

Chapter 2

Theoretical framework

by Hein de Haas

2.1. Oasis agriculture in a changing political-economic context

2.1.1. Typology of traditional oases

In the arid zones of the Maghreb, population settlements and agriculture have traditionally been concentrated in particular areas where water availability is relatively reliable. Over many centuries, inhabitants of these regions developed sophisticated techniques to capture surface water or to extract groundwater, and to exploit these water resources for irrigated agriculture. In this way oases – defined as agricultural areas in arid environments where agriculture is normally not possible without irrigation – emerged. Oases not only were agricultural production centres, but also trading centres linking distant regions, with a crucial military and political importance, from which several states and present-day dynasties originated.

The oases of the old world used to dominate large parts of arid North Africa, the Middle East, and large parts of Central Asia (along the silk trade route). These water-rich areas of intensive agricultural production, located in generally unproductive environments, have traditionally had a high economic importance. Nowadays, oases contain more than 150 million inhabitants (Clouet and Dollé 1998:83), and continue to play a strategic role in the desert environment. This study focuses specifically on the dynamics of oasis systems in the Maghreb, that is, in Morocco, Algeria, and Tunisia.¹

Depending on the specific natural environment in which they are located, the water sources they use, and the irrigation techniques employed, several traditional oasis types can be distinguished. Most large-scale oasis systems are located along perennial or semi-perennial rivers, whose water resources are directly tapped for irrigation in fields that are normally located on their fertile sediments, either on the banks of the rivers, or on alluvial plains or deltas. In agricultural terms, such river oasis systems are relatively prosperous, thanks to a more or less guaranteed flow of water and regularly occurring floods, which bring down fine sediments to the fields, thereby maintaining soil fertility.

River oases in the Maghreb are relatively small. They are most prevalent in Morocco and Algeria, at the southern foot of the relatively humid Atlas mountains, where several small- and medium sized rivers drain into the desert. These Saharan fringes suffer less from aridity due to the rainwater they receive from the mountains (Kassah 1998:95). The most famous of these river oases are the Drâa and Tafilalt-Ziz basin in Morocco, but some smaller-scale river oasis systems exist, such as the Dadès and the upper Todgha basin. Typical for river oasis systems is the existence of a large number of different oasis villages, located on the banks of the river bed, and following the river like a ribbon through desert land.

Traditionally, irrigation takes place through the establishment of several small-scale dams, which channel surface river water into complex irrigation systems consisting of a hierarchy of primary, secondary, and tertiary irrigation channels, which in turn lead water to the fields by gravity alone. The only type of irrigation practised in traditional oases is flood basin irrigation,

¹ Field research was only carried out in Tunisia and Morocco. Nevertheless, studies on Algerian oases, which are more or less comparable to their Tunisian and Moroccan counterparts, have been considered in this theoretical analysis.

which means that water is lead to the field until it is entirely submerged. After each flood, the dams have to be reconstructed. The existence of a high number of dams along the course of these rivers have created constant tensions and occasional violent conflicts between the populations living upstream and downstream from the same basin (De Haas & El Ghanjou 2000, Kassah 1998:96, Ouhajjou 1996).

Apart from river oases, numerous isolated, smaller-scale oases exist throughout the Maghreb, located in areas where groundwater is close enough to the surface to be tapped by using a high number of ingenious, traditional techniques. This type of oasis is also particularly common in Morocco and Algeria. These types of oases are generally insular, that is, they are usually located at one particular spot, and do not consist of an ensemble of oasis villages, such as is the case for river oases. Groundwater is extracted via intricate techniques, either by using animal traction (e.g. the *nouria*), or by using ingenious techniques tapping underground water sources by digging underground tunnels (a technique known by different terms: *khattaras*, *qanats* or *foggaras*)². In certain oases, especially in Algeria, groundwater is so close to the surface that cultivation of date palms is possible without any irrigation. However, in general, the social and labour costs of tapping this groundwater are very high (Clouet & Dollé 1998:86). The water resources of these isolated oases are generally less abundant and reliable (more sensitive to droughts) than those of large-scale river oasis systems. Hence, agriculture is often less intensive and more sensitive to changes in water tables induced by droughts.

The third type of general oasis is located in immediate proximity to small, local sources. These sources have generally very limited flows, which tend to be highly variable and sometimes only contain flows during part of the year. Most of these oases are of the insular type. The difference with the second type of oasis is that no elaborate techniques are required to tap water, which makes these oases less labour intensive than in the second type. However, the flows of these local sources are generally very limited and sensitive to periods of drought. Many Tunisian oases, such as those of Jérid, Nafzaoua, Gafsa, and Gabes can be classified as source oases (Kassah 1998: 96), but they can be found in other parts of the Maghreb as well, such as in the Moroccan Bani-region (De Haas 1998).

Although the general classification distinguishing river, groundwater, and source oases is valid, it should be stressed that in many cases a combination of water winning techniques can be found. For example, several oases located in the relatively water-scarce downstream parts of river basins compensate their water shortages by employing additional techniques to extract groundwater, such as *khattaras*. As most oases are located in alluvial plains or river valleys, the occasional floods are an important additional source of irrigation water in many oases. In the course of the 20th century, motor pumps have become an important new alternative technique to overcome problems related to water scarcity in virtually all oasis of the Maghreb, fundamentally changing the technological base of oasis agriculture.

² A *khattara* consists of a number of wells linked by an underground tunnel. This tunnel conducts the water originating from an underground source further downstream. Since the slope of the tunnel is always smaller than that of the terrain above, the tunnel comes to the surface after several kilometres' distance, after which it serves the purposes of irrigation and domestic use.

2.1.2. Main characteristics of traditional oasis agriculture

Notwithstanding the large variety of oasis types, most oases have a number of characteristics in common (cf. De Haas 1998). First, traditional oasis agriculture is characterised by high productivity and labour intensity. The maintenance of agro-hydrological infrastructure and the intensive nature of agriculture require high labour inputs. The scarcity of natural resources, particularly water and high population pressures, provoked optimisation of productivity by developing intricate water extraction and irrigation techniques, and the cultivation of two or even three vegetation layers. The upper layer is generally that of the date palm, the very symbol and pillar of oasis agriculture. The second layer consists of smaller fruit trees bearing figs, almonds, olives, and pomegranates. The third and lowest layer is comprised mostly of annual crops such as cereals (barley, wheat, sorghum), alfalfa and diverse vegetables. As a result of patterns of land-tenure inheritance and high population densities, plots are generally very small.

Actually, depending on natural resource availability, the techniques employed as well as climatic conditions, a high diversity of oasis production systems exists. The above-mentioned ideal type of triple-layered oasis agriculture is generally found only in oases with relatively abundant and reliable water resources, typically in river oases or other oases with stable water resources (Larbi 1989: 18). In more marginal oases, often based on small sources or water extraction techniques, where water supply is limited and less reliable, or where severe land degradation (such as salinisation) exists, the second layer of fruit trees and sometimes also the third layer of annual crops is completely absent (De Haas 1995). A special case is comprised of oases located at high altitudes, where the relatively cold climate accounts for the absence of date palms, as dates require hot desert climate conditions in order to mature. Particularly in Morocco, oases as those located in the upper Dadès valley consist only of fruit trees and a layer of annual crops (Aït Hamza 1995, Rijbroek 1997).

In general, unfavourable natural circumstances, in particular pertaining to water supply and soil properties, tend to coincide with a decreasing diversity of crops and a lower intensity of agriculture. The ideal typical oasis is only encountered if sufficient water of good quality is available, in combination with sufficient labour available for agriculture. Marginal oases or marginal sections of oases (such as their fringes) often only consist of date palm groves, without any kind of undergrowth at all, since date palms are well adapted to the harsh climatic conditions (Bencherifa & Popp 1990: 54; De Haas 1995). Although date palms need abundant irrigation in order to produce good harvests, they can survive droughts better than other crops due to their deep root system. Moreover, they are relatively resistant to the saline conditions often prevailing in oasis soils. Second, the agricultural system is based on a symbiosis between animal husbandry and crop production. The traditional oasis peasant has succeeded in optimising local resource use by integrating animal husbandry into the agricultural system. This integration has taken on two forms.

The first form is revealed in the integration of nomadic and sedentary life. In all oasis societies, sedentary oasis peasants established close links with nomadic tribes living in the deserts surrounding them. Nomads and semi-nomads exchanged products with sedentary oasis inhabitants, thereby complementing their respective livelihoods. Economic and political interdependencies between sedentary oasis populations and nomadic tribes was generally strong. The latter often extorted protection agreements from sedentary populations, forcing them to pay tribute in exchange for defence against attacks from other nomadic groups. In contrast with what is commonly believed, the distinction between nomadic and sedentary life is not very sharp. After all, in many oases, oasis inhabitants were also active in nomadic activities for at least part of the year. In other words, they practised semi-nomadism themselves. Moreover, throughout the history of the Maghreb, nomadic groups settled in existent oases or created new ones, and in the process themselves became sedentary or semi-nomadic (Ensel 1999, Hart 1981).

The second form of integration of animal husbandry and agriculture was achieved within the oasis itself. Animal husbandry should be considered as one of the principal elements of oasis agriculture, highly dependent on the utilisation of manure for the maintenance of soil fertility (cf. Tisserand 1990:237). In exchange, the oasis system produces fodder to feed animals. In addition to fodder crops cultivated in all oases, notably alfalfa, the presence of animals also enables peasants to exploit the vegetable products which are not consumed by humans, such as plants rest, weeds, and palm leaves. So, animal products are an important element in maintaining soil fertility, as well as for optimising biomass uptake in the human food chain. Livestock husbandry (milk, meat, eggs) contributes to the diversification of the nourishment of oasis populations, and provides them with hides and wool. In addition to its function of maintaining soil fertility, animals play an important role in transport, water extraction and ploughing. The possession of a flock also represents a certain capital and insurance in times of environmental stress: it can be considered as a 'mobile capital', stabilising the livelihoods of oasis peasants.

A third general feature of traditional oasis agriculture is the high degree of collective soil and water management, in particular with regard to the maintenance of the vital irrigation systems, and the sharp socio-ethnic hierarchies that seem highly associated with traditional oasis systems (De Haas 1998). If a large number of peasants make use of one single water source, this requires a high level of collective organisation on a community level in order to guarantee adequate water distribution and the maintenance of the irrigation system. The latter often requires collective action, to which the entire oasis community is obliged to participate. Traditional institutions regulating land and water management were also necessary to settle frequent disputes among peasants regarding land and water resources, and to defend the collective 'resource interests' of the oasis vis-à-vis other oases, especially in the instances where more than one oasis makes use of the same source, as is often the case in oases located in river valleys.

The maintenance of these complex irrigation systems is highly labour-intensive; efficient distribution of irrigation water among a large number of different individuals, villages, communities, social and tribal groups usually living together in river basins requires a high degree of collective socio-political organisation. Several scholars (Weber 1921, Wittfogel 1957) have suggested a link between the maintenance and organisation of irrigation systems and the emergence of hierarchical social relations and, in some cases, the emergence of central state authorities. According to this perspective, it is no coincidence that many early states and civilisations often originated from large-scale oasis systems in Mesopotamia, Egypt, and China.

Wittfogel (1957) mentioned the term 'hydrological society' for societies where central authorities base their 'despotic' power on the maintenance of irrigation systems. Within this type of feudal society, inferior social groups or 'castes' are obliged to physically contribute to the maintenance of the irrigation systems and cultivate the fields of the dominant, land-owning classes (cf. Tellegen & Wolsink 1992:32). Their labour was organised either on the basis of slavery or through feudal patron-client relationships, often combined with sharecropping arrangements in which sharecroppers only received a small share of the harvest in exchange for their labour, contributing to the wealth of dominant groups. This sharecropping system could only exist on the basis of unequal power and labour relations, which justified by ideologies in which certain ethnic groups (e.g. Black populations) were seen as inferior (cf. Ensel 1999).

In the Maghreb, oases are not comparable in scale to Egypt and Mesopotamia. Nevertheless, it seems not to be a coincidence that oases are particularly marked by sharp ethnic divisions and hierarchical relations between different ethnic groups. One could affirm that the degree of collectivity increases as a function of the number of peasants utilising one source (cf. De Mas and Jungerius 1987:78). Particularly in the case of river oases, a certain degree of centralisation was necessary. Moreover, the existence of cheap labour provided by slaves or other socially inferior groups was a condition for the maintenance of the irrigation systems and the very survival of oasis systems in general (Beaumont 1989:126). So, slavery and clientelism was

fundamental for traditional social organisation, in which the power of dominant ethnic groups was based on a monopoly of the latter over scarce means of production: labour and land, as well as water and land resources.

2.1.3. The changing political-economic context and migration in the 20th century

Oases are anthropogenic agricultural systems *par excellence*. Consequently, oasis agriculture cannot be seen in isolation from the social, economic, and political contexts which shaped these intensive agricultural production environments. Changes in the social realm should therefore automatically have a direct impact on oasis agriculture. The late 19th and 20th centuries brought many fundamental changes to oasis societies in the Maghreb. Beginning with the French colonial expansion, these regions were more and more integrated into a modern, central state and the national and international market economy, which coincided with the development of modern infrastructure linking oases with the new colonial capitals, a rapid decline of the traditional caravan trade routes linking oases with distant regions across the Sahara, the demise of nomadism and the subsequent sedentarisation of nomads in or at the fringes of oases, as well as the decline of traditional hierarchies between ethnic groups.

These processes of economic integration in the state and market economy, continued in the post-colonial era, created income earning opportunities outside agriculture for oasis peasants, especially through migration towards large towns and foreign countries, which were to fundamentally change the entire economic fabric of oasis society, thereby triggering a transformation in the local social, political and agricultural realms.

In the past century, rural areas in the Maghreb have witnessed mass emigration to their own urban centres, to Europe, and to Arab oil countries. Recent studies indicate that migration is generally strongest in the regions that are the most disadvantaged in terms of ecological conditions, such as aridity (Bencherifa 1991:125-6, Michalak 1997). Migration from marginal regions started almost immediately after colonisation, and has persisted ever since (Bellakhdar 1990: 167; De Haas 1998; Heinemeijer 1960:95). This is particularly the case for oases, where the high demographic pressure, the limited means of subsistence, and the extreme social hierarchy all seem to have further propelled migration.

Within the whole complex of socio-economic and political changes, migration stands prominent not only because of its massive character, but also because the profound impact it has on the daily life of most oasis families and the social relations within oasis society. Its impact is felt in the social, cultural as well as economic and agricultural domains. It is particularly through the experience of migration that abstract processes of ‘integration in the modern state and market economy’ or ‘globalisation’ are manifested for oasis inhabitants. As a result of these changes, traditional oasis agriculture and traditional oasis livelihoods seem to be seriously challenged.

Internal and international migration was usually accompanied and reinforced by other political and economic developments. Previously, oases had a crucial function in the regional economy, being a more or less monopolistic producer of edibles. Due to the collapse of the ancient caravan trade, the decline of nomadism, the formation of state-borders, and political and economic integration into the ‘modern’ national and international context, traditional oasis agriculture became economically marginalised. For oasis inhabitants, paid labour in non-agricultural sectors and, especially, migration created increasing opportunities to gain a higher income outside agriculture. As is the case in most countries of the Middle East and North Africa, migration has offered “a clear avenue of upward mobility for those able to migrate” (Richards & Waterbury 1990: 396). In oases, this has resulted in the (partial) socio-economic emancipation of the formerly inferior groups and the partial breakdown or even reversal of the traditional ethnic hierarchies

(Bellakhdar et al 1992: 169, Büchner 1990:27) and, hence, ancient institutions regulating land and water management (De Haas 1998, Otte 2000).

The (post) colonial era brought another change with important consequences for oasis agriculture, that is, the intrusion of the modern state and its institutions, which play an increasing role in oasis agriculture. Both in Algeria and Morocco, the state has constructed large-scale dams in the upstream parts of some of the larger oasis river basins, aiming at regulating water flows and stocking water for irrigation during dry periods, as well as preventing damage through flooding. In Morocco, two dams have been constructed, in 1971 in the Ziz River, and in 1972 in the Drâa River. In the Algeria Sahara, one dam has been constructed in the Guir River in 1965, and another in Foug El Kherza in the Aurès (Kassah 1998:97-98). The success of these dams is only partial, as sediment accumulation often reduced the capacity of the dams and there seemed to be increased problems of soil salinization. Moreover, the absence of regular floods has had a negative effect on soil fertility.

In Tunisia, the state has pursued a specific policy to rehabilitate the oases that were suffering from water shortages by creating central drillings, modernising and increasing efficiency of irrigation and drainage systems, reorganising the ancient oases and promoting the cultivation of crops (in particular dates) for the export market. Moreover, the Tunisian state promoted the establishment of modern water users associations. Both Algerian and Tunisian states have actively promoted the creation of new agricultural areas outside the traditional oases (Kassah 1998). Despite these efforts, many oases, especially in Morocco, remained largely untouched by the state.

2.1.4. The nature of agricultural transformations and the role of migration

There is a general consensus that the surge in migration and concomitant socio-economic and political developments have had a profound effect on oasis agriculture in the Maghreb. However, there is confusion about the very nature of these agricultural transformations. Whereas some observers proclaim the 'death' of the oasis, others envisaged a rapid rise of high-tech, market-oriented desert agriculture.

Even if the nature of agricultural transformations is poorly understood, opinions on its underlying causes and the specific impact of migration on oasis agriculture tend to be more divergent. This general confusion seems strongly related to the fact that studies attempting to systematically study agricultural developments in the oases of the Maghreb are virtually non-existent. Most studies are mono-disciplinary, purely descriptive case-studies of one particular oasis, which do not compare their findings with studies of other oases, let alone provide systematic empirical testing of hypotheses associated with any particular theory.

Most studies seem to be particularly incapable of comprehending the high spatial differentiation which characterises contemporary oasis agriculture. Whereas in some oases agriculture seems to be partially or entirely abandoned, peasants make large investments in others, intensify agriculture on existing plots and even create new agricultural extensions in the desert via motor pumps. In other oases, agriculture seems to be more or less continued in a traditional fashion, using traditional sources. Within many oases, opposing trends can even be observed simultaneously. Most studies typically fail to explain the co-existence of several, apparently contradictory trends, and concentrate on one trend only. Conclusions are often coloured by the situation in the particular oases under study, or by particular theoretical convictions (sometimes linked to ideologies) which are not tested through systematic data collection and analysis.

With regards to specific studies on the impact of migration on oases, studies in the Maghreb are generally purely descriptive-qualitative, and lack mostly any attempt at generalising and often lack any link to theory at all. Moreover, methodologically they are often poorly designed

and lack standardised data collection methods (Bencherifa 1991, 1993; De Haas 1998). This reflects criticism on migration impact studies in the Mediterranean in general (Taylor 1998; Massey et al. 1998).

This research project aims at improving systematised insights into agricultural transformations in oases, the ways in which they are linked to migration processes and their ecological consequences. In order to provide this insight, in the following paragraphs we offer an overview of existing views on the literature on migration and agricultural development in the Mediterranean in general and oases in particular. We will use insights from the general academic literature on migration impact on regions of origin, which will be used to interpret and develop a theoretical framework, within which the findings of the IMAROM research will be interpreted. Finally, based on a synthesis of the literature, a conceptual model of the determinants and consequences of agricultural investments will be elaborated, which will enable us to derive a set of basic hypotheses evaluated through the analysis of data collected in the Moroccan and Tunisian research oases.

2.2. The differentiated impact of migration on oasis systems

2.2.1. The dominant pessimistic scenario

Based on the bulk of literature on migration and agricultural development in the Maghreb and in the Mediterranean in general, one is inclined to conclude that migration has provoked stagnation or even decline of the local economy and agriculture in ecologically ‘marginal’ areas of the Maghreb, which includes, in addition to the southern arid oasis areas, also most mountain areas. The argument is generally as follows: migrant remittances and other external, non-agricultural sources of income have become the most important revenue source for oasis households. Agriculture is now only a marginal, supplementary source of income, and of secondary interest. Moreover, agriculture has often become the subject of strong aversion, particularly among the rural youth. Consequently, land use would have become less intensive, and sometimes fields are even abandoned (Ferry & Toutain 1990).

Another common assumption is that migrant remittances are used mainly for the construction of opulent new houses, the purchase of luxury goods and other investments evaluated as ‘non-productive’. So-called productive investments in, for example, agriculture would be very limited or even absent. In many instances, migrant households would even largely or entirely withdraw from productive activities, in or outside agriculture. In the case where traditionally intensive oasis agriculture persists or investments occur, it would mainly concern an economically non-viable form, often described as ‘ritual’ (De Mas 1990) or ‘sentimental’ (Bencherifa 1991). Moreover, the high consumption levels of, in particular, international migrants, would lead to local price inflation, rendering the life of non-migrants more expensive. Therefore, the impact of migration on the regions of departure would be very modest, or even negative (Heinemeijer et al. 1977, Kagermeier 1997, Lebon 1984, Lazaar 1987, Pascon & Van der Wusten 1983; for other Mediterranean countries see Heckmann 1985, Penninx and Van Renselaar 1978, Massey et al 1998).

Furthermore, the breakdown of extended families, the erosion of the ethnic hierarchy and the concomitant disintegration of the power of the traditional community (*jemâa*) regulating the maintenance of the hydrological infrastructure, and, as some argue, labour shortages, which would emanate from the absence of a substantial part of the male population, have undermined the enforcement of common law and the willingness to carry out collective water and soil conservation measures (Charoy & Torrent 1990: 229; De Mas & Kruithof 1992: 122; Aït Hamza

1999, Kerboub 1990). The general neglect and deteriorated land and water management would lead to the breakdown of the agricultural infrastructure, particularly of the vital irrigation system. These developments would provoke land degradation and desertification, further decreasing agricultural productivity, increasing an 'unhealthy' dependence on external revenues.

As we will see in the following sections, this view, which tended to prevail in debates on the impact of migration on oases for many decades, corresponds with 'pessimistic' theories which used to dominate much of the broader scientific debate on migration-development linkages in the past decades. These tended to interpret migration as one aspect of capitalist penetration, which would have ruined stable peasant societies, undermined their economies, and uprooted their populations. In this view, migration is put in a strongly negative light, as an expression of increasing dependency on global political-economic systems dominated by the dominant Western powers. Migration would not only be a consequence of capitalist penetration, but would also further undermine the local economy, by depriving communities from their most valuable labour force (one of the most classical arguments explaining the decline of oasis agriculture), further undermining the local economy and increasing dependence on the outside world. In a process known as 'cumulative causation' (Myrdal 1957) "international migration tends to sustain itself in ways that make additional movement progressively more likely" (Massey et al 1998:45). In this way, the vicious circle would be closed, with migration creating an unfavourable situation in the sending areas causing more migration.

Theories that view capitalist penetration and its concomitant phenomena such as migration as detrimental to economies of underdeveloped countries and as the very *causes* of underdevelopment instead of paths towards development, are strongly inspired by the work of Marxist-inspired historical-structuralists such as Andre Gunder Frank (1969) and other frontrunners of the 'dependency' school, a body of scholarship primarily developed by Latin American scholars. Another exponent of this historical-structural school of thought is the world-systems theory of Emmanuel Wallerstein (1974, 1980)³. These historical-structuralist views have been particularly influential among French and Maghrebi academics, and still dominate much of the debate on migration and development in the Maghreb, on which the evaluation is mostly negative (cf. Chattou 1998).

2.2.2. Towards a contextual approach to migration impact on oasis systems

A growing number of recent studies, mostly dating from the 1990s, reveal that in various oases of the Maghreb, peasants have invested considerable amounts of money in the development of relatively modern forms of agriculture and other local economic activities. After a period of relative stagnation during the 1960s and 1970s, there seems to be a true revival of oasis agriculture in many places since the 1980s, a development that seems to have accelerated in the 1990s. A second observation is, that in many oases, international migrants and migrant remittances feature prominently in these developments. Although migrants do not play an important role in all oases, it becomes increasingly clear that migration can play a positive role by enabling investments through migration remittances (Bencherifa & Popp 1990; Bisson 1990, 1991; Bou Ali 1990; Clouet & Dollé 1998; De Haas & De Mas 1997; De Haas 1998, 1999; Ferry & Toutain 1990: 262; Nasr 1999; Popp 1999; Skouri 1990; Kassah 1998). Third, there is a strong spatial differentiation in the development of oasis agriculture and in the impact of migration on oasis economies, agriculture, and ecology. So-called 'capitalist penetration' has apparently not uniformly resulted in further marginalisation and underdevelopment.

³ For an excellent review of migration theories, see Massey et al. 1998: 34-41.

In contrast with the above-mentioned 'pessimistic' views, it becomes more and more clear that instead of an overall decline, an agricultural transformation is taking place, in which traditional forms of oasis agriculture are partly or entirely transformed into new forms. These transformations may concern cropping patterns, but mostly also pertain to technical change. Motor pumps are increasingly being introduced as well as modern agricultural techniques, such as new irrigation methods, the use of fertilisers and pesticides and the introduction of new crop varieties.

Spatially, at times these developments occur in traditional oasis areas, for example, by installing pumps in the ancient oasis. However, individual peasants or co-operatives of peasants often seem to prefer to localise new investments in new, until recently, barren areas outside the traditional oases, where traditional constraints with respect to water availability, water distribution, land property and collective regulations do not play as important a role (Bencherifa 1991: 132-134).

Migration remittances seem to feature prominently in this development: migrant households or returned migrants play a predominant and innovative role in this process. International migrants seem particularly important in the first phase of the introduction of new techniques or cropping patterns, as they can afford the risks and the costs of such investments. In later phases, such innovations tend to diffuse over a large part of the population, including non-migrants. It goes without saying that migration is not the only cause of these changes. However, migration seems to play an important enabling role, as it is the main source of stable cash income in many oases, and as migrants often initiate new developments.

Thus, the impact of migration and concomitant socio-economic changes on oasis agriculture are not necessarily negative, as migration enables not only the abandonment of agriculture but also provides the necessary revenues to invest in agricultural transformation (De Haas 2000a). In many oases, internal but in particular international migration remittances seem to have contributed to the development of a more 'modern' agriculture (Aït Hamza 1987; Bencherifa & Popp 1990; Bisson 1990; De Haas & De Mas 1997; Bencherifa & Refass 1994; Dubost & Moguedet 1998).

Of particular importance is the notion that the spatial impact of migration is highly differentiated (cf. De Haas 1995, De Haas & De Mas 1997). The extent to which the above-described transformations occur differs considerably from oasis to oasis, and ranges from almost complete abandonment to a high degree of investments and dynamism. Although migration (remittances) seems to have had a primordial *enabling* role in recent changes, it is a key observation that migration does not determine the nature and direction of changes as such (De Haas 2000a). The extent to which migration remittances are invested and to which specific activities such investments are allocated, depends on the specific local socio-cultural, economic, political, and geographical circumstances, which can form obstacles or, instead, incentives for investments in agricultural development. Variations in these contextual variables explain geographically varying transformation patterns.

The main insight of recent literature on migration and development in oases is that the impact of migration is high, but that it does not determine the nature and direction of changes as such. In the case of agriculture, *migration enables the withdrawal from agriculture as well the intensification of agriculture*. Therefore, we appeal for a view of migration, in which the strongly contextual character of its impact stands central.

It has been clear that oasis agriculture in the Maghreb is not disappearing but undergoing a gradual, though highly differentiated, transformation across locales. The period until the 1970s seemed to be marked by a crisis of traditional oasis agriculture. This crisis was the consequence of the decline of its former economic base through its integration into a modern market economy, its incorporation into the structures of the nation-state and increased mobility. For oasis dwellers, migration was the most important phenomenon through which these fundamental changes were

felt, as migration fundamentally changed their livelihoods. The majority of households in the oases of the Maghreb are involved in internal or international migration. Although migration as such was not the fundamental cause of the decline of traditional oasis agriculture, it seems to have accelerated this trend by further undermining ancient ethnic hierarchies and the functioning of traditional village institutions regulating the maintenance of the collective agro-hydraulic infrastructure.

However, since the 1970s and 1980s oasis agriculture seems to be recovering through the establishment of new modes of existence.⁴ What is important, however, is that these developments are multi-faceted and taking place in a spatially differentiated pattern (cf. De Haas & De Mas 1997, Dollé 1998). So, it is neither a uniform 'green revolution', nor a collective 'death' of oases that is taking place in the deserts of the Maghreb, but a gradual process of agricultural transformations. In fact, a whole range of development responses is possible, depending on the specific local context.

The second insight emanating from the literature is that migrants bring in more than money, also introducing a different, more entrepreneurial attitude. In other words, the 'human capital' they accumulated while working in other countries could well be put into practice for agricultural investments. If this hypothesis is correct, migrants would tend to invest more than non-migrants, if the migration impact analysis on agricultural investments is controlled for income.

The third insight is that migration is one factor among many others determining actual processes of agricultural development, and that a wide range of agricultural development responses to migration is possible, depending on the specific local, regional and national context in which investment decisions are made. Migration may play an important role in these transformations, as a main local 'capital provider' for agricultural investments and 'enabler' of agricultural modernisation. This would be particularly true for oases with a generally low income level, where migrant households are the only ones able to make investments.

The fourth and final insight is that agricultural modernisation and extension, and the changes in land and water management and resource use that this development implies, constitutes a potential danger for the sustainability of oasis agriculture. This pertains to the increased pumping of water and increasing problems related to soil degradation, which may undermine the vitality of oasis agriculture if these problems developments remain unsolved.

⁴ These transformations of oasis systems seem to have started earlier in Tunisia and Algeria than in Morocco, where they only gained ground in the 1980s.

2.3. Links to general theories on migration and development

2.3.1. Introduction

The shift in the debate on migration and agricultural development in the Maghreb from a rather uniform, ‘pessimistic’ view to a more post-modern, pluralist view, in which various development responses are possible, and which recognised the fundamental complexity of migration-development linkages, seems at least partially a reflection of a paradigm shift in the general debate on the effects of migration in sending areas. Within the scientific literature the interaction between international migration⁵, remittances and development in sending countries has been subject of continuous debate. These debates were largely based on a number of socio-economic case studies which have been conducted on the impact of migration on sending areas, with a particular focus on Mexico and a number South-East Asian countries (cf. Massey et al 1998).

The present study aims to contribute to theory-formation on the interaction between migration and local development responses within the agricultural domain in arid regions of the Maghreb, and, secondly, the environmental consequences of these changes. To put the research in a wider theoretical context, it will refer to existing theories on the causes and perpetuation of migration and theories on the impact of migration on sending countries. The explicit choice for a particular theoretical framework is important, since it has important methodological consequences concerning the basic unit of analysis (e.g. individual, household, community) as well as the type of data to be collected (e.g. only migrant households or also non-migrant households)

2.3.2. Evolution of migration impact theories

Several theories concerning the root causes of migration have been developed in the past decades. Neo-classical macroeconomic migration theory (Lewis 1954, Harris & Todaro 1970) and neo-classical microeconomic migration theory (Todaro 1969, Todaro & Maruszko 1987, Massey et al. 1993) focus on (expected) wage differences and rational individual decision-making to explain migration. Other theories explain migration at the macro-level, such as the dual labour market theory (cf. Massey et al 1993; Piore 1979), theories inspired by dependency-theory (Frank 1969) and Wallerstein’s (1974) world system theory, which perceives migration as a natural outgrowth of disruptions and dislocations that are intrinsic to the process of capitalist accumulation. Apart from theories on the causes of migration, several theories have been developed which explain the perpetuation of migration, of which network theory (Cholden 1973, Taylor 1986, 1987; Massey et al 1987, 1998), institutional theory and cumulative causation theory (Myrdal 1957) are the most important.⁶

In recent years, the so-called *new economics of labour migration* (NELM) has emerged as a powerful response to and improvement of neo-classical theory. NELM places the behaviour of individual migrants in a wider societal context by considering the family or the household as the most appropriate basic decision-making unit (Stark & Levhari 1982; Stark 1993; Taylor 1998, Massey et al. 1998). This approach allows for integrating factors other than rational individual income maximisation influencing migration decision-making. A key insight of this new approach is that people, i.e. households, act not only to maximise income but also to minimise and spread

⁵ There are no theoretical grounds for excluding internal migration from migrant impact analyses. However, as most migration impact studies concentrate on international migration, the ‘remittance’ effect is mainly felt through international migration. Internal migrant households tend to earn only slightly higher or lower incomes than non-migrant households.

⁶ For an excellent review of these theories Massey et al. 1998.

risks, as well as overcome various market constraints, apart from strict labour market constraints (Massey et al 1998, Stark & Levhari 1982; Taylor 1986, 1987). Migration can be a household response to income risks, as migrant remittances provide an 'income insurance' for households of origin.

In addition to general theories explaining the fundamental causes and perpetuation of migration, specific theories have been developed on migration impact in sending areas, which in some cases have links with theories on the causes of migrations. Based on the existing literature, one can make an analytic distinction between two extreme views on this subject: the 'migration syndrome' versus 'developmentalist' views (Taylor 1998). Most existing studies on the relation between migration and local development in migrant regions of origin have been rather pessimistic and tend to reflect the 'migrant syndrome' view (cf. Lipton 1980, Papademetriou & Martin 1991). They tend to conclude that remittances are primarily spent on consumption and the construction of houses, and that they are hardly used for productive investments.

Particularly in studies inspired by dependency theory, migration is perceived to drain sending areas of financial capital and labour, thereby hindering local economic development rather than stimulating it. In this way, migration would contribute to their further 'marginalisation' and dependency on income provided from outside the local community. According to this view, migration does not contribute significantly to local development and even has a negative impact, by way of a retreat from local income-generating and productive migrant activities. As has been demonstrated, this is also the general tendency of migration impact studies carried out in the Maghreb.

2.3.3. New economics of labour migration

In recent years, however, more and more scholars are challenging these unilaterally pessimistic or optimistic views. This criticism has originated mainly from insights gained from the above-mentioned "new economics of labour migration theory (NELM)" (Stark 1993, Taylor 1998, Massey et al. 1998). Taylor et al. (1996:1) argue that "prior work has been unduly pessimistic about the prospects for development as a result of international migration, largely because it failed to take into account the complex, often indirect ways that migration and remittances influence the economic status of households and the communities that contain them". Most studies on migration impact in sending areas consisted only of remittance-use studies and qualitative assessments about migration impact, oversimplifying the complex relationship between migration and development.

The generally pessimistic conclusions of most studies carried out in the 1970s and 1980s also seemed to be influenced by unrealistic policy-making and research expectations concerning the development potential of migration, reflecting an overall optimism in post-war thinking on development. Migration impact studies tended to have a rather one-sided focus on the way in which migration might stimulate productive enterprises, and tended to undervalue the direct positive impact international migration has on the daily lives of numerous rural families who now live in decent houses, are well fed, can pay medical care and can receive education due to migration remittances. Moreover, there are indications that local development responses may take at least one to two decades to fully materialise, as migrants save money before being able to invest. Moreover, investments in productive enterprises generally occur only after the most basic necessities – such as decent housing – have been fulfilled.

Criticism of the new economics of labour migration as they relate to most migration impact studies rely on four basic points. First, most studies fail to interpret the behaviour of individual migrants in the context of the family and the community. Household-level analysis is essential not only for the study of migration decisions but also in order to analyse the effects of migration

remittances on investment and consumption expenditures (local economic development), and how these effects in turn reflect migration determinants.

Secondly, most migration studies are rather vague and impressionistic in their make-up. Many migration impact studies have major methodological deficiencies and lack any links to theory (Massey et al 1998). For example, most do not even include a systematic comparison between migrant and non-migrant households. Their evaluation has often been biased by unrealistically high expectations concerning the development potentials of migration. In fact, recent studies have demonstrated that in some regions migrant households are more inclined to invest than non-migrant households (Adams 1991, Taylor et al 1996).

Moreover, most studies fail to take into account the indirect impacts of migration. They tend to analyse only the direct (economic) effects of migration (i.e., the social and economic impact of migration remittances on migration households), whereas migrant remittances may also have a significant impact on non-migrant households (i.e., it may reshape sending communities as a whole). High local consumption levels of migrant households can also lead, via multiplier effects, to higher incomes for non-migrant households. These increased consumption levels – easing capital and risk constraints on local production – may in turn provoke local investments. Recent case studies from different countries confirm that local multiplier effects deriving from remittances can be significant (cf. Taylor et al 1996, Taylor 1998, Massey et al. 1998).

Thirdly, most studies apply a rather arbitrary definition of 'productive investments' and are unduly negative in their assessment of so-called non-productive investments (Taylor 1998). Provided that these 'non-productive' expenditures are done locally, they might have a positive impact on the local economy, household incomes and further investments. For example, schooling is often not considered as a productive investment, while in the long run it may stimulate innovation and create employment and income. The same applies for the usually high expenditures of migrant households on construction activities, which have a direct positive impact in stimulating local employment.

Fourth, prevailing hypotheses concerning the impact of migration (positive or negative) are too simplistic and are almost always contradicted by empirics. In fact, as we also observed for the oases of the Maghreb, the specific geographical impact of migration is highly differentiated across locales. The way remittances are actually used heavily depends on the specific physical (natural resources, climate, infrastructure), socio-economic, and political context in which migration decisions are made and in which migration remittances flow. Therefore,

“the fundamental question is not whether remittances do or do not promote economic development, but rather, why international migration appears to be associated with positive development outcomes in some migrant-sending areas but negative ones in others Under the right circumstances, then, a significant percentage of migrant remittances and savings may be devoted to productive enterprises.” (Taylor 1998:2).

According to Massey et al (1998:261), two fundamental obstacles to the effective promotion of development through migration emerge from the research literature: on the one hand, poor public services and infrastructure, and on the other a lack of well-functioning markets, in particular rural credit markets. It is therefore impossible to presuppose a fixed causal relationship between migration and development, since its actual impact depends on interfering, contextual factors, that is, the specific socio-cultural, political, economic and geographical situation at local, regional and national levels.

2.3.4. Relevance of general migration impact theories for the Maghreb

The findings of the new economics of labour migration correspond with recent findings from the Maghreb, which underscore geographical heterogeneity in response to migration. A key insight is that migration remittances play an enabling, not a determining role. *There is no deterministic relationship between migration and local development.* The consequences of migration are not inevitably either *positive* or *negative*. This depends on the specific investment conditions, and the impact may differentiate from domain to domain.

Insights into the differentiated impact of migration on local economic development can be specified for investments in agricultural activities. Specific local, regional and national contexts influence decision-making in oasis agriculture, which may explain the absence of agricultural investments in some oases and large sums invested elsewhere. Among the obstacles and enabling conditions for agricultural investments in oases at the local level, the following are frequently mentioned: climatic conditions; soil and water quality; water availability; nature and complexity of land tenure and irrigation systems; allocation and distribution of plots; migration history; specific ethnic relations; communal decision making structures on land and water management; and gender-related issues flowing from existing divisions of labour. These factors may partly explain geographical differences in investment behaviour.

As Taylor (1998) has argued, the economic environment encouraging out-migration also sets the stage for migrant remittances to stimulate development in migrant-sending areas. Poor market infrastructure, incomplete or missing credit markets, misguided economic and fiscal policies and corruption may all create economic uncertainties and restrict opportunities to use remittances for local investments.

