirs consequent upon arable soil loss have been reported in Morocco, Algeria and Tunisia (Lahlou 1996). In Morocco, this problem has been under more research within the large basins of Rif and Atlas mountains. The extent of soil loss has been studied with GIS and remote sensing methods as well as with environmental radionuclide cesium-137 (Fox *et al*. 1997; Chikhaoui *et al*. 2005; Hassouni & Bouhlassa 2006; Sadiki *et al*. 2007).

In the Tafilalet region water induced soil erosion has been reported to be a severe problem in the Ziz basin region (Messouli *et al*. 2009). In Tafilalet region the soil erosion is mainly caused by flash floods that are of pluvial or alluvial origin. In other

words, the erosion is caused by heavy rain or a flooding river. Another, more recent problem in the Tafilalet region is sand encroachment and desertification. The sand moves because of aeolian sand drift (Mainguet *et al.*).

Impacts of Soil erosion

In the 1970s construction of dams was started in Morocco in order to collect water for irrigation (Lahlou 1996). Since then the siltation of the reservoirs is causing a decrease in the volume of the reserved water – water available for irrigation, industry and drinking (Lahlou 1996, Messouli *et al.* 2009). The siltation of the reservoirs also causes eutrophication. This means especially increased levels of phosphorus and nitrogen, but also dissolved oxygen deficits and biological production. Together with high water temperatures, this promotes eutrophication and constitutes a problem for impoundments used for drinking water (Lahlou 1996).

Messouli *et al.* (2009) suggests that once the dam reaches critical level of siltation – about half of its capacity – it will make the irrigation increasingly subject to flood dominated flow and will rely more on groundwater resources. As a result, evaporation will show a decrease in future climate scenarios. Snoussi *et al.* (2002) suggest that the construction of dams has altered the water and sediment flow to the coastal areas and thus changes the costal morphology. The construction of the dams causes coastal erosion instead of sedimentation and deltaic deposits.

Sand encroachment and sand storms may cover roads and cultivated lands with sand. Sand encroachment threatens traditional palm tree plantations, forcing the farmers to move their cultures. Even buildings have been subject to sand encroachment. In Boudnib a worker clears the entrance of a school from accumulated sand on daily bases (Mainguet *et al.* 2011).

Methods to control soil erosion and its impacts

Several methods are useful in controlling erosion and protecting the soil (figure 2): conservation tillage, stabilizing structures, adequate plant cover, maintain the natural plantation, flood, water and sediment management, as wells as social sector management (Mrabet 2011; Mainguet *et al.* 2011; Mazhar 2002).

Figure 2. Methods to control soil erosion.

Conservation tillage for sustainable agriculture is important in soil conservation and protecting the oasis ecosystem. In Morocco, cereals occupy 70% of land cultivated area. There are various different cultivation methods used: no-till, minimum till, traditional and deep tillage systems on wheat yield (Mrabet 2000; Mainguet *et al*. 2011). However, studies have shown that no-tillage systems are showing agronomic benefits compared to traditional tillage systems; this system has revolutionized cropping (Mrabet 2011). Rational use of no-tillage technologies, conservation cropping systems, and crop residue management can have noticeable impacts on crops and soils reducing soil erosion and improving the quality of soil (Mrabet 2011; Pagliai 2004). Soil erosion caused by agriculture can be tackled paying attention to underground water protection, artesian wells drilling, artificial lakes creation and bettering infrastructure: bridges and roads (Mainguet *et al*. 2011).

In the case of Tafilalet there are palm, olive and cactus plantations. The goal is to keep the plantations in good condition because they significantly stabilize soil; adequate plant cover reduces erosion. There are various problems in maintaining the palm tree plantations, as mentioned earlier – palm trees are suffering from lack of water and from aeolian transport of the sand. Local residents have had to build walls against aeolian transport, as sand spreads out to the agricultural areas, on roads and neighbourhoods (Mainguet *et al.* 2011).

Cactus plantations are as efficient protectors of landscape from erosion and more adapted to land rehabilitation than palm trees, as well they do not need a lot of water. Cactus has also been used to rehabilitate denude areas with net benefit of soil protection (Mazhar 2002).

There are various methods in controlling soil, and quite often special action plans and practices are needed. Areas that supply sediments should be identified when it comes to limiting the generation of sediments and its transport to water bodies, reducing water storage capacities and water quality (Sadiki *et al*. 2007). Some methods are created to manage to flood water and keep the sediments on the site, such as aligning bags to partially stop the flow; placing small pebble dikes to create small balancing; harnessing the river only partly; lining major bed with pebbles; perching two levels of canals as result of bed hemming (Mainguet *et al.* 2011).

Erosion problems are closely related to local levels of education and to the role that women have in agriculture and water management, where women and men play different roles depending on what region they are from. Women are affected the same way as men by the impacts of land degradation but are not always allowed to participate to the decisions concerning changes in land management (Ritsema 2011; Mainguet *et al.* 2011).

Materials and methods

Material for this study was collected by two personal interviews and field observation. Persons interviewed were Professor Lachen Kabiri (27.10.2011) and engineer Abderrahman Mahboub (25.10.2011) from the department of geology at the faculty of sciences and techniques of Errachidia (FSTE) in the University of Moulay Ismaïl. Some useful comments were also presented by forest engineer Samira Mansouri (28.10.2011) from the agency of water and forest (*Direction Provinciale des Eaux et Forets et de la Lutte contre la Désertification, Errachidia*) in the closing event of the seminar for the environment and the sustainable development in the province of Errachidia.

The interviews were semistructured. The questions covered impacts of soil erosion as well as the methods to control soil erosion and desertification. The main questions concentrated on sustainable agriculture, flood control and water management, soil stabilization structures, adequate vegetation cover and social sector, as presented above.

The field observation was done between 24th and 28th October 2011 in the countryside of the province of Errachidia. GPS and photographing were used in the observation work.

Results

Interviews

According to professor Kabiri there are two types of erosion in Errachidia and Tafilalet region: wind and water.

Heavy rains on the mountain areas are causing loss of top soil. This causes also loss of arable land, which is one of the reasons for poverty in the region. Loss of vegetation, in turn, increases soil erosion. This makes a positive climate feedback increasing the amount of rain in the area. Soil erosion increases the siltation of the reservoirs with sand. The valleys and wadies (river channels that are dry part of the year) are eroded by heavy volume of flooding water, which increases the amount of sediments.

There are local projects to reduce the soil erosion: watershed management plays here an important role. The aim of the projects is to make the ground more covered by vegetation especially in the water supply area on the High Atlas mountains, as well in the river beds and their surroundings. They put focus on building more weirs and dams to reduce the speed of the water, organizing better pasturelands called *agdal* for the livestock, determining the number of livestock that is sustainable in the region. One goal of the projects is to educate people and increase awareness of erosion related problems.

Poverty and lack of education leads to illegal cutting of trees for fuel, which increases soil erosion in the

region. According to professor Kabiri, there should also be more support on other fuels than wood, so that there would not be need for cutting the trees. Government is putting effort to the education of women, but does it mainly by teaching them to read the Koran, which does not help fight desertification and leads to the misunderstandings in making agriculture sustainable. The role of women in agriculture is important because women do many such tasks that have effect to soil erosion, such as herding the livestock and collecting wood.

Hosting tourists and getting information from relatives that have moved away have given women new ideas about education, household and decision-making. Immigration has other impacts as well. There are palm tree plantations left without anyone taking care of them when people have moved to cities and even to other countries in search of a better living. This is causing soil erosion. There are also many immigrants (new comers to the region) who put their effect on tourism instead of agriculture. Plantations are cut away in need for construction material and space.

Wind erosion, especially sand encroachment is a considerable problem in the region. Plantations, irrigation canals and infrastructure are in danger and have to be protected well with different types of walls and structures. As the dune sand also makes it way towards towns, these have to be protected by planting vegetation to the area. There is a need to make good irrigation systems and drill wells in order to keep the soil fertile and humid and thus avoid soil erosion. The best way to fight against aeolian erosion is to protect the soil with vegetation coverage.

One problem with vegetation is a fungus called *Bayoud*, which kills the date palm trees by reducing the soil fertility and eroding the soil. The best way to fight the fungus is to burn the infected trees.

Engineer Mahboub is a specialist of water management issues. He pointed out the role of pluvial and alluvial erosion in the High Atlas region of the province. The heavy rains and snowmelt is causing loss of soil, which is further enhanced by overgrazing and illegal cutting of vegetation. The problem with overgrazing derives from high number of animals as well as from unorganized pastures and trails for the cattle. The vegetation is being illegally cut off in the need for fuel. Another problem is the loss of arable land. During the winter time the soil is bare and prone to erosion. Also the flooding river causes erosion of the stream banks. The cutting of vegetation makes also the stream banks more vulnerable to erosion.

Soil erosion in the mountainous area is the cause of problems down in the valley. Water reservoir build for irrigation and drinking water management has subjected severe problems because of siltation of the eroded land. The volume of the water going through the reservoir per

year was 320 million cubic meters in 1978. It had reduced to 104 million in 2010. One million cubic meters of soil is sedimented to the bottom of the reservoir every year.

According to Mahboub there are some projects to control the erosion in the mountainous region. The National agency of water and forest is planting trees in the area to stabilize the soil. There have also been projects to build dykes or weirs in to the riverbed to slow down the velocity of the flowing water. This helps to prevent soil bank erosion. Slowing down the water speed also gives a possibility for the sediment to accumulate before it reaches the reservoir.

Finally, engineer Mansouri pointed out that it is extremely important that the pasturelands of the cattle, the *agdal*, are being managed. She also emphasized that the farmers have to be integrated to the erosion control programs. She confirmed the role of women in the agriculture and soil erosion. That is the women collect the wood for fuel for example. According to Mansouri the Agency of water and forest aims to replant 150 hectares of vegetation cover per year.

The cycle of soil erosion and human action drawn together from the interviews is presented in figure 3. Desertification is causing poverty which in turn encourages to harmful

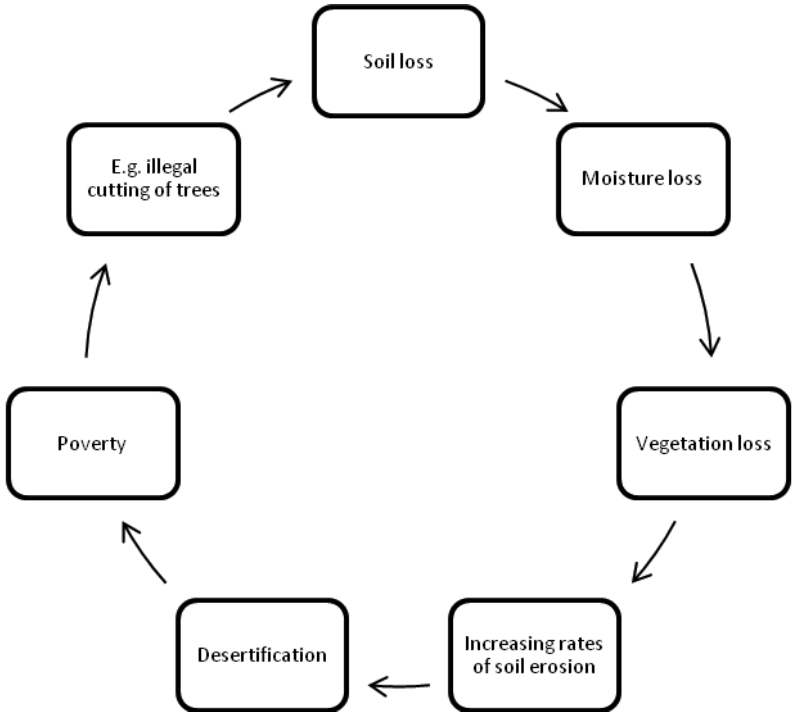

Figure 3. Cycle of soil erosion and human action. In this example poverty is leading to illegal cutting of trees but it could also be many other things, such as immigration.

activities such as illegal cutting of trees. These activities are causing soil and soil moisture loss and further vegetation loss, thus causing erosion desertification.

It can be concluded from all the interviews that in Tafilalet region the sectors of sustainable agriculture, flood, water and sediment management, adequate vegetation cover and soil stabilization structures are better managed than the social sector. There is knowledge about these social methods in the university and at the governmental level, but it needs to be spread down to the local communities. The understanding of processes behind the cycle of soil erosion (figure 3) is connected to education. Especially the education of women plays an important role as women are often doing the tasks that affect the soil erosion.

Field observation

During the field observation we noticed that fences made from palm leaves were commonly used to stop encroaching sand to cover roads or plantations. The fences were organized as small cells or squares (figure 4). Also structures made from plastic and concrete were used to stop sand encroachment. Cactus was also used in some areas to prevent the sand encroachment.

The solution to stop the spreading of the fungus called Bayoud that is threatening the date palms is to burn the infected trees (figure 5).

Figure 4. Palm leave fences are used to prevent sand encroachment.

Figure 5. To protect palm trees from fungus the infected trees has to be burnt.

Figure 6. Weirs or dykes are used to slow down the velocity of the river.

Weirs are made from concrete in the bottom of a river to slow down the velocity of the water (figure 6). In figure 4 it can be clearly seen that there has been some sedimentation between the two weirs.

During the field observation we likewise noticed that no-tillage method was not used in the region. Instead the fields were all ploughed after the grooving season (figure 7). We also noticed how the un-vegetated land is dry, cracking and prone to erode (figure 8).

One observed method to reduce soil erosion was tree plantations in the mountainous region of High Atlas (figure 9). Although the observation was made outside the Errachidia region, the same kinds of methods have been used in the study region according to personal interviews.

Figure 7. No-tillage method was not in use in the study region. Instead the fields were ploughed.

Figure 8. The dry soil is cracking and vulnerable to erosion.

Figure 9. Trees are planted to protect the soil from erosion in mountainous area.

Discussion

The results presented in chapter 3 can be divided into five categories presented in figure 2. As for sustainable agriculture, we observed that no-tillage methods were not used in the area. Additionally this method did not come up in the answers of the interviewees. On the other hand, we could add methods to control overgrazing within this category. These methods are building pastureland for livestock, organizing grazing areas and determining a sustainable number of livestock. Also burning the infected date palm trees to protect the others from infection can be seen as a method of a sustainable agriculture.

Construction of weirs and dams can be considered to belong to the sector of flood, water and sediment management. Fences made of palm leaves, plastic and concrete as well as cactuses planted to protect plantations or infrastructure from moving sand are all different types of stabilization structures.

The Agency for water and forest has projects for planting trees in the mountainous area, which can be seen as a method to protect adequate vegetation cover and thus combat soil erosion.

Within the social sector, in turn, we would place such methods as (environmental) education, support for other fuels than wood, attempts to decrease poverty and promote ecotourism. Also a system for supervision of water and soil management could be improved with some kind of penalty system for environmental offences.

All these sectors are connected to each other. Simplified stabilization structures and flood, water and sediment management can be seen as methods to control the impacts of erosion. Plant cover and sustainable agriculture are methods for controlling the actual erosion. Perhaps the most important is the social sector, because it has not only its own mechanisms to slow down erosion; it also makes a difference to how effective the other methods are.

References

Chikhaoui, M., F. Bonn, A.I. Bokoye & A. Merzouk (2005). A spectreal index for land degradation mapping using ASTER data: Application to a semi-arid Mediterranean catchment. *International journal of applied earth observation and geoinformation* 7, 140–153.

Ritsema, C. (2011). Desire-project: Gender related issues in the Sehoul commune, Atlantic Morocco. 13.10.2011, <*http://www.desire-project.eu/index.php?option=com_docman&task=doc_download&Itemid=&gid=441*>

Fox, H.R., M. Moore, J.P.N. Price & M. El Kasri (1997). Soil erosion and reservoir sedimentation in the High atlas mountains, southern Morocco. *Human impact on erosion and sedimentation*. Proceedings of the Rabat symposium, April 1997. IAHS Publication 245, 233–240.

Hassouni, K. & S. Bouhlassa (2006). Estimate of soil erosion on cultivated soils using 137CS measurements and calibration models: A case study from Nakhla watershed, Morocco. *Canadian journal of soil science* 86, 77–87.

Ilahiane, H. (1996). Small-scale irrigation in a multiethnic oasis environment: the case of Zaouit Amelkis village, southeast Morocco. *Journal of political ecology* 3, 89–106.

Lahlou, A. (1996). Environmental and socio-economic impacts of erosion and sedimentation in north Africa. *Erosion and sediment yield: Global and regional perspectives*. Proceedings of the Exeter Symposium, July 1996. IAHS Publication 236, 491–500.

Mainguet, M., F. Dumay, L. Kabiri & B. Rémini (2011). Prodromes of desertification in the Oasis of Tafilalet (Morocco) and specific local solutions. In Brauch, H.G., Oswald Spring, Ú., Mesjasz, C., Grin, J., Kameri-Mbote, P., Chourou, B., Dunay, P., Birkmann, J. (eds.) (2011). Coping with global environmental change, disasters and security. Threats, challenges, vulnerabilities and risks. *Hexagon Series on Human and Environmental Security and Peace* 5: 901920.

Malaki, A., M. El Wartiti & A. El Ghannouchi (2009). Sand dunes evolution and desertification in southeastern Morocco: a new approach to an old problem. *NATO Science for Peace and Security Series C: Environmental Security* 2, 199–206.

Messouli, M., A.B. Salem, B. Ghallabi, M. Yacoubi-Khebiza, A.A. Boughrous, A. El Alami El Filali, S. Rochdane & F.E. Hammadi (2009). Ecohydrology and groundwater resources management under global change: A pilot study in the pre-Saharan basins of Southern Morocco. *Options Méditerranéennes* A 88.

Mazhar, M. Arif, A. Chriyaa, A. El Mzouri, L and M. Derkaoui. (2002). Cactus protects soil and livestock in Rhamna region. Proceedings of the fourth international congress on cactus pear and cochineal. *Acta horticulturae* 581, 329–332

Messouli, M., A.B. Salem, B. Ghallabi, M. Yacoubi-Khebiza, A.A. Boughrous, A. El Alami El Filali, S. Rochdane & F.E. Hammadi (2009). Ecohydrology and groundwater resources management under global change: A pilot study in the pre-Saharan basins of Southern Morocco. *Options Méditerranéennes* A 88.

Mrabet, R. (2000). Differential response of wheat to tillage management systems in a semiarid area of Morocco. *Field Crops Research* 66: 2, 165–174.

Mrabet, R. (2011). Crop residue management and tillage systems for optimizing crop production and improving soil quality in Moroccan drylands. 23.11.2011, < http://a-c-s.confex.com/crops/2011am/webprogram/Paper64875.html>

Pagliai, M. Vignozzi, N & S. Pellegrini. (2004). Soil structure and the effect of management practices. *Soil & Tillage Research* 79, 131–143.

Sadiki, A., A. Faleh, A. Navas & S. Bouhlassa (2007). Assessing soil erosion and control factors by the radiometric technique in the Boussouab catchment, Eastern Rif, Morocco. *Catena* 71, 13-20.

Snoussi, M., S. Haida & S. Imassi (2002). Effects of the construction of dams on the water and sediment fluxes of the Moulouya and the Sebou Rivers, Morocco. *Regional environmental change* 3, 5–12.

UNEP (2000). *Guidelines for erosion and desertification control management with particular reference to Mediterranean coastal areas*. Pp. 107. UNEP/MAP/PAP. Priority Actions Programme, Split.

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WATER QUALITY PRESSURES AND WATER MANAGEMENT IN ERRACHIDIA AND MARRAKECH, MOROCCO

Abstract

Water quantity and quality are a problematic issue in Morocco. This study focuses on water quality, water supply, and water management in the province of Errachidia and the prefecture of Marrakech. The study methods consist of literature overview, field observations, and interviews. Both surface and ground water tables have declined in the past few decades due to high demand for water in agricultural areas, making it necessary to build canals to direct water from a watershed into another to ensure water supply. Due to overexploitation, the traditional water delivery systems, *seguias* (canals) and *khettaras* (traditional underground irrigation networks) have become useless. In both regions water quality is worsened by lack of solid waste management and wastewater treatment. The management of water resources consist not only of technical solutions, but financial and social support is also needed to get the local people involved.

Introduction

Morocco is a semi-arid area, which has been suffering of a prolonged drought since 1980s. With the climate change it faces a risk of desertification within the next few decades (Benaabidate & Fryar 2010). In addition to these physical changes, Morocco has a rapid population growth and increasing rates of urbanization and industrialization (USAID 2001). Morocco has a

population of 27 million and it is expected to double in 30 years. It is therefore easy to say that Morocco is facing some serious water resources management challenges in terms of both water quantity and quality in the years to come.

The quantity of water is a problem especially in the rural areas. According to the UN, in 2000 58 percent of the rural population lacked access to adequate sanitation and 42 percent to potable drinking water (USAID 2001). Surface water covers 80 percent and groundwater 20 percent of water supply. Groundwater is generally overexploited, which has lead to lower water tables and deterioration in water quality (World Bank 2003). Agriculture uses 83–92 percent of nation´s freshwater resources and different problems have impeded a wide adoption of new techniques and equipment to save irrigation water (USAID 2001; World Bank 2003).

The quality of surface and groundwater is affected by (1) pollution from domestic and industrial wastewater, (2) leakage of fertilizers and pesticides and (3) soil erosion and transport of sediments (Taleb 2006). Mining and acid mine drainage is also an important cause of water degradation in terms of heavy metal leakage and low pH, but its effects are more local whereas domestic and industrial wastewater and agriculture are a concern of national scale. Groundwater is generally of better quality than surface water (Fauconnet & Knoepfel 1997: 288). Cities and their municipal and industrial wastewaters are causing severe degradation of surface water quality because they carry high quantities of nutrients, bacteria and heavy metals, to name but few. Apart from Marrakech and Casablanca all collected wastewater are directed to natural water bodies without any treatment. Several Moroccan streams have high levels of phosphorus, ammonia, organic matter and high coliform counts. The majority of groundwater sources are degraded by high salinity and nitrate concentrations (World Bank 2003). Salinity occurs mostly in coastal areas near the Atlantic Ocean due to excessive pumping (Fauconnet & Knoepfel 1997: 288). Pesticide residues and elevated nitrate concentrations are a problem in both surface waters and wells.

In areas where nitrate concentrations are over 50 mg/l (a national and international guide level for potable water) nitrate has to be removed from drinking water because it causes health risks such as increased cancer risks (Elmidaoui *et al*. 2001). It has been reported that in some cases the treatment of potable water costs over fourteen times more than simple preventive measures (World Bank 2003).

The aim of the study

In this study, we are focusing on water issues related to water quality, water supply and water management in the study areas, the province of Errachidia and the prefecture of

Marrakech, Morocco. Therefore the aim of this study is to determine (1) the importance of the surface and groundwater in water supply, (2) the factors influencing the quality of water, and (3) the water management methods in both Errachidia and Marrakech.

The study areas

The study areas, the province of Errachidia and the prefecture of Marrakech, are located in arid and semi-arid Morocco, in the northwest corner of Africa. Morocco is located between latitudes 21–36° N and longitudes 1–17° W, and is bordered by the Mediterranean Sea in the north, Algeria in the east, Mauritania in the south, and the Atlantic Ocean in the west (figure 1). Morocco has a total surface of 446 550 km^2 of which land is 446 300 km^2 and water 250 km^2 (CIA 2011). The climate in Morocco is Mediterranean and there are two seasons: the wet season from October to April, representing about 95 percent of the annual rainfall, and the dry season from May to September (Boubekraoui 2011). According to Berkat and Tazi (2006), the average annual rainfall in Morocco is around 346 mm, but it varies greatly from more than 750 mm in the north to less than 150 mm in the southeast. Therefore irrigation is necessary in the southeast. More than 50 percent of the precipitation is concentrated on only 15 percent of the country's area (Berkat & Tazi 2006). The province of Errachidia is located in

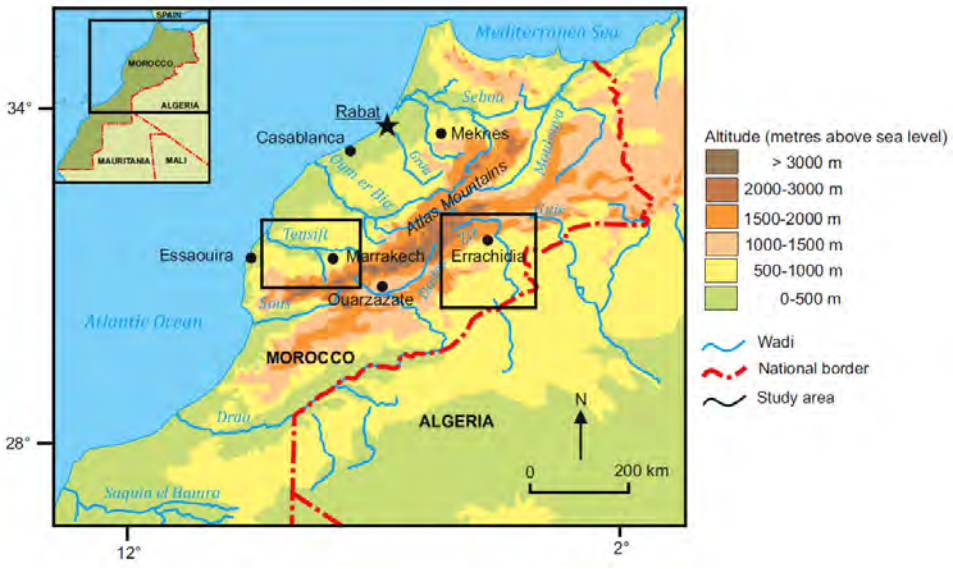


Figure 1. The location of Morocco and the study areas, Errachidia and Marrakech. The map is modified by the authors (Maps of Net 2011).

the region of Meknes-Tafilalet and the prefecture of Marrakech in the region of Marrakech-Tensift-Al Haouz.

Errachidia

The city of Errachidia is situated in Eastern Morocco, in the region of Meknès-Tafilalet and in the catchment of river Ziz (figures 2 and 3). The Ziz River originates from the Middle Atlas Mountains and flows 282 km into Algeria and the Sahara desert. The river is seasonal and it is used for human transport, production of hydroelectric power, irrigation and domestic uses. The hydro-electric power plant and its dam are situated at the south face of High Atlas Mountains. The river used to flow all year round until 1971 when the dam Hassan Addakhil was opened. Nowadays water is released from the reservoir 3–4 times a year (Lightfoot 1996).

Figure 2. The Ziz wadi flows through Tafilalt, Errachidia 26.10.2011.

In the Errachidia region there are three deep, exploitable aquifers (Senonian, Turonian and Infracenomanian), covered with alluvial ground water. The alluvial groundwater was completely depleted by the drought in 1980s and therefore the deep groundwater had to be exploited (El Ouali *et al.* 1999). Since

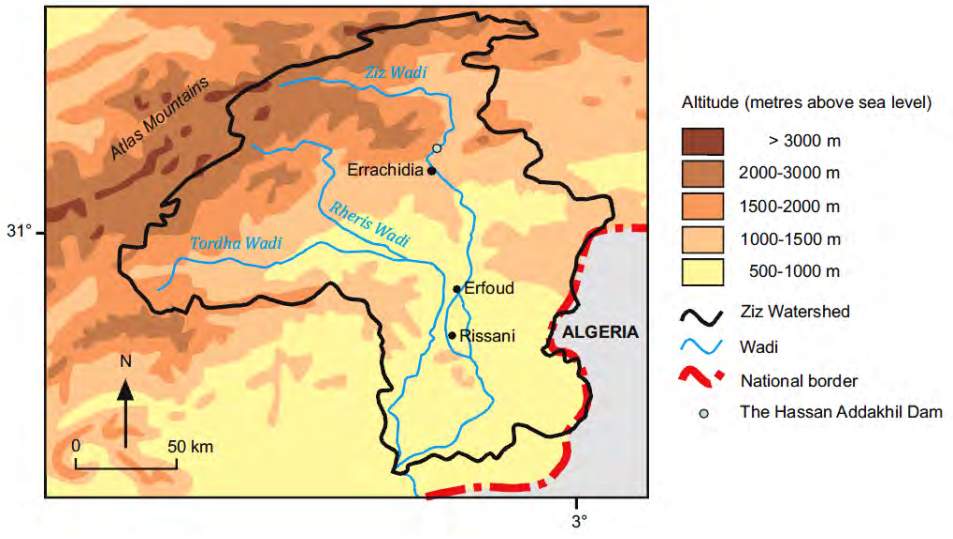


Figure 3. Ziz Watershed and the location of Errachidia and the dam Hassan Addakhil. The map is modified by the authors (Lightfoot 1996: 263; Maps of Net 2011).

then, there have been many studies on the recharge of these aquifers and the renewal of deep groundwater. There is a reserve of deep groundwater, and since the annual rainfall in the area (about 150 mm) is far below the potential evaporation (930 mm), it is estimated that the aquifer is recharged mainly higher than 1400 m i.e. in the Atlas Mountains.

Marrakech

Marrakech is the capital of the Marrakech-Tensift-Al Houz administrative region and it is located in the centre of the Tensift Watershed, which has an area of 24 800 km^2. The watershed has three subdivisions: High Atlas Mountains in the South, the Haouz Plain in the middle and the Jbilet Mountains in the North. The annual rainfall in Marrakech is around 240 mm and the evaporation is around 2 640 mm (Duchemin *et al.* 2006; Abdelkader *et al.* 2008: 301; Boubekraoui 2011).

The Tensift Wadi, which is the main natural water resource in the Watershed, is a seasonal river and it originates in the High Atlas Mountains and flows in to the Haouz plain before reaching the Atlantic Ocean in the West and has a total length of around 600 km (figure 4). The Tensift Wadi has several tributaries including the Nfis, Rhighaya, Issil, Ourika, Zat, and Rhdat Wadis (Maassen 2007; Boubekraoui 2011). The Tensift Wadi Watershed comprises three main aquifers: the Haouz, Mejjate, and Bahira. There are several dams in Marrakech, but the major dam within the region is the Lalla Takerkoust Dam, established in 1935 to help meet the growing water needs (Maassen 2007; Abdelkader *et al.* 2008). In 2009, almost 94 percent of the inhabitants had access to water (Boubekraoui 2011).

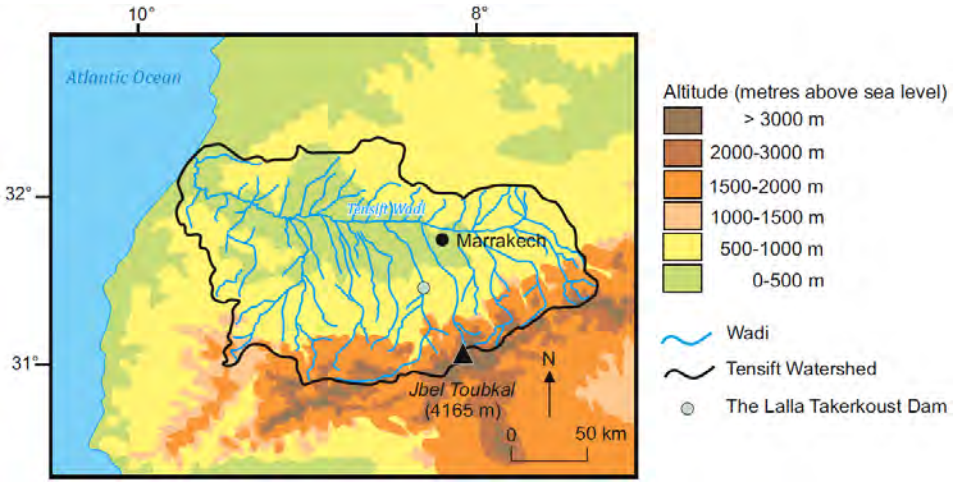


Figure 4. Tensift Watershed. The map is modified by the authors (Abdelkader et al. 2008: 300; Maps of Net 2011).

Materials and methods

The materials used in the study consist of varied literature and scientific articles on water systems, water quality and water management related to the study areas. The study material consists also of different maps, interviews and fieldwork.

The persons interviewed in Errachidia, in the Moulay Ismail University Faculty of Science and Technology Errachidia (FSTE), were L. Kabiri, professor of hydrogeology and M. Abderrahman, professor of hydrology. An additional interview was made with A. Ait Slimane, the head of exploitation department in the Office National l'Eau Potable (ONEP), by the students from FSTE in Errachidia. In Marrakech, E. H. Boubekraoui, professor of physical and hydro-geography of Cadi Ayyad University, Faculty of Arts and Humanities in Marrakech (FLSHM), was interviewed. The interviews followed a predetermined list of questions and therefore had the elements of structured interview. The questions were focusing on local water problems, the ways of improving the quality of water, and water management.

Fieldwork enables to see regional variations. The fieldwork consisted of semi-structured field observations that were focusing on water polluting sources and water management methods in Errachidia and Marrakech. The observations in the field included photographing.

Results

Errachidia

WATER USE AND WATER SUPPLY

In the province of Errachidia irrigation water is mainly surface water, whereas potable water is mainly groundwater. 80–90 percent of surface water is used for irrigation and 5–10 percent of groundwater for drinking (Abderahman 2011). In the province of Errachidia, 65 percent of the population receives their drinking water, which is groundwater, from ONEP (Ait Slimane 2011). Groundwater is also used for irrigation.

Figure 5. The Hassan Addakhil Dam and its water reservoir 28.10.2011.

As said before, Ziz's flow is nowadays regulated by the Hassan Addakhil Dam (figure 5). The dam was built in 1971 to regulate the flow, to have water for irrigation all year round and to prevent the wadi, a dry ephemeral riverbed, from flooding during the winter's wet season. The dam also increases the infiltration of surface water to groundwater, recharging the aquifer exploited by ONEP (Kabiri 2011).

According to professor Kabiri (2011) the nature of Ziz has changed a lot since the 1970s. Until the 1970s the water table and the riverbanks were stable. Since then the riverbed has expanded and as there are no longer solid banks, sand has filled the canals, seguias, used for irrigation. With the decline of the water table, the canal network is now left at a too high level compared with the water table (Kabiri 2011). The importance of Ziz as a source of irrigation water has declined over the past few decades and the role of other sources (khettaras, pumped wells and seguias branching of the Rheris Wadi) has become more important (Lightfoot 1996). To ensure a sufficient supply of irrigation water in the Tafilalt valley, downstream of the city of Errachidia, a canal has been built to redirect the water from Rheris to Ziz (figure 6) (Kabiri 2011).

The groundwater water tables have also declined since the 1970s. Since 1975 the overuse of diesel pumps has led to the abandoning of the traditional underground irrigation network, khettaras (figure 7). The majority of khettaras have run dry because the canals and their mother wells have been left above the groundwater surface. The rest of the khettaras still in use are expected to dry in the years to come (Lightfoot 1996).

Figure 6. Exposed Rheris riverbed 27.10.2011. Rheris is dammed a few hundred meters upstream and its water is directed to Ziz via canal.

Figure 7. Abandoned khettara with its two sandy wells and an access to the underground canal in Errachidia 27.10.2011.

THE QUALITY OF WATER

According to Ait Slimane (2011), the head of exploitation department in ONEP, there are four main factors influencing the water quality in the area: (1) waste from construction, hospitals, household etc., (2) population growth, (3) traditional irrigation and (4) climate change. With the climate change Morocco is expected to become even more arid than it is. Population growth increases pressure in terms of water quality and quantity. Traditional irrigation uses a

lot of water and causes the salinization of soil and groundwater (Kabiri 2011).

Lack of wastewater and solid waste treatment was also mentioned as one of the main factors influencing water quality in Errachidia by professors Abderahman and Kabiri. Professor Abderahman (2011) was especially concerned with hospital waste, which is not treated properly, but left on the ground near the hospital. When it rains, the toxins flow straight to the river. Another factor brought up by Abderahman were detergents used for washing clothes, cars etc.

ONEP has a water treatment plant in Errachidia but it is not working yet. The most common method used for water treatment is septic tanks. However, the skin problems experienced by the local people seem to indicate that it is not sufficient method. Municipal wastewater is also reused untreated in agriculture. The lack of wastewater treatment does not only affect the quality of surface water bodies. The groundwater in the Errachidia region is easily contaminated because wastewater infiltrates fast through sandy soils and therefore does not purify properly (Kabiri 2011).

WATER MANAGEMENT

According to professor Kabiri (2011), technical, social and educational methods are needed to improve water management in the province of Errachidia. The technical methods include a wastewater treatment plant, better solid waste treatment and new irrigation equipment, for example drip irrigation (figure 8). People should also be informed and educated about waste management and the benefits of new irrigation methods in terms of water consumption and salinization. Professor Kabiri especially addressed the importance of fighting poverty as a means to improve water management: even if there was a working water treatment plant most people would probably keep using their septic tanks because getting connected to a sewage network is expensive. The same goes for new irrigation methods; only a fraction of the people can afford it.

Figure 8. Newly planted drip irrigated date trees in Errachidia. Drip irrigation decreases water loss through evaporation and therefore the salinization of soil and groundwater.

Marrakech

WATER USE AND WATER SUPPLY

In Marrakech water resources are limited due to its rarity and irregularity. The region of Marrakech is facing a strong pressure on water resources related to population growth, increase in irrigated agriculture, and climate change (Razack & Huntley 1991; El-Quosy 2009; Lemkademe *et al.* 2011;

Ghallabi *et al.* 2011). Because of the high water demand, both the surface and ground water are overexploited causing a decline in the water tables of the aquifers (Abdelkader *et al*. 2008: 302). According to Boubekraoui (2011) the phenomenon is contributed by the soil degradation in the Atlas Mountains because in degraded areas the infiltration of water is weak. Because of the decreased water tables, khettaras, traditional underground galleries that convey groundwater to the surface for domestic use and irrigation, cannot be used and nowadays deep fossil groundwater is pumped for these purposes (Boubekraoui 2011) (figure 9).

Figure 9. Collapsed sandy wells exposing a dry khettara that is now being used as a dumpster in the city of Marrakech 1.11.2011.

Due to high water demand, a supplemental portion of water (300 million m^3) is transferred to the Tensift Watershed from Oum Er R'bia Watershed (north of the Tensift Watershed), via Canal du Rocade, a channel transporting potable water and water for irrigation in Marrakech (Abdelkader *et al.* 2008; Boubekraoui 2011). The water transferred through Canal du Rocade is mainly in poor condition and therefore hotels, resorts, and local households have chosen to dig their own wells (Maassen 2007). The problem is that the number of these wells is unknown, making it difficult to monitor the water use (Boubekraoui 2011).

In the region of Marrakech surface water has a main role in water supply and it is used for irrigation and drinking (Abdelkader *et al.* 2008; Boubekraoui 2011). The surface water resources within the watershed in an average year are about 520 million m^3 per year, with 85 million m^3 being from the Lalla Takerkoust Dam, 2 million m^3 from small dams, and 433 million m^3 from traditional withdrawals (seguias) (Abdelkader *et al.* 2008). The Lalla Takerkoust Dam has a major role in supplying the water for the urban region of Marrakech and also for the agricultural usage at the centre of the Haouz Plain (Agence Japonaise de Coopération Internationale 2007). Groundwater is also used, but it has a minor role in water supply (Abdelkader *et al.* 2008; Boubekraoui 2011). According to Boubekraoui (2011), the agricultural sector consumes 95 percent, domestic and industrial sector 3.5 percent, and tourism sector 1.5 percent of total water resources.

Tourism has increased in Marrakech, which has also increased the water consumption. While average households in Marrakech use daily 180 litres water per person, large

hotels use daily over 600 litres water per person (Boubekraoui 2011). As a means to attract tourists, several parks, swimming pools and golf courses that consume great amounts of water have been constructed (figure 10). Golf courses are the largest consumers of water and a single golf course consumes up to 35 000 litres water per day (Boubekraoui 2011). Although tourism consumes a lot of water, it is still the agricultural sector that consumes the majority of the water.

Figure 10. Water consuming golf course in the city of Marrakech 1.11.2011.

THE QUALITY OF WATER

In the region of Marrakech, the water quality of the surface water is generally better in upstream and poorer in downstream of the city of Marrakech, because Marrakech is a major polluter along the Tensift River. The groundwater is generally in better condition than the surface water (Boubekraoui 2011). In the region of Marrakech, the quality of water is threatened by several polluting sources, including salinization, lack of waste management, leakage of fertilizers and washing detergents, and siltation of dams.

Due to the lack of the wastewater treatment in the region of Marrakech, wastewaters with high chemical and heavy metal content are threatening the quality of both the surface and groundwater and can cause environmental and health risks. Wastewaters with high chemical content are derived from hamams (Turkish baths) (Boubekraoui 2011). Wastewaters with heavy metals are derived mainly from leather tanneries and mining areas (Mandi *et al.* 2009; El Khalil *et al.* 2008). Olive oil mill wastewaters have high polluting organic load due to the high contents of organic substances such as sugars, tannins, polyalcohols, pectins, lipids, and different aromatic compounds (Labat *et al.* 2000; Lesage-Meessen *et al.* 2001; Chamkh *et al.* 2009). The high concentrations of nitrates are derived from inadequate sanitation and fertilizers used in agriculture (Boubekraoui 2011). Sanitation wastewaters are also rich in infectious micro-organisms and bacteria and can cause health problems (WHO 2003: 51). Phosphorus concentrations are derived from e.g. washing detergents used in laundering in the wadis (figure 11).

According to Boubekraoui (2011), urbanization can also be considered as a threat in the region of Marrakech, because its large population generates a lot of solid waste. In many cases waste, including toxic hospital waste, is dumped into wadis due to the lack of solid waste management. This generates lixiviates

that are contributing to the pollution of water resources. Solid waste together with narrow bridge underpasses are also blocking the wadis and causing floods in urban areas with severe consequences (Boubekraoui 2011).

Figure 11. A woman washing her laundry in the Assif N'ougouns Wadi, the tributary of The Tensift Wadi in Imlil 31.10.2011.

Land erosion caused by deforestration and unsustainable cultural and cultivation practises is a problem within the Tensift Watershed (Abdelkader *et al.* 2008). Because of the erosion, more sediment is transported during floods to the dams causing the siltation of the dams (Abdelkader *et al.* 2008). The safety of the dams will eventually became questionable, if the sediment load associated to floods would create high loads on the dam walls. In the mountainous areas the siltation is contributed by concrete irrigation channels, seguias, which prevent the infiltration of water.

WATER INSTITUTIONS AND NEEDS

There are many organizations both at the regional and city level that work together in order to help manage and monitor the water resources in Marrakech. These include ABHT (Agence du Bassin Hydraulique du Tensift), ONEP, ORMVAH (Office Régional de Mise en Valeur Agricole du Haouz), and RADEEMA (Le Conseil d'Aminstration de la Régie Autonome Distribution d'Eau et d'Electricite de Marrakech). The water quality in the upstream is monitored by ONEP every three to five years.

There are many ways that could help managing the water resources more sustainably and would therefore improve the water quality in the region of Marrakech. These include increasing the awareness and involving rural communities in all projects dealing with water and land management, investing in infrastructure development in rural areas to combat the rural-to-urban migration, developing the policies and legislation to control urbanization, and further assessing and developing the groundwater resources, and upgrading the water supply and sewage systems (Abdelkader *et al.* 2008). In fact in 2008, a water treatment plant was established in the city of Marrakech and it is estimated that by the year 2012 100 percent of the urban wastewaters will be purified (Boubekraoui 2011). It would also be necessary to apply more efficient solid waste management.

Conclusions

The study areas, the province of Errachidia and the region of Marrakech, are struggling with very

similar problems when it comes to water quality and quantity. They are both located in a semi-arid region and they have a wet season in the winter and dry season in the summer, so the problem of rarity and irregularity of water is shared. To assure water availability throughout the year major dams were constructed in the regions during the 1930s in Marrakech and 1970s in Errachidia. Still, the demand for water in agricultural areas has been so high that in both areas it has been necessary to build a canal and direct water from a watershed to another to ensure water supply in the most crucial areas.

Since the 1980s and the beginning of the current drought, both areas have witnessed the decline of surface water and groundwater tables in the past few decades. The traditional water delivery systems, seguias aboveground and khettaras underground, have become useless in many regions as the canals have been left above the water table. Groundwater is primarily used for drinking since it is of better quality than surface water. However, in Marrakech also surface water is used for drinking. With climate change and population growth water management challenges are expected to become even more difficult.

In both regions, water quality is worsened by the lack of solid waste and wastewater treatment. In the cities of Errachidia and Marrakech water treatment plants should be taken into use and solid waste management should be upgraded to improve water quality. In both cities, experts were extremely concerned about the detrimental effects of toxic, untreated hospital waste.

The means of improving water quality and management do not only consist of technical solutions but financial and social support is also needed in order to get the local people involved. The rural people need to be informed about the new agricultural methods and their benefits. Moreover, people need financial support to adopt new techniques and equipment to save irrigation water, to get connected to the sewage network etc. Fighting poverty is necessary to efficiently improve water management in the study areas.

References

Abdelkader, A., M. Snoussi, L. Djabri, A. B. Bayoumi, K. Abu-Zeid, O. M. A. Mirghani, C. Baubion & S. Kadri (2008). Northern Africa. *In* Beekman, H. E. & S. Sunguro (ed.): *Freshwater under threat: Vulnerability assessment of freshwater resource to environmental change – Africa*, 249–319. UNEP & WRC.

Abderrahman, M. (2011). Professor of hydrology in the Moulay Ismail University Faculty of Science and Technology Errachidia (FSTE). Interview on 26.11.2011.

Agence Japonaise de Coopération Internationale (2007). *Etude du plan de gestion intégrée des resources en eau dans la plaine du Haouz Royaume du Maroc. Rapport Intermédiaire*. Pp. 138. Pacific Consultants International, Japon.

Ait Lemkade, A., J-L. Michelot, A. Benkaddour, L. Hanich & A. Maliki (2011). Isotopic and Hydrochemical approach to the functioning of an aquifer system in the region of Marrakech (Morocco). *Rapid Communications in Mass Spectrometry* 25, 2785–2792.

Ait Slimane A. (2011). Head of exploitation department in the Office National l'Eau Potable (ONEP). Interview on 27.11.2011.

Benaabidate, L. & A. E. Fryar (2010). Controls on Ground Water Chemistry in the Central Couloir Sud Rifain, Morocco. *Ground Water* 48: 2, 306-319.

Berkat, O. & M. Tazi (2006). *Country Pasture/Forage Resource Profiles*. Morocco. 12.10.2011, <*www.fao.org/ag/AGP/agpc/doc/Counprof/Morocco/Morocco.htm*>

Boubekraoui, E. H. (2011). Professor of physical and hydrogeography. Interview on 1.11.2011.

CIA (2011). *The world factbook. Africa, Morocco*. 8.10.2011, <*www.cia.gov/library/publications/the-world-factbook/geos/mo.html*>

Chamkh, F., C. Spröer, P. Costa Lemos, S. Besson, A.-G. El Asli, R. Bennisse, M. Labat, M. Reis & A.-I. Qatibi (2009). Desulfovibrio marrakechensis sp. nov., a 1,4-tyrosol-oxidizing, sulphate-reducing bacterium isolated from olive oil mill wastewater. *International Journal of Systematic and Evolutionary Microbiology* 59, 936–942.

Duchemin, B., R. Hadria, S. Er-Raki, G. Boulet, P. Maisongrande, A. Chehbouni, R. Escadafal, J. Ezzahar, J. Hoedjes, M. H. Kharrou, S. Khabba, B. Mougenot, A. Olioso, J.-C. Rodriguez & V. Simonneux (2006). Monitoring wheat phenology and irrigation in center of Morocco: on the use of relationship between evapotranspiration, crops coefficients, leaf area index and remotely-sensed vegetation indices. *Agricultural Water Management* 79, 1–27.

El Adnani, M., A. Ait Boughrous, M. Khebiza, Yacoubi, A. El Gharmali, M. L. Sbai, A. S. Errouane, L. Idrissi, Loukili & A. Nejmeddine (2007). Impact of mining wastes on the physicochemical and biological characteristics of groundwater in a mining area in Marrakech (Morocco). *Environmental Technology* 28: 1, 71–82.

El Khalil, H., O. El Hamiani, G. Bitton, N. Ouazzani & A. Boularbah (2008). Heavy metal contamination from mining sites in South Morocco: Monitoring metal content and toxicity of soil runoff and groundwater. *Environmental Monitoring and Assessment* 136, 147–160.

El Ouali A., J. Mudry, J. Mania, P. Chauve, N. Elyamine & M. Marzouk (1999). Present recharge of an aquifer in a semi-arid region: an example from the Turonian limestones of the Errachidia basin, Morocco. *Environmental Geology* 38: 2.

Elmidaoui, A., F. Elhannouni, M. A. Menkouchi Sahli, L. Chay, H. Elabbassi, M. Hafsi & D. Largeteau (2001). Pollution of nitrate in Moroccan ground water: removal by electrodialysis. *Desalination* 136, 325–332.

El-Quosy, D. E.-D. (2009). Impact of climate change: vulnerability and adaptation. Freshwater. *In* Tolba, M. K. & N. W. Saab (ed.): *2009 Report of the Arab Forum*

for Environment and Development. Arab Environment. Climate change. Impact of climate change on Arab countries, 75–86. Arab Forum for Environment and Development (AFED), Beirut.

Fauconnet M. & P. Knoepfel (1997). Morocco. *In* M. Jänicke & H. Weidner (ed.): *Environmental Policies: A Comparative Study of Capacity-Building – With a Data Appendix: International Profiles of Changes since 1970.* Pp. 480.

Ghallabi, L. B., M. Messouli & M. Yacoubi (2011). Integrated approaches to the assessment of the impacts of climate and socio-economic change on groundwater resources in the Tensif Basin, Morocco. *International Journal of Water Resources and Arid Environments* 1: 3, 219–225.

Kabiri, L. (2011). A professor of hydrogeology in the Moulay Ismail University Faculty of Science and Technology Errachidia (FSTE). An interview on 27.11.2011.

Labat, M., C. Augur, I. Perraud-Gaime, S. Roussos & S. Sayadi (2000). Biotechnological potentialities of polyphenolic compounds of coffee and comparison with olive. *In* Sera, T., C. R. Soccol, A. Pandey & S. Roussos (ed.): *Coffee Biotechnology and Quality*, 517–531. Kluwer, Dordrecht.

Lesage-Meessen, L., D. Navarro, S. Maunier, J.-C. Sigoillot, J. Lorquin, M. Delattre, J.-L. Simon, M. Asther & M. Labat (2001). Simple phenolic content in olive residues as a function of extraction systems. *Food Chemistry* 75, 501–507.

Lightfoot, D. R. (1996). Moroccan khettara: traditional irrigation and progressive desiccation. *Geoforum* 27: 2, 261–273.

Maassen, A. (2007). Watered down: the intersection and integration of tourism development and water resource management in Marrakech, Morocco. Pp. 39. *ISP Collection* 117.

Mandi, L., S. Tiglyene & A. Jaouad (2009). Depuration of tannery effluent by phytoremediation and infiltration percolation under arid climate. *Options Méditerranéennes* A 88. 179–187.

Maps of Net (2011). *Morocco topography*. 24.11.2011, <*mapsof.net/map/morocco-topography*>

Merlin, A. Abourida, A. Cheggour, I. Benhadj, A. Boudhar, A. Chaponnièl, P. Maisongrande, H. Kharrou, N.Guemouria, N. Alaa & B. Berjami (2008). The Tensift basin: an ideal outdoor loboratory to investigate basin scale hydrological functioning in the Mediterranean region: The SUBMED Program. *Proceeding of WWC*. Pp. 15. Montpellier, France.

Razack, M. & D. Huntley (1991). Assessing transmissivity from specific capacity in a large and heterogeneous alluvial aquifer. *Ground Water* 29: 6, 856–861.

Taleb, H (2006). Water management in Morocco. *In* G. Dura et al. (eds.): *Management of Intentional and Accidental Water Pollution*, 177–180. Springer, Netherlands.

USAID (2001). *USAID's Integrated Water Resources Management in Morocco*. 10.10.2011, <*www.usaid.gov/our_work/environment/water/.../morocco.iwrm.pdf*>

WHO (2003*). Guidelines for safe recreational water environments. Volume 1: Coastal and fresh waters*. Pp. 215.

World Bank (2003). *Water quality management*. 10.10.2011, <*siteresour-ces.worldbank.org/EXTME-TAP/.../WQM-MoroccoP.pdf*>

Belinda Kivivuori, Juha Niemelä & Matias Andersson

RURAL-URBAN MIGRATION IN THE TAFILALET REGION

Abstract

This work strives to map, explain and understand the main spatial patterns of rural-urban migration in the Ziz Valley area in eastern Morocco and contribute to the understanding of the phenomenon as a wider issue. Also it discusses the effects of that migration on rural communities. Rural-urban migration is a well recognized process in both developed and developing countries, but is yet to attract more attention in Morocco or the Ziz Valley. The national government's ambitions regionalization plan serves as a specific background for the Moroccan rural-urban migration as well as for this study. Interviews with both officials and "ordinary citizens" as well as general observation are used to assess the spatial patterns of, the reasons for, and the effects of rural-urban migration. Lack of dependable statistics makes quantitative analysis impossible in this context.

The research concludes that the migration process follows to a large extent the main lines of the phenomenon elsewhere. The emigration from rural to urban areas is biased towards the young, educated male population, which migrates in search of work and educational opportunities. This leaves the rural communities with a weak, biased and unsustainable demographic structure. More specific impacts include cultural degradation and economical issues related to loss of workforce in the agricultural sector as fields and harvests are left unattended and exposed to erosion. There is also an increased pressure on taking care of the elders and the children. On the other hand there is a reported flow of different forms of aid and support to rural home communities from the emigrants. The government's regionalization plan has not yet made a big impact on local circumstances, as it is generally not acknowledged by the local population.

Introduction

This is a case study on the internal migration and its spatial patterns in Morocco. More specifically we concentrate on the Ziz valley, which is located in the eastern part of the country. Here, we set the outline of the work by presenting some theoretical background and by comparing them to the migration patterns in Morocco. We are dealing with migration in the light of global trends especially in developing countries. The international migration is however not covered in this work, since the internal migration seems to be bigger in quantitative terms.

What makes Morocco interesting in this matter is the strong emphasis on the regionalization and the subsequent decentralization in the nation that is made explicit in the Moroccan politics. The connection between regionalization and migration in Morocco is yet not very well documented and the inhabitants of Errachidia have very little knowledge of the regionalization plans that the king Mohammed VI has announced. A basic problem in Morocco seems to be the lack of a national network of reporting and informing. An official in Errachidia might say that there are no plans for the public transport on the national level, while the corresponding official in Marrakesh might state that there indeed are. Planning on the state level is inadequate and only small-scale projects are managed. This is often the problem in developing countries and in this study we again prove that informing is one of the cornerstones of development. Further, we concentrate on the impacts, both negative and positive, of migration on the agricultural society in the Ziz valley.

Background

Migration from rural areas to urban areas is a global trend in both developing and industrialised countries. In less developed countries the urbanization rate is higher, which have resulted in large unplanned shantytowns in the outer edge of the cities. In developing countries the rural areas are poorer than urban and so people move to cities in hope for a better life.

In West Africa migration has a long tradition and is still the lifestyle for a big part of the population. Those who migrate are seasonal workers, cross-border workers, refugees, craftsmen or professionals. Traditionally both the long and short distance migration streams have been male-dominated as farmers abandon their rural lifestyle in search for a wage labour in the cities. Today migration is becoming increasingly feminized when macro-economic changes and generalized poverty has pulled women into the labour market (Adepoju 2003). In poor areas many women are small-scale traders who often are essential for these countries. These women migrate within a smaller region when migration out of the country is clearly male-dominated. Women are becoming more educated

and therefore more independent. For them migration is a survival strategy.

Brain drain is a big problem throughout the world. Pellegrino (2002) says that skilled people in Latin America move to the more developed world – mostly the US – because their education is not being valued in their home country. The same pattern can also be seen between rural and urban areas. In the rural areas no one is willing to, or can pay salaries that would be equivalent to their skills. Also specialized work is difficult to find in less developed or rural areas.

Migration trends in rural Morocco

Like the rest of the African continent, Morocco has an ongoing trend of international and internal migration. In this study the focus is on the internal out-migration from the rural Morocco, more specifically the Errachidia area in the region of Meknès-Tafilalet in the eastern part of the country.

In this region the incorporation of formerly stateless society of Berbers (*Imazighen*) into the modern French and – after independence – Moroccan-Arabic state, meant the loss of tribal autonomy and the decline of regional and trans-Saharan (caravan) trade networks, as well as nomad-peasant trade and barter relations (Haas 2005a). Combined with a steep population increase, these processes have contributed to undermining the traditional oasis livelihoods. Haas (2005a) has studied the region of Todgha valley, which is located close to the Errachidia area and has similar socio-economic and geographical conditions. In the Todgha region the transformation of political and economic macro-context through the incorporation of the area into the modern state and the capitalist economy, along with the concomitant expansion of infrastructure and means of transport, created entirely new livelihood opportunities through wage labour outside traditional subsistence oasis agriculture both within and, in particular, outside the valley. These processes have led to increasing levels of labour migration from the Todgha valley and more generally contributed to the trend of rural-urban migration in the whole country including the Errachidia area (figure 1).

Although international migration out of Morocco is significant, internal migration is greater in quantitative terms (Haas 2005b). A significant increase in Morocco's urban population started in the 1950s and this trend has remained ever since. Rural population stagnated in the 1990s although birth rates have remained high. This reflects the rural-urban migration to cities, but according to Haas (2005b), the migration pattern is more complex than merely from countryside to big cities. An increasing number of internal migrants do not settle in the biggest cities, but in rapidly growing smaller and medium-sized towns near to, or within, the rural provinces themselves. This process of micro- and meso-urbanization has

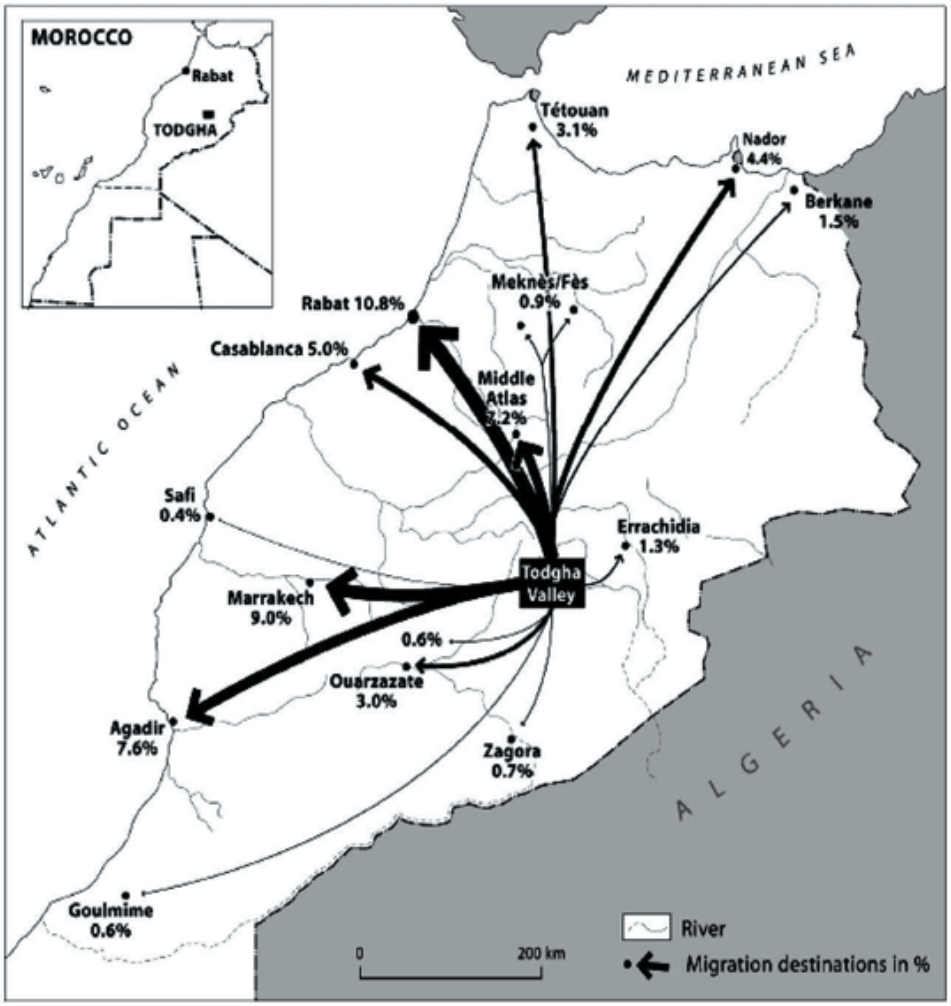


Figure 1. Out-migration flows from Todgha valley (Haas 2005a).

been encouraged by regionalization policy and by the major improvements in road and electricity infrastructure. Therefore the "rural exodus" is not necessarily as severe as often discussed, as the internal migration includes important processes of intra-regional migration and the partial urbanization of the rural space (Haas 2005b). However, even though there is the positive process of micro- and meso-urbanisation, the hypothesis is that the most remote areas in Morocco cannot offer enough job opportunities and are suffering from out-migration.

Regionalization and migration in Morocco

Regionalization is here seen in a wider sense as a process and a tool by which

a central government strives to spread decision-making and responsibility of local development to the more local level and to the communities that are affected by that decision-making. The underlying academic train of thought is that a policy of regionalization is part of the wider development method of participatory development which uplifts local knowledge as an important development tool and challenges the local communities to take on a big role in surveying and finding solutions for local development issues (Ben-Meir 2010: 2). King Mohammed VI (2008a, cit. Ben-Meir 2010: 1) and the Moroccan government states that the goal in the case of Morocco is to work along these lines to "enable good local governance that responds more closely to the citizen's needs, and boost integrated development". Of course, on the national level this process primarily means spreading decision making from the governmental level to the local administrations.

A primary tool, and a key concept when discussing and performing regionalization, is decentralization. Here, decentralization is considered to be the activities that strive to achieve the wider goal of regionalization. Decentralization takes many forms in practice (Rondinelli *et al.* 1983: 13–28), but generally it involves an action on behalf of the national or regional government that moves the physical location of decision-making and/or important functions away from large centres to more peripheral locations. For the Ziz Valley this, most importantly, involves the detachment of the city of Errachidia from the governmental control of Meknès. In contrast to now belonging to the Meknès-Tafilalet region, Errachidia will become the centre of a new region, Drâa–Tafilalet. This region will be formed by two rural areas (the Ziz Valley and the Drâa Valley), with Ouarzazate and Errachidia as administrative centres.

Regionalization is of great interest regarding migration since it influences the cornerstones of migration theory: the push and pull factors. Although not clearly stated in any official documentation regarding the regionalization project in Morocco, it is very probable that it will have an effect on migration flows in a way that decreases the movement from the countryside and the smaller centres to the big urban centres. It is curious that this does not seem to get a lot of attention from the government, as reducing the brain-drain from the countryside would be a very efficient way of promoting the regional development that is so much strived for.

Aim of the study

The main goals of this study were to observe the effects of rural-urban migration in the local societies, to examine what kind of reactions there have been to the issue of migration, and also to find out what are the spatial patterns of the migration. Also, one of the goals was to study how the

Moroccan regionalization policy and the related decentralization process and activities are in practice transforming the migration patterns in the country. The research questions were: How is migration affecting the local society (rural and urban)? What responses have there been to the problem? What are the spatial patterns of migration? Is the regionalization process evident in the study area, and if so, how does it appear?

Methods

Intended methods for our research were interviews and collection of statistics concerning migration. Statistics could have been used to create tables and maps using GIS. However, during our stay in Morocco we were unable to get any statistics or figures concerning migration, which lead us to a conclusion that statistics are either really difficult to reach or non-existent. This is of course the situation in most of the developing countries.

In the absence of statistics, our only useful methods were interviews and general observation. The interviewed persons were interpreters Ismail Hasnouni and Tata Abdel Karim and in addition Mohamed Baddou of the UNDP's program of Tafilalet Oasis and El Boulmani Said of the Urban Agency of Errachidia. Baddou and Said represented the official view of the migration situation generated through their positions in UNDP and the urban agency, whereas Hasnouni and Karim represented the "ordinary citizens" and provided us with some personal experiences regarding migration. We managed to gather a lot of relevant information using interviews, although statistics would have been very useful in providing information about the volumes and spatial patterns of migration in the Tafilalet region.

Results

Push-factors in the countryside of Errachidia

The main factor that causes people to move to cities in our study area of Meknès-Tafilalet in north-eastern Morocco is the lack of work in rural areas. Particularly young men move out from the villages in search for a paid job. The oldest son in the Moroccan family is responsible for providing income for his family. They move to big cities like Meknès, Marrakesh, Fez and Rabat for long term or even for permanent work. Women on the other hand do seasonal work for instance in the Atlas Mountains when it is time for harvest. The youth also want to study more than before and do not settle for agricultural work anymore. In other words they cannot find work that corresponds to their studies in their villages. Also tourism in the cities attracts the youth.

According to Baddou (2011), who is working in the project 'Programme Oasis Tafilalet', the national government is trying to promote life opportunities in the countryside to prevent this emigration. Baddou states that the program has shown good results but so far no evidence can prove this, since no statistics are available. The aim of this project is also to create statistics on migration so that areas could be planned better for their demands. There are no such statistics in Errachidia, which made it difficult for us to analyze the emigration from rural areas. The area of Errachidia is part of the national regionalization process because the oases serve as centres for regionalization.

One factor is climate change, which makes periods of drought longer and the condition of the oases becomes worse. Many *palmeries* (palm plantations) are covered with sand brought from the desert by winds. Therefore inhabitants are forced to move away permanently. The development of agriculture is hampered also because of traditions (Baddou 2011). The farmers are unwilling to adapt new and more efficient ways of work.

The effects of emigration on the rural communities

The effects of rural-urban migration on the rural communities are naturally wide and obvious to the interviewees. The interviews conducted on the field provided therefore a good look on these issues, which are accounted for here.

The effect of emigration on rural communities that was most often mentioned by the local population was, somewhat surprisingly, not an economic one. The biggest concern is the cultural (or traditional) degradation, which is backed up by the relatively big differences between rural and urban cultures in Morocco. Cultural degradation is seen here as the process where norms and traditions lose respect in the eyes of the youth or are forgotten altogether as a result of contact with a more western and/or urban culture. This is a phenomenon that is probably even more strongly connected to globalization and the general development of information technology. It is however surely enhanced by rural-urban migration (and therefore rural-urban connections) especially in less developed countries as big cities everywhere are the main hubs of globalization.

In the case of rural-urban migration in Morocco cultural degradation is specifically seen by the interviewees as the process where young people move away and learn a new culture with new norms and ways of conduct (Hasnouni 2011). If they move back to their home villages they often experience problems in adapting back to the rural lifestyle, which can cause distress or even direct personal conflicts. It is also probable that the traditional culture will not be taught as effectively to future generations by the once-emigrants. This would in the

worst-case scenario imply the demise of a whole way of life.

There are also clear effects on the economic life and the wellbeing in the rural communities. It is obvious that the emigrants would constitute a considerable workforce for the communities if they were to stay. This has clear consequences on the agricultural sector (Baddou 2011, Hasnouni 2011). The diminished workforce means that important harvests are not collected in time, which leads to considerable economic losses for the communities. Perhaps even more important in the long run is the fact that fields that are left unattended contribute to soil erosion, which is a big problem in any semi-arid region. In addition to the agricultural sector, more social issues stem from the loss of workforce. In the local culture it is expected that the able part of the population takes care of both the elders and the children, both directly and indirectly through economic contribution. The impacts of emigration are even more highlighted by an obvious case of brain-drain. The emigrants come mostly from the more educated part of the population, especially in the case were young people have moved to cities to study. This magnifies the difference in the educational level between rural and urban populations and hinders the overall development of rural communities.

However, the impacts are of course not as one-sided as it might seem in the discussion above. The interviewees liked to highlight the fact that a part of the educated emigrants participate actively in the development of their home communities. This is most often done by cash remittances and economical or other kind of participation in community development programs and other projects such as the Program of Oasis Tafilalet (Baddou 2011). There are also a considerable amount of cases of educated and experienced people returning to home communities and contributing to the local development, modernization and human capital resources (Hasnouni 2011).

Probably the grimmest aspect of the future for rural communities in the Ziz Valley regarding rural-urban migration is however the vicious circle that it causes. The emigrants are most notably young, mostly male and sometimes educated people. This leads in the long run to a weak and biased demographic structure. Population left in the villages is relatively old and biased in its gender. This affects negatively the potential for reproduction in a community and therefore the vitality of the community as well as the lifestyle it represents.

The question of regionalization

One of our study questions was about Moroccan regionalization policy and whether it transforms the migration patterns in our study area. Through our interviews we could not get much information about this factor.

Unsurprisingly, ordinary people know very little about the concept of regionalization, and even the officials did not really stress it. The UNDP representative Mohamed Baddou (2011), however, pointed out that the king Mohamed IV has established regional cores as nodes of growth as a part of the regionalization process. Errachidia is one of these cores. Also, as mentioned above, the oases have important role in regionalization in this particular area since they offer liveable habitat and work opportunities in a region otherwise so infertile and dry (figure 2).

Figure 2. Ziz valley is one of the oases in the Errachidia region.

Despite the lack of sources, it can be said that at this moment the process of regionalization seems to be still more on the paper and that little has been done in practice. The king has made his announcement, but the difficulty lies in how to transform the good intentions into a working system. Regionalization is a difficult process regardless of where it is carried out. There have been major obstacles in the organized society of Finland, and it would be surprising if Morocco did not face some difficulties in the regionalization process as well.

Discussion and conclusions

The migration patterns in the Ziz Valley seem to follow the general lines of wider global migration patterns and theories. There is a clear movement of relatively young and educated people from rural to urban areas both close and far away. Big cities, especially Casablanca, Meknès and Marrakech where often mentioned as the target cities of migrants. This confirms the similarity of the migration processes in the Ziz Valley area and the Todgha Valley area (as presented earlier by Haas 2005a). Because of the regrettable absence of any, let alone reliable, statistics regarding rural-urban migration in the area, it is however hard to quantitatively compare the extent of the issue with similar processes temporally, spatially in Morocco or with both more and/or less developed countries. Therefore it is also hard to assess in what stage the migration process is and whether it is increasing or decreasing. The fact that the issue is well acknowledged by the local population does nonetheless point to a conclusion that the movement has been going on for some time and that it has considerable effects on the local communities.

The most important push-factors in the Ziz Valley paint a very familiar picture of migration in developing countries. The absence of employment possibilities in rural communities and, probably more importantly, the perceived abundance of work possibilities in cities are the main drivers of rural-urban migration. In addition to permanent migration for work, there is considerable seasonal migration, mostly by women, after agricultural jobs. The young population moves to some extent also after greater possibilities for higher education. Education is widely accepted to be maybe the most important cornerstone for the general development of a community, but ironically it also seems in some cases to undermine the development of rural communities. As the population gets more educated, there are even less meaningful job opportunities for them on the countryside. Of course climate change is also an important reason for leaving rural communities as soil erosion and the encroachment of the surrounding desert makes agricultural activities harder and less productive.

The impacts of emigration on the rural areas are substantial and easy to understand. The loss of young and able workforce in the communities leads to pressures both on social care taking and agricultural production and with it on economical circumstances. Children and elders are more easily left without care as the working part of the population, which is traditionally responsible for them, moves away. Harvests are also left unattended which leads easily, besides economic losses, to accelerated soil erosion and loss of agriculturally suitable area. The emigration is biased to the more educated part of the population, which leads to considerable brain drain. There is, moreover, a case of cultural degradation and a conflict between urban and rural culture. The age structure of the emigrating population leads to a weak and biased demographic structure in the rural communities, which causes a vicious circle of accelerated emigration that threatens entire communities and even a whole way of life.

On the more beneficial side there is also a (at least reported) steady flow of cash remittances and other support, even in the form of independent development projects, for the rural communities by well-off emigrants. This promises some positive development and modernization by emigration also for the rural communities.

The impact of substantial immigration in cities is not supposed to be considered in this work, but it can be mentioned that the interviewees had surprisingly little to comment on that issue. This is somehow understandable in developing country circumstances, where the big population growth in cities is seldom divided into natural and other forms of population growth. Immigration is seen as incorporated in the bigger issue of urban population growth, which is far too wide to be discussed here.

The results of the research can be seen as being a bit shallow because the information was gained mostly by interviews. This gives always rise to questions regarding the points of view and the objectivity of the respondents. The interviewees were however picked from different personal and institutional backgrounds, and still they explained the most important parts of the issues in a similar way. Therefore there is not too much reason for suspicion regarding the relevant statements. The absence of statistics is an important shortcoming but could not be addressed during the work. The problem was however generally acknowledged also by local authorities after inquiry. An issue that was not very well addressed in the work compared to our starting point was the impacts of the national regionalization project. This is however mostly because the project, as explained earlier, has yet to considerably impact life on the grassroots level and be perceived in a meaningful way by the local population.

References

Adepoju, Aderanti (2003). Migration in West Afrika. *Development* 46: 3, 37–41.

Baddou, Mohamed (2011). National coordinator, Programme de Développement Territorial Durable des Oasis du Tafilalet. Interview in Errachidia, 29.11.2011.

Ben-Meir, Yossef (2010). Morocco's regionalization roadmap and the Western Sahara. *International journal of sociology and social policy* 31: 1/2, 75–90

Dorotan, Eddie (2008). Frameworks for decentralization: Global perspective. Presentation in Phom Phen, Cambodia, 18.11.2008.

Haas, H. (2005a). *Migration, remittances and regional development in Southern Morocco*. 6.10.2011, <*http://www.ssrc.org/workspace/images/crm/new_publication_3/%7B76b4626e-5c50-de11-afac-001cc477ec70%7D.pdf*>

Haas, H. (2005b). *Morocco's migration transition: Trends, determinants and future scenarios*. 6.10.2011, <*http://www.unhcr.org/refworld/category,LEGAL,GCIM,,MAR,42ce528d4,0.html*>

Hardgrave, Robert L. (1983). The Northeast, the Punjab, and the regionalization of Indian politics. *Asian survey* 23: 11, 1171–1181.

Hasnouni, Ismail (2011). Verbal statement, 28.11.2011.

Kakowich, Arie M. (1998). Regionalization, globalization and nationalism: Convergent, divergent, or overlapping? Pp. 47. Working paper of presentation at the University of Oslo, 7.8.1998.

Pellegrino, Adela (2002). Trends in Latin American skilled migration: "Brain drain" or "brain exchange"? *International migration* 39: 5, 111–132.

Rondinelli, Dennis A., Nellis, John R. & Cheema, G. Shabbir (1983). Decentralization in developing countries. A review of recent experience. *World bank staff working papers* 528. Pp. 110. The World Bank. Washington D.C.

Maria Viitasaari

PUBLIC TRANSPORT SYSTEM IN THE CITY OF ERRACHIDIA

Abstract

Public transport services remain underdeveloped in most of Morocco. Alike in Errachidia the services are based on the collective taxi system. Citizens are quite satisfied with the taxis but there is a demand for proper planning and for organizing the system more efficiently. Some remarks based on interviews with the local people are presented and analyzed in this study.

The Aim of the Study

The aim of the study was to investigate the current situation concerning the public transport services in the city Errachidia in the eastern Morocco. The aim was also to find out some plans for developing the public transport network in the study area. It was also important to hear what the local people think about the matter. The issue was selected to this study due the fact that operational public transport system is an important factor in improving the local development. Errachidia is located in an extremely dry and peripheral area of Morocco, which raises the risk for poverty and low economical and societal development.

Background

Public transport – According to Iles (2005), the concept of public transport can be divided into two different types. Mass public transport modes (MPT) refer to vehicles that run on permanent routes and timetables, and they can be used by independent individuals. These kinds of public transport vehicles are for example trains, subways, ferries and large buses. Individual public transport modes (IPM) refer to vehicles that individuals or groups can use by deciding the routes and timetables by themselves. IPM's are very common means to travel especially in the developing countries. A few examples of these vehicles are motorcycle-taxis, rickshaws, taxis and animal-drawn means to travel. Besides of these two types mentioned above, public transport can be divided also into road-, air-, water- and rail-based forms (Iles 2005). In developing countries the division between different modes of public transport is not always that clear as it is in Europe, for example. In many cities of the South there can be considerable overlap between buses and taxis (Simon 1996).

Urbanization is a process that occurs at an alarming rate in many developing countries. In practice, urban population grows fast and the distances within the city area expand all the time. This kind of development means that the demand for public transport is high. Although the number of private car owners in developing countries is growing, there are still only few people who can afford an own car and are therefore dependent on public transport. An effective public transport system is a vital element in preventing poverty and promoting local development (Simon 1996).

Although reasonable public transport systems may promote development, it has to be mentioned that modern transport modes were conceived in the North and it is not self-evident that they suit the needs of developing countries just like that. Therefore it would be important to plan the development of transportation networks by taking into consideration the local circumstances and traditions. Anyway, the only way to avoid the explosive growth of private car-ownership and to prevent major environmental problems is to support the development of public transport modes (Simon 1996).

In Morocco one of the most visible form of public transport is the system of collective taxis, or "Les grands taxis", as they are called locally. As the public transportation remains still underdeveloped in Morocco, the collective taxis provide for people's needs. Technically, they are adapted to the demand of local inhabitants and provide them with a solution to travel collectively. Thus, taxis play a part in the spatial organization of the cities and in the interurban relations. While they are partially responsible for gridlocks in city centres, they also contribute to the improvement of traffic flow (Le Tellier 2005). Beside the shared "grand taxis" there are also "petit taxis" (small

taxis) that are more like regular taxis in Europe for example. The grand taxis take five passengers in total, but the small taxis only take three persons. To travel between the cities, there are three national bus companies: Supratours, CTM and SATAS (goafrica.about.com 2011). Generally speaking the Moroccan government has started to turn its policy towards privatization of the transport sector. It has started to invest on getting new private operators to work within transport services so that the national funds could be used for "bigger" projects (Ford 2005).

In Morocco, the railway network is quite comprehensive with over 2000 km of existing tracks. The rail services in Morocco are exceptionally good if compared to other North African countries although the train investments are concentrating more on cargo than passenger services. Still, for example in Libya there are no functioning rail services at all (Fodor 2009). One of the most significant plans is the idea of building a railway tunnel between Morocco and Spain. This plan and other projects for modernizing track infrastructure in Morocco are tightly connected to the need for getting more tourists (Ford 2005). After all, commuter train networks in Morocco exist only in Casablanca (ONCF 2011), which is understandable since there are no other real metropolises.

Figure 1. "Les grands taxis" at the taxi park in Errachidia.

Material and methods

Methods in this study were interviews and observation. In total six individual semi-structured interviews were made with local people who were participating the seminar of sustainable development carried out by the University of Errachidia and University of Helsinki. Also one brief group interview was carried out with a few students of the University of Errachidia. Meeting with El Boulmani Saïd, the chief of the urban agency, also cleared out some points concerning transport. The original plan was to interview also the person in charge of the transport issues in Errachidia, but unfortunately the meeting was finally cancelled. That was a really a pity since he would have been the best expert to tell about the future plans. Finally, an observation around the city center was made to help the mapping of the transport services and also to get an overall picture about the transport culture in the study area.

The individual interviews and the group interview were semi-structured so that a few questions were presented to interviewees and then they were free to tell their personal opinions about certain issues.
The questions were:

1. What is your opinion about the current public transport system in Errachidia?
2. Name some positive and negative aspects concerning the collective taxis.
3. Do you find the current taxi system safe for the passengers?
4. How the public transport should be developed in Errachidia in the future?

It has to be mentioned that since the time for research was very limited and because the small number of interviews were made with the help of an interpreter, the results are not comprehensive nor very comparative. There should be a much larger sample of interviews to get a more realistic picture about the general opinion of citizen. However, these few interviews still give some kind of a guideline about attitudes toward public transport in Errachidia.

Results and Analysis

The answers reveal that in general people feel safe in taxis but the lack of proper organization of the taxi system sometimes causes conflicts between drivers and that bothers the customers. In practice it also annoys some people that there has to be a certain number of passengers in the taxi before it leaves the taxi park. This may take some time if you want to travel for example to some distant village or some other

unpopular place. So finding a taxi in that case may be troublesome.

Passengers also have mixed feelings about the current system of paying the taxi trips. The common mean is that before entering the car you negotiate the price for the journey. Thereby the price is clear for both the customer and the driver and there is always a possibility to try to bargain. On the other hand some people think that the European taximeter system would be better and more equal. Despite the contradictory feelings all of the persons who were interviewed thought that one of the most positive aspects concerning the pricing of collective taxis is the fact that now even the poorest people can afford using them.

Figure 2. Grand taxis with signs showing the directions they are going to leave.

According to the interviewees, many people in Errachidia would like to have some kind of minibus service besides collective taxis. Buses with permanent routes and timetables would make it easier to travel to workplace or school at the morning and then back home in the evening. During the group interview the participants told that there have been public bus services in Errachidia in the 1990s. At the meeting with the chief of the urban agency of Errachidia it was clarified that the bus system was ran down as a part of the governmental privatization strategy. The government thinks that the private sector has better qualification for organizing stable and functional transport services nationally.

According to the urban agency, the primary target of transport sector in Errachidia and in the whole province is the improving of road network and especially the building of a new highway connection to Meknes. Still, the Atlas Mountains make the work very challenging and expensive. Also the improving of the Errachidia airport is considered as an important development task. Nowadays there are two flights in a week: one from Casablanca and one to Casablanca.

When it comes to the development of public transport in the city area, the plans are slight and apparently they are not very easily studied by the public. According to the chief of the urban agency there are not any plans for developing the urban public transport services. Similar argument was reported also by several experts participated the seminar of sustainable development. Then again, the discussion with an official working in the transport sector revealed that there is a plan for developing the public transport of the area. It was not possible to get a real certainty concerning this

Figure 3. Bus station in Errachidia. Long-distance buses are leaving to other cities.

issue since the meeting with the person in charge of the transport sector was not arranged.

During the observations around the city center it was possible to see the taxi parks – both taxi types have their own parks – and the long distant bus station. There are bus connections to nearly all the biggest cities like Marrakesh, Meknes and Oujda. Also many smaller towns and villages like Ouarzazate and Merzouga are easy to achieve by bus. The taxi parks and the bus station were in very good condition, but they could have been better guideposted.

Conclusion and Discussion

The public transport of Errachidia is based on the collective taxi system as it is mainly in whole Morocco. The local people are used to the collective taxis and are quite satisfied with them. Still, there seems to be some aspects that should be developed, like organizing the taxi system more efficiently, so that the travelling would be more fluent. Positive point is that the pricing of the collective taxis is so low that even the poor people who do not have an own car can afford using them. The maintenance of taxis and other facilities is cheap compared to large bus networks, but the trips with old Mercedez-taxis may be more dangerous and more unstable unreliable.

Although the current state of the transport planning did not become clear during this research I strongly believe that there are some kinds of plans concerning the public transport in the city. But as it became evident during this study, finding them is too difficult and as the local people had

not heard of them, they apparently are not public. This is also a point, which should be changed rapidly. If people had a proper possibility to examine the plans they could express their own opinions and propositions for the authorities. This could lead to better results in all planning but also strengthen the public trust towards the authorities. As it was mentioned in the urban agency, Errachidia is a growing city. Therefore the demand for public transport will probably grow in the future and plans for a good transport system are vital for the local development.

As it was mentioned earlier, the city of Errachidia is located in periphery and therefore it is important that connections to other cities and parts of the state are working well. It was good to notice that several improvements concerning the road network and airport service are to be realized soon. It is clear that before investing in new vehicles or other public transport facilities, roads must be paved and be in good condition. Good connections bring not only more possibilities for people to move freely but also new companies and economic development to the area.

References

Africa Travel (2011). *Morocco*. 13.10.2011, <*http://goafrica.about.com/od/morocco/a/moroctraveltips_3.htm*>

Fodor, M. (2009). Transport: An investment that pays. *The OECD Observer* 275: 40.

Ford, N. (2005). Morocco looks to the private sector. *Middle East* 353: 48.

Iles, R. (2005). *Public Transport in Developing Countries*. Pp. 478. Elsevier, United Kingdom.

Le Tellier, J. (2005). Collective taxis: Study of a transportation system in Morocco. *Annales de Geographie* 114: 642.

ONCF (2011). <*http://www.oncf.ma/Index.aspx?ep=2,11/2011.*>

Simon, D. (1996). *Transport and development in the Third World*. Pp. 194. Routledge, New York.

Kaisa Kinnunen, Wilma Toljander & Mari Kovasin

URBAN PLANNING IN MOROCCO

Abstract

This case study examines urban planning system in Morocco. Most of the study is based on presentations and interviews of Moroccan urban planning professionals. The outcome of the study is that urban planning in Morocco needs more cooperation between different planning levels and more coordination and transparency in the decision-making process.

Introduction

Urban planning is a topical issue in today's Morocco because of the rapid growth of its cities. Morocco's cities experience the same challenges and problems as most growing cities in the developing countries, for example lack of efficient infrastructure and poor housing conditions. The reason for the rapid growth of the cities in developing countries is mostly rural-urban migration, where people from the rural areas move into cities to find jobs and better life. Presumably this is the case also in Morocco. Most of the expanding cities might have functional urban plans to answer to demand of cities growth, but it is another question whether these plans ever come true and get realized.

Although Islamic tradition rules over many of the North African cities, their forms also tell stories of the colonial times. Colonialism in Africa left its marks in the urban form of African cities and during the colonial period completely new cities were founded. Usually colonial cities were not developed as industrial centres, but instead to facilitate the extraction of commodities and to support the political-administrative system on which this extraction depended. The form of the colonial city also differed from the traditional Islamic city structure (Rakodi 1997). On our field trip to Morocco we observed the urban forms of some Moroccan cities and tried to examine the notable signs of a traditional Islamic city or a typical colonial city.

The main aim of our study is nonetheless to examine urban planning in today's Morocco. We carried out our research as a case study, in which we examined the urban planning of an old city, Marrakech, in comparison to a newer city, Errachidia. Before the field trip we tried to find some background information about the history of Morocco's urban planning. On the field trip our study areas were Errachidia in the southeast and Marrakech in the south of Morocco. Fieldwork methods were observation and interviews of urban planning professionals. Photographing worked mainly as visualization tool.

Background information – History of urban planning in Morocco

Morocco's city planning is strongly rooted in French colonial history. In the colonial period (1800–1945) Europeans used urban planning successfully to establish and maintain the colonial extractive system. Physical land use planning and urban design, which mainly concerned the arrangement of urban infrastructure and land use, dominated planning in that era. The physical environment of the colonies were planned to support the Europeans' trading networks and to secure suitable living environments for European colonial administrators, workers, and their households. European colonialists built port cities to collect and ship goods, for example Casablanca. They also built interior cities, for example Errachidia, to serve as military centers or collection points for regional resources. Infrastructure such as roads and railways were built to connect interior towns to port cities on the coast. Urban planning concentrated to maintain and serve European military personnel, administrators, business people, settlers, etc. The purpose of the city planning was to build segregated towns where European, higher-class quarters were separated from the rest of the city. Morocco offers a very typical example of this kind of city planning. European

new quarters were built separate from the old *medinas*, which stayed preserved as important urban cultural sites, and the European part of the cities utilized the most modern urban-planning techniques (Amirahmadi 2004).

Morocco was the last of the French colonies to be conquered and it was ruled as a protectorate since 1912. Morocco was divided into two separate protectorates, the Spanish part that was smaller and located in the north, and the French part that covered the rest of country in the south and the west. Morocco was under the leadership of General Hubert Lyautey who opposed the values of the European colony due to their racist and insular nature. Lyautey saw the reason to these unjust values in the structure of the colonial situation and in the French society. In those times colonies, like Morocco, constituted a kind of experimentation laboratories of colonial powers for testing new arts of government capable to bring a modern and healthy society into being (Rabinow, 1989: 32). Morocco stayed as a protectorate until 1956, when it became an independent kingdom.

France's first comprehensive experiments in urban planning took place in Morocco under Lyautey's leadership when he started to execute certain policies in Morocco. Lyautey and his supporters put into action a system for levying taxes, expropriating property and coordinating land use policies. In the year 1914, comprehensive urban planning legislation was implemented by decree in Morocco. In that legislation was set the principle for the separation of native cities from new cities. Lyautey established a juxtaposition of modern city planning over traditional Moroccan cities and their social hierarchies. The law also included a vast number of regulations related to width of streets, alignment of buildings, height, construction and architectural standards concerning color, style, and so on. In addition, all Moroccan cities were required to produce a *Plan Directeur.* Special expropriation legislation was implemented in 1914 that permitted Moroccan expropriation by zones. Important institutes were established to expropriate property for the public good. The goal of these acts was the creation of "islands of modern civilization" (Rabinow, 1989: 32–34) In Casablanca, the city itself was divided into three sections. There was the bourgeois section with the administrative headquarters, port officials, commercial houses etc. for Europeans, the *mellah* Jewish quarter and the *Tnaker* for the poorest inhabitants. Casablanca was highly distinctive for its rich mixture of inhabitants. People constantly ignored any attempts at spatial segregation, whether defined in religious, racial, ethnic or class terms (Rabinow, 1989: 37)

Study areas and research questions

Because the destinations of our field trip were decided beforehand, we chose to do our fieldwork in two cities: Errachidia, which is a newer and smaller one, and Marrakech, which is much bigger and older. Marrakech is located in mid-southwestern region of Marrakach–Tensift–Al-Haouz, and it is the economic capital of the region. Marrakech is one of the largest city in Morocco with approximately 1 000 000 inhabitant (The World Factbook 2011). In Marrakech there are both old and new neighborhoods, but the city is best-known for its old town, *medina*, and the main market square called Djemaa el Fna, which is also inscribed in 2008 UNESCO's "Masterpiece of the Oral and Intangible Heritage of Humanity" (Wright 2011). The old town of Marrakech is a typical Moroccan "medina" with rambling and narrow streets. In Marrakech we mainly observed the medina and Djemaa el Fna. The city of Errachidia is located in the southeast of Meknès-Tafilalet region, in the province of Errahidia. In Errachidia our field work was concentrated on different parts of the city in order to get a general overview of the city.

The aim of our study is to find out answers to the following questions: What kind of urban planning system is there in Morocco, and on which levels (national, regional, local)? What kind of problems and challenges are there in urban planning and how are these problems tackled? Finally, what are the future strategies of urban planning?

Methods

Interviews with professionals of urban planning in Errachidia and Marrakech played a crucial part in our fieldwork. We used both structured and unstructured questions in our interviews in order to have broader data for the study. Our interviews were quite complicated, because of the translation problems. We had to use an interpreter to translate our English questions to the interviewees in French, and again to get the French answers translated into English. This was problematic, because none of us speaks English as her/his first language and misunderstandings could easily take place.

Another important fieldwork method was observation. Observation is a traditional qualitative research method where researcher works her/himself as her/his own research tool (Tervo 2009: 24). Observation is a good way to get direct information of individuals', groups' or organizations' behavior and action. Observation can focus on an event, a behavior or in a physical object. In our fieldwork we focused on physical objects like the market square, and on peoples' behavior on that area. Observation can be divided into two groups: participant and non-participant observation. In

participant observation, the researcher has got an active role in observation and is usually part of the group he/she observes. In non-participant observation the researcher in not part of the group he/she observes. Researcher observes the area or the people as an outsider, so that the existence of the researcher does not affect the way people behave and act (Saaranen-Kauppinen & Puusniekka, 2006).

Our observation method was mostly based on non-participant observation, and we observed the area outwardly without interrupting the people. Public places, for example cities' main market squares, were our main targets when doing our research on the field. We focused on how people used the place and what kind of people there were. The idea was to examine how public is the public place really, or whether the public places are dominated by certain groups of people. We also observed the shape and the size of the places and the way that the transportation was organized in the area. The structure and the style of the buildings are also very interesting points when trying to make observations on how the city planning materializes in different cities.

Photography is a commonly used method in geography to visualize different phenomena in landscapes. The role of photos is significant because visual representation of an object is much more illustrative than a written text (Tervo 2009: 35–36). In our fieldwork photographs support the research mainly as a visualization tool.

Fieldwork

Our fieldwork took place in two cities: first in Errachidia and after that in Marrakech. In Errachidia we did our observation with our translator Mourad Saraoui on the 25th of October 2011. We walked around the city and visited for example the older part of Errachidia, a neighborhood called Targa. Then we visited the administrative area, where the governor's house and other administrative buildings were located. We also saw the transport station and two market places, the council's market place and a public market, which have a central role in people's everyday lives. Saraoui told us basic information about the places we visited, which was very useful concerning our study. In Errachidia we also visited the Agency of Urban planning in Errachidia (Agence Urbaine d'Errachidia). There Said Boulmani presented urban planning in Errachidia, Meknes-Tafilat area, and more broadly in Morocco. We also had possibility to ask the urban authorities questions about city planning.

The second city where we did our fieldwork in was Marrakech, on the 1st of November 2011. In Marrakech we heard a presentation from professor Mohammed Ait Hassou from the University of Marrakech. He told about urban planning in Marrakech and about the future city plans (Croissance urbaine de Marrakech: Diagnostic, perspectives et Scénarios de développement). After the presentation we had a tour around the city with professor Ait Hassou

and we went to the highest peak of Marrakech, where we saw a panoramic view of the city. At the top of the hill we interviewed the professor Ait Hassou to get more specific information about city planning generally in Morocco, but also from Marrakech area, in particular.

Results

There seems to be very little information and previous studies in English about urban planning in Morocco today, and we did have problems to find out reliable information about urban planning especially on Errachidia region before our field trip. That is why the interviews with the urban planning experts had a crucial part to answering our research questions. Before the field trip we tought that observing would be the main method which we would use in our case study, but in the end observing played quite a small role in our study.

For us the biggest challenge in this study was the language barrier, which limited everything, because almost all literature, studies and information is only in French and during the field trip all communication with the Moroccan urban planning experts took place in French too. Luckily we had translators along the way, because without them we could not carry through our fieldwork. To study more closely Morocco's urban planning, it would be essential to speak French and have good connections to urban planners in Morocco.

Observing Errachidia and Marrakech

In Errachidia we took a walk around the city with our translator Mourad Saraoui. Fortunately Errachidia is Saraoui's home town so he had a lot of information about the town and its surrounding areas. According to Saraoui (2011) there are huge differences between neighbourhoods in Errachidia, especially in maintenance and in the condition of the infrastructure and the buildings. We started our walking tour from the oldest and the poorest neighbourhood of Errachidia, Targa (figure 1).

Figure 1. Neighbourhood of Targa in Errachidia (Wilma Toljander 2011).

The area mostly consist of two-storey high buildings made of palm and mixture of clay and straw. Most of the houses in the neighbourhood do not have electricity or water supply and sewerage. Although the standard of living in Targa is low according to

today's standards, the area is protected and must be preserved because the neighborhood is a valuable example of Errachidia's history. So in a sense, Targa is an example of attemps to protect historical buildings.

After Targa we headed to the administrative area of Errachidia. The contrast between these two districts is obvious. The wide main street of Errachidia runs through administrative area which is overall well maintained (figure 2). The atmosphere in this area is quite different compared to the vivid market place nearby. At the daytime the streets are empty and only few cars and pedestrians are in sight. Obviously everyday life of ordinary people takes place in some other parts of the city than here.

Figure 2. Administrative area of Errachidia (Wilma Toljander 2011).

Figure 3. A street just next to market place of Errachidia (Wilma Toljander 2011).

The market place is the commercial heart of every Moroccan town and city. From the market place people buy their food, clothes and other necessary things. Errachidia's main market place has typical narrow passages, shops packed full of goods, and eager vendors. Just next to the Errachidia's market place there is a good sample of differences in the condition of Errachidia's infrastructure (figure 3). It seems to be common that the side streets are not that well maintained as the main streets, and even the infrastructure of the side streets might be just half way finished. Unfinished buildings and construction sites are also common sight around the city, despite the status of the neighborhoods. After visiting Errachidia, we would describe it as a laidback town which was originally built to serve military needs, but nowadays has a function as a passage place in the crossroads of the South Morocco's main roads.

Marrakech, also known as the Red City, is a city which has a long history as a vivid commerce center. Atmosphere in Marrakech is busy, crowded and chaotic. In Marrakech we walked around the *medina* and the

Figure 4. Panoramic view of city of Marrakech (Wilma Toljander 2011).

world famous market square Djemaa el Fna. Morocco is an Islamic country, and there are examples of some typical forms of Islamic city in the Marrakech's oldest part, *medina*. For example, the public street network of traditional Islamic city is reduced to the minimum required to provide connections between the main city gates and the central markets and to ensure the selective accessibility to private quarters (Bianca 2000: 39) and this is also seen in the medina of Marrakech.

We had a little tour by bus around Marrakech and saw some suburbs and the protected area of palm trees, which forms a greenbelt for the city. From the top of the highest hill of Marrakech we could see the city's urban sprawl on the surrounding plain (figure 4). All in all, Marrakech is a fine example of an African city where the old city and the new suburbs merge into a lively and colorful complex.

Urban planning system in Morocco

Morocco's urban planning system is divided into different levels. Urban planning system is coordinated by the Ministry of housing and urban planning at the national level. Urban planning strategies are divided into different documents for different planning levels. The first, Srat document, provides

principles for the whole country's development and its main principles are effective economy, social equality and sustainable development. The second document is more focused on co-operation and on specific projects for particular regions. At the regional level urban planning is coordinated by urban planning agencies. For example in Errachidia the agency of urban planning is responsible for planning the whole Meknès-Tafilalet area, but also for planning of city of Errachidia. Urban planning agency also plans the rural areas on the Meknès-Tafilalet region (Boulmani 2011).

Challenges and problems in urban planning

Although the urban planning professionals who we interviewed did not point out clearly the problems in Moroccan urban planning system, we could read between lines the challenges, which are current and need solutions. It is quite clear that the urban planning system, from national to local level, seems to suffer from lack of proper coordination and master planning. There are a lot of plans for different land use projects, but in the end only few of them will be carried out and finished. Rural-urban migration and tourism are causing challenges also to urban planning, especially in the sense of sustainable development.

Future of urban planning in Morocco

Future plans in Morocco's urban planning are various and vary regionally. It has been noticed that systematic land use planning is a valuable function in order to develop areas sustainably. It is clear that in the future more attention should be paid to urban planning issues in every region of Morocco. The levels of coordinating land use planning policies are diverse in different regions, which makes comparison between areas more challenging.

In Errachidia the general aim in the near future is to strengthen urban planning functions and to enhance comprehensive planning practices. In the city area there is need for updating the land use plan, since the latest plan has been made in the 1990s. In the future environmental issues will need to be considered more carefully in Errachidia. According to the Urban Agency of Errachidia, the importance of these questions is noticed, and environmental assessments will be made more intensively in the big projects in the future. For example the environmental effects of a future airport will be assessed. In the Errachidia region, tourism has grown in significance in shaping the future of the area. For example strong investments have been made in desert tourism in the Merzouga dune area and the palm valley area of the Ziz. Tourism is the fastest growing business sector that creates working places to local people and that brings money

to Errachidia and its surroundings. Tourism creates many opportunities but it also brings challenges to the urban planning system. That is why urban planning will pay special attention to the needs of tourism development in the forthcoming years by constituting good possibilities to develop tourism (Boulmani 2011).

In Marrakech tourism is also a growing business that is taken into account in urban planning as well. The areas surrounding the city center are increasingly tourism-oriented, for example vast golf resorts. Marrakech city center, the old *medina*, is another target area of development. Vision 2030 for the *medina* is striven for more cultural and historical presence and lower density of population. Nowadays the *medina* suffers from too compact housing and social and environmental problems. In Marrakech the latest urban plan dates to 1995, so the need for a new comprehensive plan exists. Marrakech is changing into a more multipolar city model from one-centric city. Suburb areas are growing, which leads to the emergence of new sub-centers. The purpose is to create a city where there are areas with different functions (Ait Hassou 2011).

Discussion and conclusions

The development of urban planning practices plays a central role in Morocco today and in the near future. Rapid growth of Moroccan cities and migration from rural areas to towns and cities creates a huge pressure to develop land use policies oriented towards more sustainable practices. Moroccan urban planning practices suffer from many deficiencies such as the absence of comprehensive land use plans that include main regulations for different land use forms. One of the big problems seems to also be the lack of cooperation between the different planning levels in Morocco. Local planning agencies should have more information from the ministry of common planning systems, for example what are the future transportation plans in the country as a whole and on regional levels. Better cooperation and transparency in decision-making process would probably ensure more functional outcomes.

Although we did visit only two cities and took a closer look at urban planning in these two areas, it became clear that Moroccan urban planners face many challenges in their work. Morocco's public administration is a very complex system and it seems that there is not an exhaustive master plan on any level, the regional or local. And if some plans exist, they are not put into practice. This is a good example of an ineffective coordination of a planning system in general, where a lot of plans are made but their implementation is often uncertain in the end. So for a conclusion, Moroccan urban planning system has to increase its effectiveness of planning both in the master plans and in the details, at the local level, and

make plans that can be carried out.

For us the study of Moroccan urban planning system ends here, but there are many interesting issues to continue the research. There would be especially need for an exhaustive survey of the different levels of Moroccan urban planning system that would also address the question of how these levels cooperate and overlap. Another thing which needs to be examined more closely, is the cooperation between urban planning and other actors involved in land use planning and developing, because their integration will be more likely the key element in the future of Moroccan urban planning.

References

Ait Hassou, M. (2011). Croissance urbaine de Marrakech: Diagnostic, perspectives et Scénarios de developpement. Presentation and interview. Marrakech, Morocco. 1.11.2011.

Amirahmadi, H. (2004). Effect on city organization of colonialism and petroleum wealth. *In* Mattar, P. (ed.): *Encyclopedia of the Modern Middle East and North Africa*. MacMillan, USA.

Bianca, S. (2000). *Urban form in the Arab world: past and present*. Pp. 347. Thames & Hudson, London.

Boulmani, S. (2011). Presentation and interview in Agence Urbaine d'Errachidia. Errachidia, Morocco. 27.10.2011.

CIA (2011). *The World factbook*. 14.10.2011, <*https://www.cia.gov/library/publications/the-world-factbook/*>

Rabinow, P. (1989). Governing Morocco: modernity and difference. *International journal of urban and regional research* 13: 1, 32–46.

Rakodi, C. (1997). Global forces, urban change, and urban management in Africa. *In* Rakodi, C. (ed.): *The urban challenge in Africa: Growth and management of its large cities*, 17–73. United Nations University Press, Tokyo.

Saarinen-Kauppinen, A. & A. Puusniekka (2006). *KvaliMOTV –Menetelmäopetuksen tietovaranto. Yhteiskuntatieteellinen tietoarkisto, Tampere*. 13.10.2011, <*http://www.fsd.uta.fi/menetelmaopetus/*>

Saraoui, M. (2011). Interview in Errachidia, Morocco. 25.10.2011.

Tervo, M. (2009). *Kvalitatiiviset menetelmät*. Pp. 43. Oulun yliopisto, Oulu

Wright, J. (2011). *The cultural space of Jemaa el-Fna square. Unesco*. 14.10.2011, <*http://www.unesco.org/culture/ich/en/RL/00014*>

Ira Lahovuo & Minna Nuutinen

THE SOCIO-ECONOMIC IMPACTS OF HERITAGE TOURISM IN MOROCCO

Abstract

This paper examines the heritage tourism supply and its socio-economic impacts in Morocco through case studies in the province of Errachidia and on UNESCO's World Heritage sites. Our study methods are thematic interviews and observations on the heritage tourism sites on the field.

Introduction

The aim of the study is to find out the socio-economic impacts of heritage tourism by using thematic interviews and observations in the chosen study sites: Errachidia, Marrakech, Essaouira and the Ksar of Ait Ben Haddou. Sites that are on the UNESCO's World Heritage List are officially classified as heritage tourism sites. The World Heritage Convention was founded in 1972. Its mission is to encourage the recognition and protection of sites of outstanding universal value to humanity that include both cultural and natural heritage (UNESCO World Heritage Centre 1992-2011e). In order to get a more comprehensive view of the heritage tourism in Morocco the province of Errachidia is included as a complementary case study.

In Morocco, the National Tourism Strategy 2020 aims to increase tourist arrivals. One of its five core components is heritage tourism (Laabab 2011b). The heritage tourism sites in Morocco are mainly cultural sites with architectural or archaeological value (UNESCO World Heritage Centre 1992-2011c). Many of them are hundreds of years old and have several historical layers. They also show the influence of different cultures during different periods. The UNESCO's World Heritage Centre has defined eight cultural sites in Morocco that are on the World Heritage List (UNESCO World Heritage Centre 1992-2011c). These sites measure up at least one of the criterions that UNESCO World Heritage Centre has defined for sites of world heritage (UNESCO World Heritage Centre 1992-2011d).

Errachidia

Errachidia belongs to the Meknès-Tafilalet region and is situated in the central Morocco close to the Algerian border. The province of Errachidia is a transit destination with its 109 543 tourist arrivals and the average stay of a little bit more than one night. The accommodation capacity is 6 400 beds. In 2010, the arrivals increased 21 percent from 2009. This statistic includes only the classified accommodations, which makes it less reliable (Laabab 2011b).

In the action plan of Errachidia's tourism program, heritage tourism is important even though the main attractions represent natural heritage (Laabab 2011b). The cultural heritage sites of Errachidia include the historical towns of Rissani and Aoufousse, the ruins of Sijilmassa, architectural heritage and the long rich history (Laabab 2011b). The movie industry is an important part of the tourism sector in Errachidia and represents more contemporary heritage. The Gnawa and Berber cultures offer a lot of potential considering the intangible heritage. The agricultural heritage is represented at the dates festival.

Ecotourism plays a significant role in the tourism development of Errachidia. The environment is vulnerable; the water shortage and other environmental problems raise the concern for a more sustainable use of the environment. The idea of the Sustainable Territorial Development Program of Tafilalet Oasis is to protect the oasian heritage and nature by introducing tourism products enhancing this goal. The main product is Majhoul Road, which is initiated to create the area a specific image and to enhance the ecotourism efforts (Baddou 2011; Programme Oasis Tafilalet 2011: 62).

Marrakech

Marrakech is the fourth biggest city and the biggest tourism destination of Morocco in terms of bed capacity that was 44 394 beds in 2008 (Administration du tourisme 2011; Ait-Hassou 2011). The medina of Marrakech was listed in 1985 to

Figure 1. The Jemaa el Fna Square is the heart of the Medina in Marrakech (Lahovuo 2011).

Figure 2. Housing in the state of degradation in the Mellah of Essaouira (Lahovuo 2011).

UNESCO's World Heritage List because of its exceptional character as a fully preserved historical town. The committee recommended the protection of the facades and the gardens in the medina (UNESCO World Heritage Centre 1992-2011a). In 2003, the Convention for the Intangible Cultural Heritage of Humanity was set up (Tebbaa & Skounti 2011: 45). The Jemaa el Fna Square (figure 1) was inscribed in 2008 on the representative list (UNESCO 1995-2011). The Square has been the heart of Marrakech for hundreds of years. It brings together the linguistic and cultural elements that form the identity of the city (Tebbaa & Skounti 2011: 58).

Essaouira

Essaouira is a fortified seaport town that was built in the mid-18th century (UNESCO World Heritage Centre 1992-2011f). The medina of the town was listed to UNESCO's World Heritage List in 2001 because the architecture of the town is outstanding and well preserved. The architecture combines the North African and Arab-Muslim style to the European military architecture. Over the centuries, Essaouira has been an important trading seaport between Morocco and Europe.

Essaouira is also a multicultural town because there are various ethnic and religious groups (UNESCO World Heritage Centre 1992-2011f). The Jewish quarter is called the Mellah

(figure 2). Many houses in the Mellah have collapsed because of the waves from the nearby sea in 1994–1995 (Ramou 2011b). Some parts of the Mellah have already been restored but it is said that some houses cannot be renovated because Jews families, who moved to Israel during 1980–1990, still own the houses. Some Jews have come back to Essaouira.

Ait Ben Haddou

Ait Ben Haddou (figure 3) is located in the Ouarzazate province on the southern slopes of the High Atlas. The ksar of Ait Ben Haddou was listed as a World Heritage site in 1987. Ait Ben Haddou was founded in the 11th century as a roadside inn along the commercial route from Sahara to Europe and is a good example of southern Moroccan architecture that illustrates the main types of construction in the valleys of Dra, Dades, Todgha and Souss dating back to the 17th century (Iken 2011b; UNESCO World Heritage Centre 1992-2011b).

The ksar refers to a fortified village that is home to several families. There are still eight to nine families living in Ait Ben Haddou (Iken 2011b). The Ksar has preserved its architectural authenticity and the conservation works follow the original methods and materials (UNESCO World Heritage Centre 1992-2011b). UNESCO pays for the restoration of the buildings' outside walls to maintain the general look of the Ksar. The inhabitants are responsible for the restoration inside the buildings (Iken 2011b).

Figure 3. The Ksar of Ait Ben Haddou (Lahovuo 2011).

Materials and methods

The study is based on thematic interviews and field observations. The tourism officials interviewed were Majid Laabab, a provincial tourism representative of the Ministry of Tourism (25.10.2011), and Mohamed Baddou representing the Sustainable Territorial Development Program of the Tafilalet Oasis (25.10.2011). The other interviews were done with professor Hassan Ramou from the University of Mohammed V Souissi (1.11. and 13.12.2011) and Ayoub Iken, a tourist guide in Ait Ben-Haddou (30.10.2011). Most of the information considering the heritage tourism supply is received from the interviewees. The field observations were done on the World Heritage sites we visited, and along Majhoul Road in the Errachidia region. These observations complement the information we got form the interviews.

Analysis of the impacts

Errachidia

The economic impact of the tourism industry in Morocco is considerable. In the rural setting, unemployment is a big problem and young people are moving to cities. This is also the case in Errachidia where tourism is one of the only opportunities for people to make a living or to improve their living standards. Locals have put up enterprises to offer services for tourists. In the province of Errachidia, there are 3 travel agencies, 159 transport licenses for four wheel drives, busses etc., 38 official guides and 45 classified and 103 non-classified accommodation (Laabab 2011b).

Figure 4. The ruins of Sijilmassa (Nuutinen 2011).

There has been an increase in the tourist arrivals in Errachidia but it still remains as a transit area. Tourists stay on average for one night in Errachidia before continuing to the desert in Merzouga or the Valleys in the South. The national tourism strategies aim to increase the number of visitors and the authorities of Errachidia want the city to get its share from this increase (Laabab 2011b). Even though Errachidia might have attractions and services, there is not enough information on it to attract more tourism. The tourist guidebooks tell about Sijilmassa ruins (figure 4) but when we visited the ruins there weren't any signs to guide the tourists

to the site from the main street, let alone information boards telling about the history of the place.

Tourism is often seen as a solution to the socio-economic problems of the rural communities (Gilbert 2006). Besides the revenues it brings, tourism increases the locals' awareness of their own identity and the need to protect the heritage. The local involvement and participation in conservation efforts increases. Nonetheless, all the impacts of tourism are not positive. Cultural commodification, outflow of revenues, seasonality, contested land use etc. are some of the downsides (Cooper *et al.* 2008; Gilbert 2006).

In the local tourism action plan, one of the components is to increase the value of heritage (Laabab 2011b). In the interview, Laabab says that that for example the Ksars of Oulad Abdelhalim and Abuham in Errachidia would have universal value, but they are in a rather bad condition and need restoration. He says that UNESCO's status would increase the number of visitors and help in the promotion of the sites, but applying for the status is a long procedure and the restoration of the ksars requires a lot of funds (Laabab 2011a). In general, the heritage sites in Errachidia are more of a natural or immaterial nature. The city of Errachidia is a French garrison city founded in the 20th century and does not offer much to see. In the surrounding region, there are sites like the Ziz River Valley with its palmeraie and date farms that represent the agricultural heritage of the area.

There is no exact data on how many people work in tourism and how much money does tourism bring to the economy of the region. Both Baddou and Laabab emphasize that the locals are pleased with tourism as it creates work opportunities (Baddou 2011, Laabab 2011b). The development project of Tafilalet Oasis uses a communal bottom-up approach to support the implementation of the tourism plans (Baddou 2011; Program Oasis Tafilalet 2011: 31). However, it did not become clear how people were involved. The need to protect the cultural heritage has been recognized and for example the Sustainable Territorial Development Program of Tafilalet Oasis aims to integrate ksours and kasbahs in the oasis tourism and to develop handicrafts (Program Oasis Tafilalet 2011: 29).

Marrakech

Marrakech is a weekend trip destination for Moroccans but also a cultural tourism destination (Ramou 2011a). The UNESCO's status has not affected tourism in the city but it helps to promote the city as a tourism destination. The UNESCO's status is mentioned more and more often in tourist guides and on websites. There is also a plaque of UNESCO on the Jemaa el Fna Square (figure 5). The tourism markets of Marrakech have become wider; Australia, Russia, China and Japan are the new targets for tourism marketing. There are also

an increasing number of guesthouses in Marrakech but it is difficult to say whether this is a result of the UNESCO's status or not. UNESCO supports the restoration works in Marrakech and the principal aim is to protect the historical monuments (Ait-Hassou 2011). Some big corporations have also done investments that have an economic impact in the city.

Figure 5. The plaque of UNESCO on the Jemaa el Fna Square (Nuutinen 2011). On the plaque it says: "This plaque commemorates: The universal recognition of the exceptional richness of the square and the symbolism it represents."

Before joining the UNESCO's World Heritage List the medina was abandoned by the elite and highly marginalized as a place to live for those who did not have any other choice. After the listing in 1985 the medina started to gain inhabitants again and especially foreign inhabitants invested in it in order to live their oriental dream (Tebbaa & Skounti 2011: 59). Tebbaa and Skounti (2011: 63) argue that the nomination has led to the accelerating gentrification of the medina. It is said that soon the intangible heritage of the medina is only an object of monetary aspirations. The new status has helped to improve the built surroundings of the medina, but the immaterial aspects have not gained in quality (Tebbaa & Skounti 2011: 61). Tourism has brought employment to the area but it has also led to an oversupply of workers because of lack of control (Ait-Hassou 2011). Tour operators profit the most from tourism but the money filters into foreign countries.

The status has also brought problems and at the present there are conflicts between different groups (Ramou 2011a). Conflicts arise especially between the association of performers and other performers on Jemaa El Fna. The status has not improved the quality of cultural activities on the square that has become an open-air restaurant. As a consequence, some performers are asking whether the UNESCO's status is really beneficial. Also the status as a site of intangible cultural heritage is being criticized. Tebbaa and Skounti (2011: 58) argue that there are no measures or programs to identify or protect the forms of cultural expression that takes place on the square.

Essaouira

According to Ramou (2011b), the tourism industry has increased in the medina of Essaouira after it got the UNESCO's status. The status has indirectly encouraged cultural

events and as a consequence the city of Essaouira has become a tourism destination for tourists who enjoy cultural activities such as classical music festivals (Ramou 2011a). However, Essaouira is also a destination for Moroccan summer tourists. The classification of the medina of Essaouira as a world heritage site has not affected the protection of the city because there were some restoration projects before the classification (Ramou 2011a). There has also been resettlement of the population in the Mellah. UNESCO has, however, helped to protect the medina against the impacts of the waves (Ramou 2011b).

Figure 6. A souvenir shop selling locally produced handicrafts (Nuutinen 2011).

Ait Ben Haddou

According to Ramou (2011a), Ait Ben Haddou and the movie industry give the best example of economic benefits arising from tourism though there are no precise statistics. The UNESCO World Heritage status in 1987 had an immediate effect in restoration efforts and tourism promotion, which multiplied the tourist flows. The increase in the number of visitors brought the movie industry to the region and movies like The Living Daylights by John Glen (1987) and The Last temptation of Christ by Martin Scorcese (1988) were filmed in Ait Ben Haddou. The movies served as an additional promotion and again tourism flows increased. Ait Ben Haddou is one of the most popular tourist attractions in Morocco (Ramou 2011a).

Before the restoration, Ait Ben Haddou was abandoned by the locals. After the influx of tourists, some families moved back to their Kasbahs and started to organize tours and services to the tourists. A conflict arose from the spatial dynamics of the Ksar: those located near the entrance benefited the most from the tourists (Ramou 2011a). The increased numbers of visitors have attracted also foreign investors and people from elsewhere in Morocco. Only 6 out of 25 shops sell local handicrafts (figure 6) and the locals are proposing that more traditional local handicrafts, like metallurgy, wooden locks and carpets, should be sold in the Ksar (Iken 2011b).

At the moment, a Spanish investor is building a massive hotel that can be seen from the Ksar (Iken

2011b). It is said that the hotel ruins the scenery. It is also common that the local inhabitants do not benefit from such foreign investments. Even if some families are still living in the Ksar there are no services for locals and they are highly dependent on Ouarzazate and on the new part of the town (Iken 2011b). Ait Ben Haddou reminded us more of a museum than someone's home village. There were no signs of everyday life in it and all the local people seemed to be working in tourism directly or indirectly.

According to a tourist guide Ayoub Iken (2011a) UNESCO does not play a visible role on the site. The office is in Ouarzazate. He says the status brings work for the locals and is good for tourism promotion. According to our observations, the locals offer a lot of small-scale tourism services like guiding, donkey rides and showing their homes to tourists. UNESCO takes part in the restoration funding. Iken says that the restoration efforts are good and for example a new set of stairs is built to the granary.

According to Iken (2011a) there have not been any official UNESCO visits to the site since 1987. Ait Ben Haddou is managed by a board of 12 locals that is changed every three months (Iken 2011b). Iken feels that the locals are not consulted in the development decisions. The restoration efforts follow a strict set of rules to protect the scenery but at the same time UNESCO allows the construction of a new hotel just next to the Ksar. According to UNESCO's World Heritage Centre (1992-2011b), there is a five-year management plan 2007–2012 that is a result of workshops and local participation. Also a local management committee is established. There is a contradiction between the official declaration and the perception of a local working in tourism. Finding the reasons for such a contradiction is out of the scope of this study, but there definitely seems to be a problem in informing the locals of the development decisions concerning Ait Ben Haddou.

Conclusions and discussion

There seems to be a serious lack of both quantitative and qualitative research of tourism in Morocco. The accurate data is crucial to analyze the risks of tourism development. It might be hard to track down all the effects of the tourism industry, but at least data from direct tourism impacts can be collected. According to Ramou (2011a), statistics on the economic impacts are rare, and the impacts of the UNESCO's World Heritage classification are especially hard to estimate. The intangible aspects of the heritage need to be addressed in order to protect them and not to lose them when aiming for more economic benefits.

According to our experience, tourism has a big employment impact in Morocco. It seems that the UNESCO's status among other factors

has resulted in the increased number of visitors. One positive impact of the status is its advertising value (Ramou 2011a). That may lead to wider tourism markets as in Marrakech that nowadays attracts Australian and Chinese tourists, among others. In the rural setting, tourism offers one of the only viable sources of living. All in all, the benefits of the UNESCO's status are the publicity and marketing of the sites, development of the tourism sector, money for the restoration and studies (Ramou 2011b).

The status does not always have a positive impact on local society. Instead, it might indirectly lead to conflicts between interest groups like in Ait Ben Haddou or Marrakech. UNESCO does not always help to restore the sites, either, and according to Ramou (2011b), most of the sites do not represent the local culture. In addition, the locals might not benefit from tourism if they are not involved in tourism activities or if the businesses are owned by outsiders. The problem of UNESCO lies in the huge size of the organization. It seems that the local aspects have been tramped down as the main playground is global. It is important to take the grassroots level into consideration when aiming for a sustainable future development.

References

Administration du tourisme (2011). *Tourisme en chiffres – capacité d'hébergement*. 25.12.2011, <*http://www.tourisme.gov.ma/francais/5-Tourisme-chiffres/CapaciteHoteliere.htm*>

Ait-Hassou, Mohamed (2011). Professor of urban planning, University of Marrakesh. Oral communication. 1.11.2011.

Baddou, Mohamed (2011). Project coordinator. Oral communication in Errachidia, Morocco. 25.10.2011.

Cooper, Chris, John Fletcher, David Gilbert, Alan Fyall & Stephen Wanhill (2008). *Tourism. Principles and Practice.* 4th edition. Pearson Education, Harlow.

Gilbert, Susan (2006). Finding a balance: Heritage and tourism in Australian rural communities. *Rural Society* 16: 2, 186–198.

Iken, Ayoub (2011a). Tourist guide. Interview in Ait Ben-Haddou, Morocco. 30.10.2011.

Iken, Ayoub (2011b). Tourist guide. Oral communication on a tour in Ait Ben-Haddou, Morocco. 30.10.2011.

Laabab, Majid (2011a). Provincial representative of the Ministry of Tourism. Interview in Errachidia, Morocco. 25.10.2011.

Laabab, Majid (2011b). Provincial representative of the Ministry of Tourism. Presentation on Errachidia's tourism. 25.10.2011.

Program Oasis Tafilalet (2011). *The Oasis Tafilalet revalorizing an area of unique life with a high heritage value*. Pp. 64.

Ramou, Hassan <ramou_h@hotmail.fr> (2011a). Professor in the institute of African Studies, researcher, University of Mohammed V Souissi. Interview by e-mail. 13.12.2011.
Ramou, Hassan (2011b). Professor in the institute of African Studies, researcher, University of Mohammed V Souissi. Oral communication. 2.11.2011.
Tebbaa, Ouidad & Ahmed Skounti (2011). Patrimoine mondial et patrimoine culturel immatérial, le problème de la double reconnaissance de l'UNESCO : cas de Marrakesh. *In* Skounti, Ahmed & Ouidad Tebbaa (eds.): *De l'immatérialité du patrimoine culturel*, 45–65. Universite Cadi Ayyad, Marrakesh.
UNESCO (1995-2011). *The cultural space of Jemaa el-Fna Square*. 8.1.2011, <*http://www.unesco.org/culture/ich/index.php?lg=en&pg=00011&RL=00014*>
UNESCO World Heritage Centre (1992-2011a). *Decision - 09COM X.A - Inscription: The Medina of Marrakesh (Morocco)*. 27.12.2011, <*http://whc.unesco.org/en/decisions/3854*>
UNESCO World Heritage Centre (1992-2011b). *Ksar of Ait-Ben-Haddou*. 26.12.2011, <*http://whc.unesco.org/en/list/444*>
UNESCO World Heritage Centre (1992-2011c). *Morocco*. 4.10.2011, <*http://whc.unesco.org/en/statesparties/ma*>
UNESCO World Heritage Centre (1992-2011d). *The criteria for selection*. 11.10.2011, <*http://whc.unesco.org/en/criteria/*>
UNESCO World Heritage Centre (1992-2011e). *World Heritage*. 27.12.2011, <*http://whc.unesco.org/en/about/*>
UNESCO World Heritage Centre (1992-2011f). *Medina of Essaouira*. 31.12.2011, <*http://whc.unesco.org/en/list/753*>

Appendix 1. The general frame of interview questions

1. What kind of positive/negative impacts does heritage tourism or the World Heritage status introduce?
    - economic impacts
    - social impacts
2. Are there any statistics on the economic impacts?
3. In case the site has the World Heritage status, what are the impacts of it?
4. Are there any other potential sites in Morocco that should be on the UNESCO's World Heritage list (in addition to those on the tentative list)?

Ossi Ahonen & Petri Hård

TOURISM SERVICES IN ERRACHIDIA: SUPPLY AND LOCATION

Abstract

In this study we wanted to find out what kind of tourism services there are in Errachidia area and thus what kind of tourism there exists, and what are the future prospects for tourism in the area. Before the field trip we gathered some background information of tourism in Morocco by reading articles and publications we had found in the internet. In the field we interviewed local professionals about our themes and did some observing. We had to keep in mind the characteristics of the dry area and how that affects the possibilities for tourism development as Morocco has suffered from droughts since the 1980s. We found out that tourism is concentrated in the rural areas and the city of Errachidia is not a very popular destination among tourists. We also paid attention to sustainability of tourism and found out that it was a very important part of tourism strategy of the area. The positive attitude towards tourism and friendliness of Moroccan people are a good starting point for tourism development in the area. The major attractions are based on the natural specialties of the area such as sand dunes, oases and gorges. Also cultural destinations exist in the area. Some of them suffer from deterioration as they sometimes have not been preserved well enough. Cultural and heritage tourism are one of the main targets for development, as well as increasing bed capacity. Also cinematic tourism is important as there is a site in the area where many Hollywood movies have been shot. Many development projects still concern nature-based attractions.

Introduction

The main themes of this study are evaluating the current tourism services of the Errachidia area, Morocco, and think of ways they could be developed in the future. Tourism is an effective way to the financial development of a rather poor area as increasing tourism also increases revenues, which means that our themes are important for the overall development of Errachidia area. Tourism should not however be developed at any cost as uncontrolled tourism growth leads to serious environmental and social problems. It means that we should also think about sustainable ways to increase tourism in the area. We have interviewed local specialists and we will analyze the situation based on facts we have found out.

Background

Moroccan tourism

Morocco does not have important natural resources such as oil so its economy is mainly based on agriculture and industry, which do not create enough revenues for development (Rachidi *et al.* 2006). That means Morocco has been under pressure of finding new ways to gain additional revenues. Morocco is a country with a good location near European markets, pleasant climate, natural attractions and a long history which makes it a suitable destination for large number of tourists.

Morocco has adopted politics on strengthening its tourism industry. In 2001 King Mohammed VI started *Vision 2010* -program to boost tourist

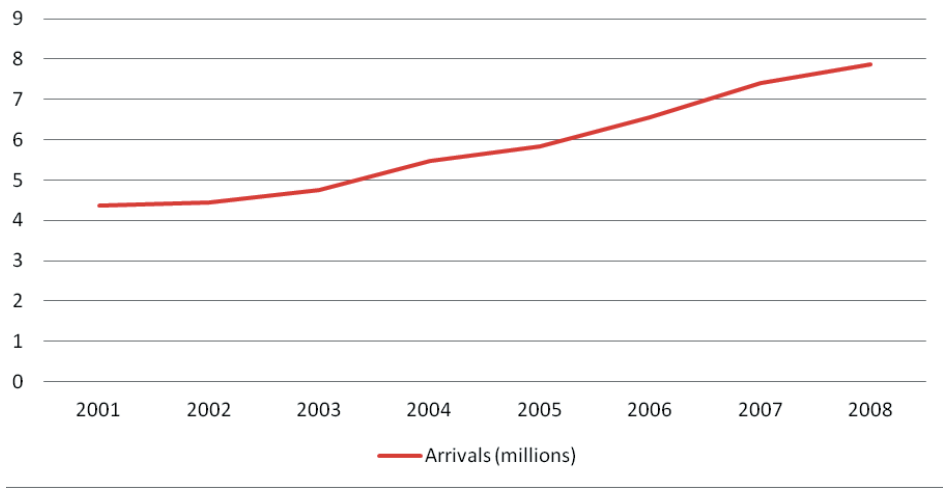


Figure 1. Tourism arrivals to Morocco including Moroccans living abroad.

arrivals from 2 million to 10 million (Tourism Morocco… 2010). Growth in number of arrivals was relatively low during the first years of the program but it accelerated towards the end of the decade. Between 2006 and 2007, the number of arrivals increased by about 850 000. In 2008 almost 7.9 million tourists arrived in Morocco (see figure 1). Almost half of the arrivals were Moroccans living abroad. Clearly the largest groups of foreign tourists were the French which may be explained by language and common history.

After good experiences from the *Vision 2010* -program the country now has its *Vision 2020* -program with main goal on making Morocco one of the top ten tourism destinations in the world by investing 177 billion dirhams (15.8 billion euros) to tourism sector, creating 147 000 new jobs and double the tourism arrivals (AZD Morocco 2011). The former project concentrated on development of six seaside resorts but the *Vision 2020* also adds other tourism locations like "Central Morocco" or "Atlas and valleys" which are more relevant for our study.

Research area

Our research area is the Province of Errachidia (and especially its main city Errachidia) which is located in Meknes-Tafilalet region in Eastern Morocco. The province has approximately 556 612 inhabitants, 195 440 of which live in urban areas and 361 172 in rural areas. The area of the Province of Errachidia is 42 852 square kilometers and 58.1 % of the population lives in Tafilalet region. The city of Errachidia has a population of about 80 000 depending on the source. Principal business in the area is agriculture, and irrigated land area is 53 350 Ha. (Ichir 2011). Infrastructure in the province is mainly good. Almost 100 percent of the inhabitants have access to electricity. Access to drinkable water is good in urban areas but 15 percent of the rural inhabitants have inadequate access to it. Telecommunications are good in urban areas but in rural areas 85 percent of the inhabitants have access to telephone network and only 70 percent have access to GSM network. The province has an international airport (My Ali Serif) and the tourism industry is growing. There are both cultural (historical monuments and festivals) and physical (oases and mountains) attractions for the tourists in the area (Province d´Errachidia 2011).

Some of the biggest problems in the region are desertification and droughts that have been plaguing the region since 1980s. Also the land heritage system causes problems. When the generation changes in a farm, the land is divided into smaller parts between the heirs. This causes problems in developing the farms. There is a problem with waste management as well. The standard of living has increased but waste management has not evolved equally fast. The government has responded to environmental problems by setting

a certain standard for the state of environment. (Ichir 2011.)

The water of the area comes from the mountains. At the moment there is enough drinking water in the city of Errachidia but the situation is more difficult in southern rural areas. Climate change should not affect the area too badly in the future as climatic zones are expected to remain as they are in the region. (Ichir 2011.)

Rural tourism

Tourism in Errachidia area can mainly be defined as rural tourism. Wilson *et al.* (2001) state that one of the main advantages about rural tourism is that its development is not necessarily dependent on external agents or companies. Rural tourism also develops two kinds of enterprises. First it creates primary facilities (like hotels and restaurants) and then it creates secondary facilities (stores, gasoline stations etc.). It is heavily based on local communities and therefore its main concern is how to best maintain community approach. Local governments are largely responsible for the infrastructure, marketing, etc. being in a good form. The problem in rural tourism is that actors in nearby areas easily start to compete against each other (Wilson *et al.* 2001). One solution for the problem could be specific tourist routes that connect for example roads or areas to work for a common goal (joint marketing etc.). Briedenhann & Wickens (2003) have studied rural tourism routes in South Africa and the role of these as a development strategy for the areas and communities. They claim that traditional mass tourism has evolved in last decades into more individualistic patterns which is a good thing for rural tourism. Following Greffe (1994) they argue that this individualism gives a unique opportunity for rural operators to manage in terms of "economies of scope" by establishing networks of different service providers, organized in such a way as to maximize opportunity and offer a diverse range of activities. Moroccan mountainous and arid areas are also very vulnerable environments so their capacity for centered mass tourism is very limited. Briedenhann & Wickens (2003) mention that achieving genuine community participation is a great task when participants do not always mean same thing with the term "tourism development".

One must also notice that tourism development in rural areas is not autonomous. If the area had been more favorable to economic development it would have already started to develop on its own. Therefore peripheral area and its actors need external regulation, management and financial support (Kagermeier 2003). Kagermeier further remarks that external support must take into consideration the fact that markets in rural tourism are not only international; local demand must likewise be included in planning. These factors were identified in Kagermeiers study in Ouarzazate which is neighboring region and very comparable to Tafilalet and Errachidia.

Methods

We gathered some background information of tourism in Morocco by reading articles and publications we found in the internet. After gaining a theoretical knowledge of ways how tourism has been developed elsewhere we analyzed the situation in study area and observed how the development has been in Morocco. Then we reflected our own findings on the field to the literature. The sustainability of tourism was one factor we paid attention to, as the carrying capacity of a dry area is rather low.

Tourism is dependent on local people and their support. If they think that tourism has more benefits than costs, they are likely to have a positive attitude towards it. Tourists are not likely to come back to the destination if they feel unwelcome or inconvenient. Yoon *et al.* (2001) claim that, in general, locals take tourism's economic and cultural impacts positively and its social and environmental impacts negatively. As local people's attitudes towards foreigners can quite easily be observed in the field, we wished to be able to find out if this theory applies to Moroccans in our research area.

Our main methods on the field were interviewing and observing. Interviewing local authorities, university researchers and agency workers was an effective way to collect data. We also took advertising and infrastructure into account.

Fieldwork

Cultural and geographical diversity makes the area of Errachidia one of the most potential tourism destinations in Morocco. Tourism strategy of the area consists of four segments: cultural, desert and oasis, thermal and cinematic tourism. All of these segments have certain attractive cornerstones:

- Oasis tourism is characteristic to the region. It is quite an original form of tourism and thus is interesting in the eyes of visitors.

- Cultural tourism relies on architecture, diversity, festivals and ceremonies, historical heritage and historical trade routes as the area has been a central trade point.

- There are 3–4 popular thermal destinations in the area. One of the most interesting attractions is sand bathing in the desert.

- Cinematic tourism is an important industry in the area. The reputation of the area as a popular location for shooting films creates fame and attraction. Also the actors and other cinematic workers bring money to the area.

The number of tourism services in the area is increasing. Now there are 2 918 hotel rooms, 1 354 encampments and 45 classified hotels or hostels in the area. In addition, there are 103 unclassified accommodation

sites. There are also 3 tourism agencies, 159 bus/car licenses and 39 official and trained guides. All actors involved in tourism business are organized as well. (Laabab 2011.)

The dunes of Merzougha are at the moment the number one tourist attraction of the region. In figure 2 can be seen the dunes and also the town which is fully premised on tourism. Other popular destinations are for example the gorges and Ziz valley (Hasnouni 2011).

Figure 2. The dunes of Merzougha and in front of them a completely touristic town of the same name.

There is an international airport in Errachidia but the volume of passengers is low. According to Hasnouni (2011), the development of the airport would be important as it would benefit taxi drivers as well as other locals working on the transportation sector. At present there are flights to Errachidia airport on Fridays and Mondays. There is, for example, a private entrepreneur who organizes flights from Barcelona. Increasing the number of flights in the airport is problematic as travel companies are located in bigger towns and thus want to fly there. (El Boulmani 2011.)

Problems

Some difficulties considering tourism in the area are the deterioration of cultural heritage sites such as *ksars,* ancient fortified housings and villages. In 2006 there was a flood in Merzougha area near the dunes that caused damage to the touristic areas. The increase of tourism is a goal in Merzougha but tourism also damages the dunes. That is why sustainability must always taken into consideration.

Oasis tourism

Tafilalet region, especially in tourism context, is known as "oasis region" (Kagermeier, 2003). Typical landscape is shown in figure 3 on the next page. *La Réserve de Biosphère des Oasis du Sud Marocain* (RBOSM) is a project which aims on sustainable development of the use of Moroccan oases and also affects the tourism industry. Actually, tourism plays a big role in these development projects. The intention is to institutionalize the oasis tourism by establishing an agency for promotion and supervision of sustainable tourism practices. This agency should also gather different actors to make synergy for development strategies (Ministre de l'Agriculture 2007).

Figure 3. Ziz valley and The Ziz river make livable conditions for the locals and great opportunities for tourism.

The oases of Morocco are a vital part of ecological and cultural heritage of the nation. National Territorial Planning Scheme (NTPS) has seen these fragile areas as an important issue and that is why a "Strategy of Oases Development and Management" was carried out between years 2002 and 2004. In this framework "Tafilalet oases programme" was launched in 2006 by the Direction of the Territorial Management. The main goal of this project is to maintain oases of the area in livable condition by the principles of sustainable development. Oases are the traditional living areas of the local communities. These places are used by many different interest groups so the places suffer from pressure of many types. That is the reason why a need for a holistic development program in the field was seen. (Programme oasis…2011.)

We interviewed Mr. Mohammed Baddou, the coordinator of *Programme Oasis*. According to him, two important reasons have lead to the immigration from rural to urban areas. One is the drought the area has suffered from, and the other is the scarcity of land. For one oasis farmer there is only 0.8 hectare or less land. This has awakened the local government to see that there is no living for young people. That might be the biggest reason for investments in tourism (Baddou 2011).

Mr. Baddou emphasizes the principles of ecotourism in the current development of these oases. Two main issues in this development are local community involvement and effective waste management. As seen in rural tourism programs elsewhere in Africa and the developing world, the tourism routes are an effective way to involve all participants into the "big picture" of regional tourism. In the Tafilalet region a concept of tourism route called "*La Route du Majhoul*" has also been created. It is an entity of nine theme accommodations in the area and along the same road and all these operators are involved in ecotourism (Baddou 2011).

Baddou is very confident about this particular program and about the future of the Tafilalet valley as whole. He believes that tourism can bring emigrants back from other regions and lessen the immigration. Statistics of this phenomenon are not yet available but Baddou emphasizes the process is still underway.

Future

One important goal for tourism development of the area is increasing

the bed capacity (Laabab 2011). There are many development projects going on and the investors are both Moroccan and foreign. Different stakeholders cooperate to reach the goals set by the Moroccan government. The province of Errachidia is part of the rural tourism segment of the project *Vision 2020*. Targets for development include hotels and heritage tourism. Increase in tourism is supposed to be achieved by more efficient promotion of the area and educating the people working in tourism industry.

One concrete target for tourism development is mountain and rock climbing. There is a big climbing project under way and the mountains in the region are one of the world's most potential climbing destinations. Some other big projects in the region include the development of two river valleys, mountain biking and an ecological golf course that does not require any water. These projects are aided by foreign experts. Other smaller possibilities for tourism development are mining tourism (archeological) and handicraft.

The area of Errachidia belongs to the *Vision 2020* -project as a part of one of Morocco's eight tourist areas, the Atlas and valleys area. Local people's participation is important for the project and as Moroccans are very friendly and have a positive attitude towards foreigners, there is a good chance for success. There is a lack of jobs in Errachidia region and tourism could be one key for solving the problem. (Laabab 2011.)

The small city of Erfoud near Errachidia has attracted many large scale Hollywood productions in recent years. Those projects came in the area thanks to suitable desert landscapes but also because of supportive politics played by Moroccans (Saharatravel 2010). This is a good example of the new policy of Morocco on widening the scale of industries other than agriculture. Attracting foreign movie productions has also been talked about in Finland and it is actually same type of an export business like tourism.

Conclusions

Tourism in Morocco has grown considerably for over a decade. First the increase happened at the traditional coastal resorts and big cities. Nowadays also the mountain areas and arid desert areas gain incremental tourism flow. The focus of this research was the province of Errachidia, which is a highly potential rural tourism destination in the arid eastern part of the country.

Tourism in the province of Errachidia can be divided in several different themes namely desert tourism, oasis tourism and cinematic tourism. The official tourism strategy of the area consists of four segments: cultural, desert and oasis, thermal and cinematic tourism. The main goal is to increase the amount of tourism and especially the flow of capital into the area. One particular idea is to

lure tourists stay in the area as long as possible. This is especially the case in the city of Errachidia, which is now only a pass-by node to the rural areas. Also the rural route -project has this goal.

Tourism not only brings good things but also negative effects. A great problem is that tourism harms the vulnerable dunes of Merzougha and another big concern is the deterioration of cultural heritage sites such as *ksars*. Also the whole tourism industry has to be organized so that the revenues do not flow out of the province to the big cities in the south or even abroad.

In the future the Province of Errachidia aims at being an important rock climbing destination. This could be an important addition to the tourism supply. Logistically the area is challenging because it is quite remote. There is an airport in the city but not much traffic. If the locals can attract travel agencies to found offices in the city, there could be better opportunities to reach the increasing tourism flows. The idea of ecotourism has been adapted to the tourism development which is a positive trend because of the vulnerable environment. For the same reason, mass tourism will never be the natural or sustainable way to develop the industry in the area. That is why a broad variety of and clear customer segmentation in tourism supply is a good way for this rural tourism area.

References

AZD Morocco (2011). *Vision 2020 – Morocco unveils its tourism plans*. 12.10.2011, <*http://www.azdmorocco.com/30/Latest+News/2010/53/Vision+2020++Morocco+Unveils+Its+T*>

Baddou, M. (2011). Interview at the office of Programme oasis Tafilalet, Errachidia. 25.10.2011.

Briedenhann, J. & E. Wickens (2004). Tourism routes as a tool for the economic development of rural areas—vibrant hope or impossible dream? *Tourism management* 25, 71–79.

El Boulmani, S. (2011). Interview at Agence urbaine d'Errachidia. 27.10.2011.

Hasnouni, I. (2011). Interview in Errachidia. 28.10.2011.

Hassan (2011). Presentation at the village of Imlil. 31.10.2011.

Ichir, L. (2011). Seminar presentation "L'Environment et le Développement Durable dans la Province d'Errachidia". 24.10.2011.

Kagermeier, A. (2003). The development and economic impact of newly established tourist areas in rural areas of Morocco and Tunisia. *In* Kopp, H. (ed.): *Area studies, business and culture*, 61–70. Lit Verlag, Münster.

Laabab, M. (2011). Interview at Délégué du Tourisme Errachidia. 25.10.2011.

Ministre de l`Agriculture, du Developpement Rural et des Peches Maritimes (2007). La Réserve de Biosphère des Oasis du Sud Marocain. Workshop paper.

Programme oasis Tafilalet (2011). *The Oasis Tafilalet revalorizing an area of unique*

life with a high heritage value. Pp. 63. Kingdom of Morocco – Programme document.

Province d´Errachidia (2011). *Principales Données sur la province d'Errachidia*. 10.10.2011, <*https://moodle.helsinki.fi/file.php/4832/Principales_Donnees_sur_la_province_kabiri_1_.pdf*>

Rachidi, F. E., M. Rai, N. Hassanain & S. Nana (2006). *Tourism in Morocco: The challenge to attract 10 million foreign visitors by 2010*. SSK 1202 – Critical Reading and Problem Solving Summer 2006. 12.10.2011. <*http://www.aui.ma/VPAA/cads/research/cad-research-student-tourism.pdf*>

Saharatravel (2010). *Erfoud Sahara Desert City Guide Morocco*. 14.10.2011, <*http://www.saharatravel.net/erfoud/*>

Tourism Morocco - Vision 2010 (2010). *Visit Morocco*. 12.10.2011, <*http://www.visitmorocco.eu/general-info/archives/71-tourism-morocco-2010-vision.html*>

Wilson, S., D. R. Fesenmaier, J. Fesenmaier & J. C. Van Es (2001). Factors for Success in Rural Tourism Development. *Journal of Travel Research* 40, 132–138.

Yoon, Y., D. Gursoy & J. S. Chen (2001). Validating a tourism development theory with structural equation modeling. *Tourism Management* 22, 363–372.

Part II

TRAVEL JOURNAL

TRAVEL JOURNAL

In the fall of 2011 a group of 15 students and a senior lecturer made a two-week field excursion to Morocco. The aim of the trip was to introduce the students to doing fieldwork in foreign settings, publishing short texts on the findings and establish contacts with the local universities.

The minibus in which we spent a considerable part of the trip.

Travel itinerary

Fri 21st Oct
Part of the group arrives to Casablanca

Sat 22nd Oct
The rest arrive to Casablanca (14:10 at the airport) -> bus towards Er Rachidia, the night in Meknès

Sun 23rd Oct
Morning in Meknès; the ride to Er Rachidia continues with two stops: Azrou for a lunch, and Midelt. Arrival to Er Rachidia in the evening

Mon 24th Oct
An opening seminar at the University of Er Rachidia

Tue 25th Oct
The field course; visits to Goulmima, Ferkla, Tinjdad, Aoufouss, Erfoud, Rissani, Tafilalet oases, Merzouga, the dunes of Erg Chebbi…

Wed 26th Oct
The field course

Thu 27th Oct
The field course

Fri 28th Oct
A closing seminar in Er Rachidia; bus towards Dadès Valley, night in Ait Aissi

Sat 29th Oct
Todra Gorge, Todra palmeries & Dadès Gorge, Kasbahs in Skoura (Kasbah Amahidil) and Aït Benhaddou (a UNESCO heritage site). Night in Ouarzazate.

Sun 30th Oct
To Imlil via Marrakesh

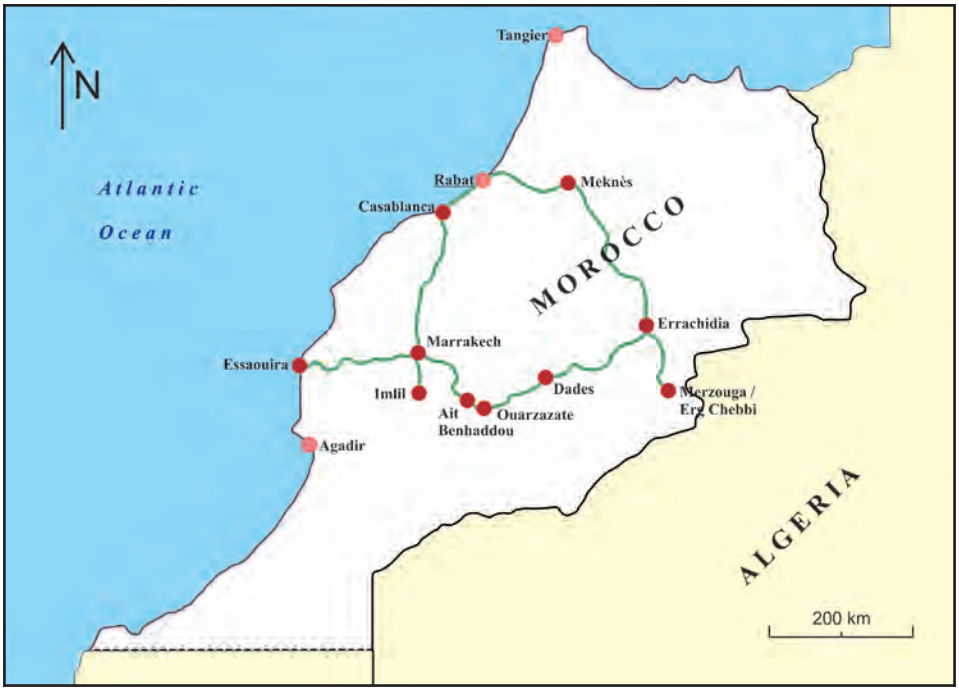
Mon 31st Oct
Trekking on the Djebel Toubkal mountain, night in Marrakech

Tue 1st Nov
Essaouira, night in Marrakech

Wed 2nd Nov
Marrakech: meeting researchers at the university, visiting Medina, Djemaa el Fna, etc.

Thu 3rd Nov
Half-day in Marrakech, return to Casablanca for the night

Fri 4th Nov
The excursion ends; return flight to Helsinki by part of the group



Travel itinerary map.

List of participants

Senior lecturer:
Paola Minoia

Students:
Ossi Ahonen
Matias Andersson
Helena Haanperä
Karti Heiskala
Turo Hjerppe
Petri Hård
Belinda Kivivuori
Kaisa Kinnunen
Mari Kovasin
Jaana Kuisma
Ira Lahovuo
Juha Niemelä
Minna Nuutinen
Wilta Toljander
Maria Viitasaari

SAT 22 OCT 2011

The Medina of Casablanca.

The big day: our journey around Morroco will begin.

Most of us arrived to Casablanca a day before the official start of the journey. Those who have arrived a day before had some time to enjoy warm and sunny Casablanca before the others arrived: doing a bit city sightseeing, visiting the old Medina of the town and getting the first taste of Moroccan food and the mint tea.

In the afternoon we were supposed to meet the half of the group in the front of the railway station. We took a taxi from the hotel, negotiated price for the taxi trip well (negotiation skills were important in that country!) and survived in the chaotic traffic to the meeting point.

The whole group was looking forward to seeing Paola and the bus. There were a lot of expectations for the vehicle "there has to be toilet there" "it has to be a quite big one". Finally, Paola, the driver and the bus arrived: we squeezed our bags and ourselves into to our "new home". The minibus was not probably that big than someone expected but we were ready and happy to start our travel around the country. The sky was clear, the road was bumpy and we headed to Meknès where we arrived late that night.

Katri Heiskala

SUN 23 OCT 2011

The group in front of the Bab Mansour.

In the morning we explored the medina of Meknès which is one of the old capital cities of Morocco. Some of us got to see the main attractions of the Medina while some searched for a second breakfast.

After noon we started our long travel towards Errachidia. We decided to take a detour to Ifrane National Park where we got to see some really old cedar trees and Barbary apes that are endangered and indigenous to the Mediterranean region. We didn't have to look for the apes for long; they found us in hopes of treats. The local people, Berbers, provide their livelihood by offering horse rides and selling small souvenirs to tourists.

In the forest, there was garbage all over which reminded us of the negative impacts of tourism. Another downside of tourism in the Ifrane National Park is that the apes are highly dependent on human in terms of food supply.

We arrived in Errachidia late in the evening to find out that we could only spend one night at the accommodation reserved for us because we weren't Moroccans. We had a late dinner in the one and only coffee house Vitamine.

Jaana Kuisma

MON 24 OCT 2011

Seminar audience and speakers.

This was the day when our real field course started. And what a start! After a good breakfast at the Vitamine we came to the University of Errachidia. We soon noticed huge banner advertising this seminar starred by the people from University of Helsinki – that was us. The auditorium was packed with people who had come to listen to us and the local experts. This was the also day when we met our translators and the professors we worked with during our time in Errachidia. We soon found out that the schedules during this trip wouldn't hold. It was a very long day as there were many presentations and lots of talking, especially from professor Kabiri. And everything had to be translated, too. It was well after the sunset when we got to our cosy hotel rooms in the centre of Errachidia. We were very tired but still very excited about our new experiences and couldn't wait until the early wake-up next morning!

Petri Hård

TUE 25 OCT 2011

University of Errachidia.

After good night of sleep was a long day of doing our group works. First we went to the University of Errachidia where we met the local student and continued to do our group work together.

In the afternoon each group went to do their interviews and observation around the city. For example the city planning and transportation group went with one of the translators, called Mourad, to see different parts of Errachidia. Oldies neighborhood called Targa was the first place to visit. The group also visited in one museum and two market places in the centre.

After the field work the whole group went to the hotel where most of the group stayed the night. There we had the traditional Moroccan dinner with Moroccan salad, lamb and dessert. We also listened traditional Moroccan music and some of us also played some of the instruments. After dinner five of us left and stayed the night in a different hotel, because the hotel was too small for all of us.

Kaisa Kinnunen

WED 26 OCT 2011

The camel ride back to Merzouga after exciting night at the dunes.

After a good night sleep we had a nice breakfast in the lovely garden of guesthouse Palmerie. The owner of the guesthouse was very friendly and we really enjoyed our stay in there.

So our adventure continued as we got into the bus and headed to South, towards Merzouga and Erg Chebbi. Along the way to the dunes, we visited in the camping area Meski and in the date farm, where we had a taste of absolutely delicious dates. We also saw on our way some sand barriers made of palm leaves and visited in a shop which was selling fossils.

When we arrived to Merzouga the camels were already waiting for us. For some of us the idea of riding a camel was quite exciting, but luckily all managed to mount a camel. The sun started to set down while we slowly headed to the dunes and towards the Berber camp.

After 1,5 hour camel ride we arrived to our camping place. After we settled down into the Berber tents, some of us climbed on a dune nearby and lied down on sand to watch the stars on the sky. Few of us even saw some shooting stars! After having a delicious tajine dinner by candlelight, the students and Berber guides gathered around campfire to sing some songs accompanied on the guitar and drums.

Wilma Toljander

THU 27 OCT 2011

Leaving the dunes on dromedaries.

After waking up early in the morning to see the Saharan sunrise we rode the dromedaries back to the village of Merzouga, had a nice breakfast and enjoyed the morning sun after a rather cold desert night.

On the way back to Errachidia we saw traditional khettaras and learned how they function. Khettaras (or khattaras) are water management systems that were widely used before to provide a reliable supply of water for human settlements and irrigation in the Moroccan hot and arid climate. We also listened to live gnawa music that has its roots in sub-Saharan Africa.

At the university a national television channel interviewed Matias, Katri and Paola about our research. Later on we found out that the interview had ended up in local news. After the interview some of us visited the urban agency of Errachidia while others planned their presentations for the closing seminar in a local cafe. The long day was ended enjoying a couscous dinner and hospitality of the founder of the nurse school we rented our bus from. The dinner was probably the finest and plenteous we had during the field trip.

Juha Niemelä

FRI 28 OCT 2011

A group picture after the magnificent lunch the dean of FSTE was offering.

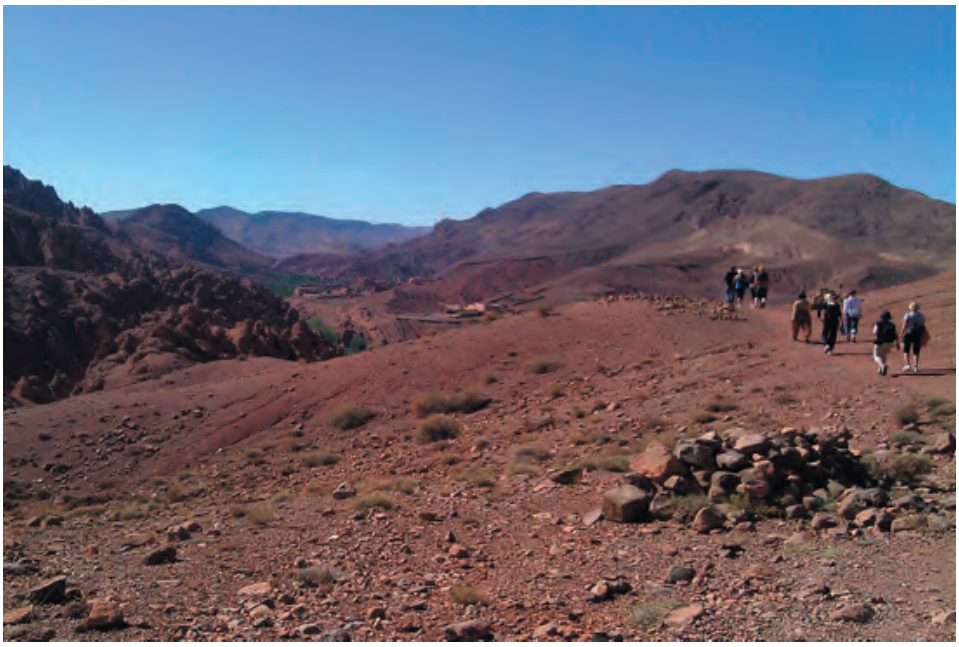
This was the day with closing seminar in the University of Errachidia. In the seminar both Finnish and Moroccan student presented their findings. After the seminar we had a lunch offered by the dean of the FSTE. The local students joined us on the lunch. Next Paola and Kabiri made same official paper work about the co-operation between the two universities. This was also time for some group pictures.

In the afternoon we started our trip towards the gorges of Dades. First we made a stop to the reservoir that is used for water management of the Errachidia region. This was also time for saying good bye to professor Kabiri. The bus drive was long during which we most probably were having some quizzes and saying nice things about our bus driver.

We stayed the night in a nice guesthouse in Ait Oudinar. It was already dark when we arrived. In the guesthouse there was also a group of German speaking tourists, which was weird because we hadn't seen so many tourists earlier in the trip. We had dinner at the same guesthouse as well. As it was Friday it was no surprise that we where served with couscous.

Turo Hjerppe

SAT 29 OCT 2011



The aridity of the region is evident everywhere .

After a well deserved late wake-up we finally got do some easy sporting. Our driver Hamid, who we re-named "Risto", calm as ever, took us through a wonderful scenery and breathtaking serpentine roads up the Atlas Mountains and to the Dadès gorge. There we took a mini-hike of about 5 kilometers, seeing both narrow ravines and mountainous views, including the first snowy peaks of the trip. The walk was lined with some peculiar geological formations called "Monkey fingers".

After the tricky mountainous part we entered a small village of some 500 inhabitants called Aït Ougheit, where children ran to us from all directions asking for… pencils.

We stopped for a relatively western-style lunch. At least that's what it looked like on the menu. Then we continued towards our next stay, Ouarzazate. It was the first city that we had visited in a while, which raised the spirit in the group, since we hadn't been around a lot of people lately.

Belinda Kivivuori & Matias Andersson

SUN 30 OCT 2011

The medina of Marrakech.

The morning began with a nice breakfast set along a busy street in Ouarzazate. After the breakfast we drove to the Atlas Corporation studios to learn about movie making. Some big Hollywood productions are filmed there. We had a funny guide who gave us a quick tour around the sets. After the tour Risto arrived with the just washed car to take us to Ait Ben Haddou.

On spot we hired a guide to show us around. It was a very interesting place even if it is one of the most touristic attractions in Morocco. Some of us interviewed the guide about his thoughts on tourism while the others sweltered in the heath. We got to eat cold and burned skewers for lunch because once again we were running late. We drove to Marrakesh to pick up Paola's colleague Hassan who was to join us.

In the darkening night we drove some curvy roads to Imlil. We settled down to our communal accommodation and ate a nice dinner prepared by the seemingly stressed French owner. We found out that there would have been a better and cheaper accommodation across the road but it was too late. Lastly, the guys were extremely happy after finding beer in a local superstore in Ouarzazate. It might have been super expensive but oh the joy!

Ira Lahovuori

MON 31 OCT 2011

Mr. Hassan having a lesson about life in the mountains.

We woke up into the fresh mountain air of Imlil village. This was the day for trekking on the slopes! The weather was good and the high mountain of Djebel Toubkal (4 167 m) looked colossal in front of us. Mr. Hassan from the University of Rabat is an expert what comes to the mountain tourism and he was quite willing to tell us details about the environmental and social circumstances in this particular trekking area. The actual trek was eventually not so long but we had good overview what is going on in the mountain areas and their people nowadays.

After a refreshing day we headed to the Marrakesh which is about an hour drive down from mountains. Our beloved bus driver had a chance to show his driving skills in chaotic traffic! Our hotel was at the heart of old town (medina) so we got right into the vibe and atmosphere of this legendary city. We made a little walk around the Djemaa el-Fna which is the main square and popular tourist attraction. The square was full of action and enjoyment. We stopped for one of the street kitchens to have a seafood dinner. After a good dinner some of us found a nice bar on a shady alley where we had a night can before going back to hotel and preparing ourselves for the next days visit at the University of Marrakesh.

Ossi Ahonen

TUE 01 NOV 2011

At the University of Marrakech.

In the morning, we had breakfast on the roof terrace of our hotel. Then we had to hurry to the University of Marrakech where two professors had their presentations about water management and urban planning. We were welcomed to the university with a cup of tea and croissant. We had lunch after the presentations and during the lunch break, some of us rested in the professors' room and some got to know the campus.

In the afternoon, we went to a city tour around the city with the professors. First we climbed to a hill were we surveyed the magnificent view of the city. Some students also interviewed the professors. After a while, our trip continued and we saw khettaras. When our tour ended, we were glad to hear that we would have free time in the evening. We walked to our hotel and on the way we passed the Koutoubia Mosque.

It was already dark when some of us walked to the medina to do shopping. The medina was close to our hotel. The shopping area was large and there were many narrow alleys. Luckily, we didn't get lost. There were vendors selling leather bags, scarves and wooden handicrafts. The haggle was fun but sometimes also very exhausting.

Minna Nuutinen

WED 02 NOV 2011

Different fish species at the busy fish market.

In the morning, we headed to Essaouira, a fortified town of the mid 18th century with walls facing towards the Atlantic Ocean. On the way, we saw goats on the branches of argan trees (*Argania spinosa*), trees endemic to Morocco. First we thought that the goats had climbed on the trees by themselves, but soon we realized that the shepherds had put them there to entertain tourists and to get a few dirhams. We also visited a cooperative, where women manufactured e.g. cosmetic oils from argan nuts. In fact argan oil is valued not only for its cosmetic properties, but also for its nutritive and medical properties.

In Essaouira, we visited a local fish market full of different fish and crustacean species. Because it was already lunch time, we among other Moroccans, decided to buy fresh fish from the market. After buying the fish, we took it to a stall nearby, to be prepared and cooked.

After the delicious lunch, we went to the great walls of the fortress to admire the sea shore. From the walls, we headed to the labyrinth like Medina, full of cats, shops, and eager vendors. The Medina is multicultural and a place where the Muslims and Jews coexist. Despite this, The Jewish quarter, the Mellah, was in a bad condition.

At sunset, we headed back to Marrakech. Since we spent the last night together, we had a gala evening, during which we had a great time singing, laughing, and recalling the field trip with warmth.

Helena Haanperä

THU 03 NOV 2011

Visiting El Bahia palace in Marrakesh.

In the morning some of the group visited the Marrakesh Medina and its attractions, such as El Bahia Palace and an old Koranic school. Many also did some shopping in the huge medina. After the last lunch together by the square of Jamaa el Fna, the group split up. Part of the group headed to Casablanca by our bus while others stayed for couple of more nights in Marrakesh. Before leaving we thanked our reliable driver Hamid by giving him a little gift.

On the way to Casablanca almost everyone was sleeping as there were no quizzes anymore that had entertained us previously during the long bus rides. It was already dark when the bus arrived in Casablanca. Students headed to the already familiar Hotel Astrid while Paola continued to other Hotel to get ready for her flight back home. After the dinner in pizzeria everyone just went to rest and started to plan the programme for remaining days in Casa. The five students who stayed in Marrakesh had a relaxing evening after two weeks of hectic travelling and research. Later on they travelled again to Essaouira to try some surfing among other things.

Maria Viitasaari

FRI 04 NOV 2011

Maa Salama, Goodbye Morocco.

The way back home has started. Our group is now divided into smaller parts, one group continued holiday in Marrakech, one in Casablanca. Paola headed to Finland already today. The biggest part of the group woke up again in cosy hotel Astrid in Casablanca after two week journey around Morocco. What a feeling to have a warm nice shower and a comfortable bed!

The day went really well, although the weather was rainy and windy. We planned to make some shopping in Medina but the weather was too uncomfortable under the dark sky, so we switched to plan B. That plan was to go shopping at Morocco Mall, the biggest shopping center in whole country. Sounded really nice, so we took two taxis to that place outside Casablanca downtown. After one hour taxi drive and frustrated drivers we found right place but is was still under construction and not yet open! What! We were very surprised, because even Lonely Planet recommended to go there for shopping. Maybe next time then. We drove back to city and used plan C to go shopping in westernised part of the centrum. In the evening we had some dinner and relaxed at Astrid and planned to go to Rabat and Casa next day.

Mari Kovasin