Chapter 16
Culturally Mediated Provision of Ecosystem Services: The *AGDAL* of *Yagour*

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Introduction

There has been a wide international recognition of the potential contribution of traditional systems of communal natural resources management to current practices of sustainable development (Ostrom 1990; Neves-Garca 2004; Folke et al. 2007). Nevertheless, little research has been conducted regarding the still existing traditional institution of communal natural resource use and preservation in Morocco (Auclair and Al Ifriqui 2005). One of such still existing institutions is *agdal*, which can be defined as a seasonal prohibition of access to a given agro/sylvo/pastoral resource, in order to allow the resource a resting time during the most sensitive period of growth (e.g., the 3 months of spring in the case of the Yagour High Atlas Mountain pastures that we will analyze in detail in this chapter). The dates, resources, and spaces affected by this prohibition are established according to the community's own history, territorial heritage, political structure, and economic strategies. The political body that makes such decisions and oversees it execution is the tribal assembly (*jamaa*) composed of the heads of all households that use the resources. The *agdal* management system aims at optimization of productivity of the resources as well as assurance of a sustainable extraction and redistribution of the resources among its users. Such administrative scheme most frequently leads to (1) the maintenance of dense plant cover, a consequence of prohibition of the biomass removal for several months (Hammi et al. 2007), and (2) higher rate of biodiversity conservation within the *agdal* managed space than in non or less *agdal* managed spaces (Kerautret 2005; Alaoui-Haroni 2009; Dominguez and Hammi 2010).

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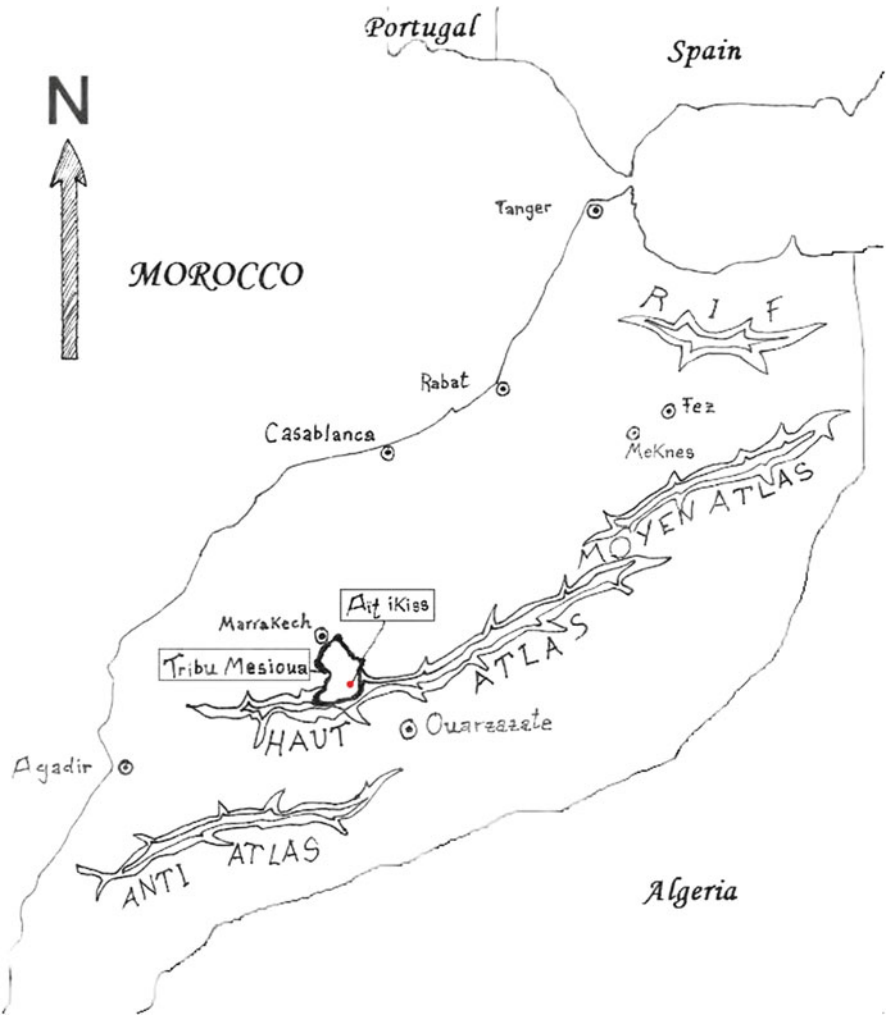


Fig. 16.1 Geographic location and borders of the *Mesioua* tribe and the *Ait Ikiss* group in the High Atlas

The territory of *Yagour* is a pastoral area of more than 70 km² that belongs to the *Mesioua* tribe (Fig. 16.1). It is located in a very difficult to access region, only 50 kilometers away from Marrakech. The study area stretches from 1,900 meters above sea level (masl) up to the peak of the sacred mountain of *Meltsene* reaching almost 3,600 masl. The *Yagour* is particularly used as a summer pastoral land, receiving more than 7,000 people each year from almost 50 nearby villages and hamlets (maximum 10 km distance) with about 25,000 inhabitants in total.

The *agdal* of the *Yagour* is, above all, a space characterized by green grasslands symbolizing the idea of life in the environment abundant in water. The cultural representations associated to it by herders often make reference to a mystic place.

Fig. 16.2 Rock carving in *Yagour* interpreted as showing the *Maltsene* Mountain and the *Yagour* River in the middle. (Photo by B. Romany)

In the *Yagour*, the rites of fecundity and pastoralism were probably present in the Paleoberber herding societies of the Bronze Age (4000 to 2500 BP), as the profusion of engraved symbols on the red sandstone of these pastoral *Olympus* (Auclair and Al Ifriqui 2005) demonstrates (Fig. 16.2).

The term *agdal* (plural: *igoudlane*) has complex etymology and meanings. *Agdal* is a root of words used in the region stretching from the Atlantic coasts of Morocco to the *Aïr* of southern Algeria (Lefébure 1979). It can also be found in Tunisia where a similar collective natural resource management arrangement exists for fruit trees. All of it points out a more than likely widespread of such collective institutional arrangements in the past. Although the most common meaning in the High Atlas Mountains, where the presented study is based, is the temporary prohibition to access a particular space or resource after the agreement imposed by the tribal assemblies (*jmaa*) (Auclair and Al Ifriqui 2005), other meanings of this term are also present. Mahdi (1999) mentioned that E. Laoust translated the meaning of the verb *agdal* as "to herd animals in a grassland." In other places in Morocco, *agdal* means seed tank, or refers to a great water container, a small private plot with thick grass due to constant artificial irrigation, a woman's abundant hair … , etc.

Al Faïz (2002) stated that *agdal* has also spread among the non-Berber societies far beyond the Atlas: "During its nine centuries of history, the city of Marrakech has accumulated an impressive green heritage. It is in this city where the art of gardens

Fig. 16.3 *Tagdalt* (little *agdal*) of a Berber cemetery with an evident ecological result (pool of biodiversity and point of seed diffusion) (photo credit P. Dominguez 2004)

was born in the 12th century […] [It is] a new style, that of the "Almohade garden" (the *Agdal* of Marrakech) […], with huge orchards, large pools, water pavilions… […] because its creators were not just servile imitators of the oriental model […] The Berbers from the High Atlas saw in these growing city gardens, the familiar enclosure of their mountains […] They called it *agdal* to conserve this evocation of green pastures and the memory of their *alpages* […] Once the immense enclosure of the *Agdal* of Marrakech was completed, the Almohades exported it as far as they could. The same model of gardening was used in Rabat, Gibraltar, and Seville," all far away from the heart of the Atlas and most of them beyond Morocco.

Besides the magnificent landscape that sculpts and contains the institution of *agdal*, numerous legends accompany its presence in these mountains. Among the stories on *Yagour,* one often told is that of *a man dressed in white, riding a white horse, who appears every year at the time of the herding prohibition on the Yagour in order to save the agdal from dishonest stealers, punishing them in several ways*. Another story refers to *the 360 saints who walk around together to watch over the Yagour with their horses and camels*, and symbolizes long caravans, long voyages, and testimonies of allegiance and respect. Legends also identify many spaces around *Yagour* situated near saints' graves or cemeteries, that are called *tagdalt* (little *agdal*) and have abundant vegetation, protected permanently from cattle and humans. Such protection is achieved mainly through the force of the beliefs and taboos that are present around these sacred places (Fig. 16.3).

The system of *agdal* is an ancient and inherently Moroccan form of gardening, or maybe even of the whole Maghreb. Proved to resist climate variations and social

change throughout centuries (Ilahiane 1999), *agdal* has survived and continues to structure the territory, natural resources, and landscapes of the High Atlas Mountains. In fact, *agdal* encourages dense plant cover, and biodiversity through its specialized and planned land use. The plant cover is also denser in *agdal* managed spaces than surrounding areas, as its spaces are ungrazed from spring to summer, and forests are only cut in winter, etc. At the same time, the *agdal* of *Yagour* contributes to the local economy, mainly in three ways. First, the *agdal* managed territory brings in up to 20% of the annual fodder for cattle (Dominguez et al. 2012). But more importantly, the contribution of *agdal* in terms of fodder arrives in the middle of the summer, when other pastures have nothing to offer. Secondly, *agdal* provides fundamental manure to enrich agricultural sectors, making these much more productive. Finally, *agdal* brings in increasing income through the emerging ecotourism surrounding the discovery of the natural and cultural heritage of *agdal* in the region. As we can see, *agdal* proves to be multi-adaptable and highly resilient, resisting collapse for centuries and still reformulating itself without decline. Through life histories we have been able to trace the existence of *agdal* of Yagour to 150 years ago, but it is undoubtedly older, as shown by toponymy, geographical extension of the same type of practices within and outside of Morocco, and also rock carvings dated to different time periods.

Case Study

In particular, we carried out an in-depth study of the *Ait Ikiss* group, which comprises about 640 people who occupy four different habitats: *Azgour/Tifni, Ikiss, Warzarzt*, and *Yagour n'Ikiss* (Fig. 16.1). The *Aït Ikiss* belong to the *Mesioua* tribe, who are all patrilineal. As in other Berber societies, all the decisions about the household's use of agro-pastoral resources are made by the male who is the household head, and in his absence, by the oldest adult male of the family (depending on the family structure, it can be a brother, the eldest son, etc. …). The *Aït Ikiss*, and the rest of the mountain *Mesioui*, are defined in Morocco as mainly nonorthodox Sunni Muslims who sustain indigenous beliefs and practices as a result of a long cohabitation and reformulation between pre-Islamic religions and earlier Islam. They organize activities and manage their communal territory through the above mentioned tribal assemblies (*jmaa*). The seasonal *agdal* prohibitions imposed in their territories are decided by the *jmaa* and are watched over by *jmaa* nominated members that serve as guardians (locally called *Ait Rbains*). When the *Ait Rbains* report an infraction, graduated sanctions are usually established by the *jmaa*, according to the type of offences. The extensive pastures of the *Ait Ikiss* and dense humid grasslands of the highlands mainly situated in the *Yagour n'Ikiss* habitat (about 5 km^2) are the most important basis for the existence of the local agro-pastoral system. But other spaces and resources are also important to this system, as we will see later (Fig. 16.4).

The studied groups still follow more or less the pattern of the old tribal organization, described by a British anthropologist Ernst Gellner as *segmentary structure* (Gellner 1969). It is characterized by fitting one social group (*segment*)

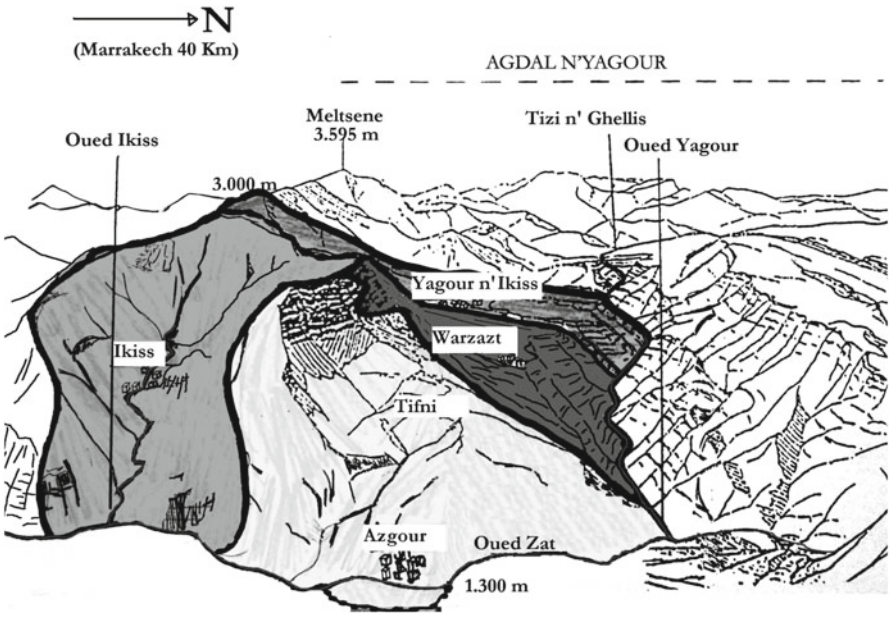


Fig. 16.4 Territory of the *Ait Ikiss* and their four habitats (after Dresch 1939)

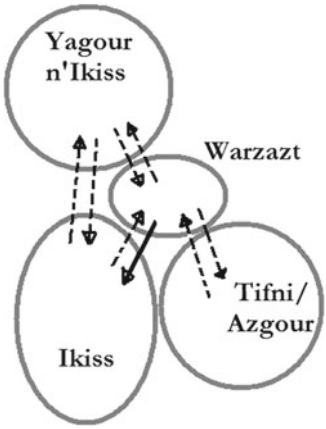
into another, from the smallest to the largest, like the Russian dolls (Evans-Pritchard 1970). For example, the *Ait Ikiss* continue organizing themselves in tribal groups, subgroups, villages, clans, and nuclear families. They speak *Tachelhit* as their mother tongue, a southern Moroccan Berber dialect. In addition, practically all men and some of the younger women speak Arabic. They learn this language through television, administrative procedures, in schools established in the area around the 1980s, and through social/professional relationships (only men in this case). The local agro-pastoral sector contributes 75% of the income, which is usually combined with seasonal emigration or engagement in some specialized local professions such as masonry, smithery, or others of the sort (Bellaoui 1989). Locally practiced animal husbandry concerns mainly cows, sheep, and goats.

Collective Spatial Organization of the Tagdalts System of the Aït Ikiss

This area with heavy winter snow and a harsh climate suffers from fodder shortages for the herds during winters and especially in dry years at the end of summers. It is thus a challenge for these agro-pastoralists to manage the use of the territory in time and space in order to meet the nutritional needs of their livestock, and to ensure soil fertility in the cultivated areas by means of animal manure (Genin et al. 2012). With this in mind, agro-pastoralists regulate access to the resources by means of various

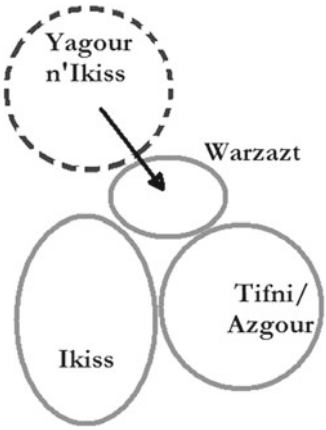
agdals. All these *agdals,* as a whole, are locally named *tagdalts* (small *agdals*) in contrast to large tribal *agdals* managed by several villages and tribal groups. The discussed below agro-pastoral calendar reflects the choices people have regarding restrictive herding periods which dictate the rhythm of displacements of animals and people, in relation to the availability of different natural resources throughout the year. There are five major episodes of movements in the annual cycle.

28 September–28 March



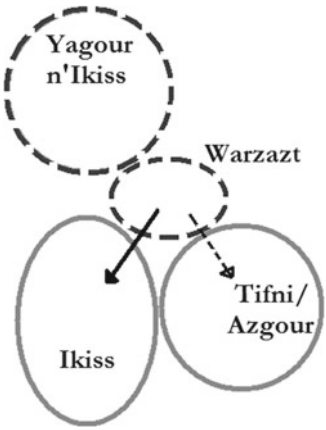
On September 28th, after 2 months of herding prohibition, the *agdal* (or *tagdalt*) of *Ikiss* opens up. Until this date the prohibition affects not only herding but also gathering walnuts and other fruits. From this date onwards, all spaces are opened and there are multiple movements of people and animals. In any case, it is nut gathering at the end of September which dictates the main movement of peoples (main displacement is always indicated with a solid line arrow on the diagrams and other movements are represented by dashed lines). At this time, most of the people leave for *Ikiss* because that is where most of the walnut trees are located. The village of *Ikiss* is the location where most of the *Ait Ikis* population spends the autumn and winter seasons. One of the reasons for this is walnut gathering, but people move there mainly because it is located at lesser altitude (1,700 m), and the weather is not as cold as in *Warzazt* (2,000 m) or *Yagour n'Ikiss* (2,200 m). Another important reason for living in *Ikiss* is because it is the hometown of the entire group (hence their name, *Aït Ikiss* meaning "those from *Ikiss*") from where, throughout the last century, some have moved to other habitats. Thus, *Ikis* has more well-built houses and is better suited for spending the winter. *Tifni* is mainly an area for sheepfolds and *Azgour*, although lower and with a better winter climate, has less agricultural lands and is an old sheepfold that was transformed into a village only at the arrival of the twentieth century, after the construction of the road at the bottom of the valley. It is less equipped in terms of infrastructure.

28 March–20 April (Approximately)



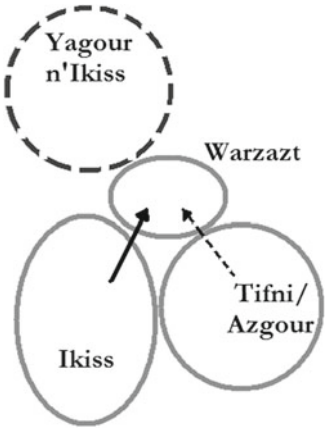
On March 28th the whole of *Yagour* is put in *agdal* for 3 months (areas under the *agdal* prohibition are marked with dashed circles), mainly in order to promote the growth of graminaceous plants. In fact, it takes several weeks to enforce the prohibition because there are always herders who attempt local political maneuvers to stay as long as they can. Presently, the prohibition is only imposed from about mid-April every year. At this time, approximately 50 adult shepherds of the *Aït Ikiss* leave *Yagour*. People who have been herding their sheep in *Yagour* come down to *Warzazt* at this time. Caprines and bovines are kept away from the colder regions all year except late spring and summer, mostly in *Ikiss* and a very small minority in *Azgour*.

20 April (Approximately)–20 May (Approximately)



Warzazt is the second high altitude habitat of the *Aït Ikiss*, and the most extensively cultivated. According to the shepherds, the month of May is the most critical period for the growth of the pastoral plants at *Warzazt*, although the dates seem to be starting to move with the apparent climatic change that locals say they have noticed. Winter seems to becoming increasingly shorter and snow melts earlier, so people start moving the opening dates earlier. Thus, in mid-spring, the herding prohibition is also imposed on *Warzarzt*, in order to allow the grass to grow back, particularly the strips between the cultivated fields which are especially productive by the fact of being permanently irrigated. At the time of prohibition, the 20 families who have their main houses in *Warzarzt* (mainly sheep herders) are obliged to move with their herds down to the *Tifni* sheepfolds at 1,900 m (on the way to *Azgour*), and especially to *Ikiss* at 1,700 m.

20 May (Approximately)–10 July (Approximately)

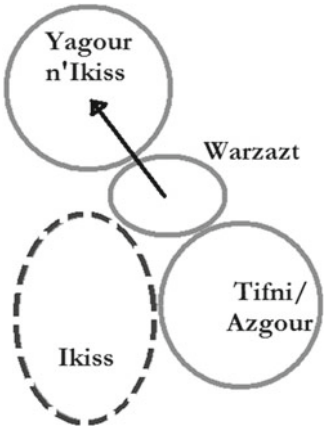


After 1 month of *agdal*, *Warzarzt* reopens again (around May 20th), but not before celebrating the annual ritual in honor of the local female saint, *Lalla Tacheïkht*. To ensure not only the community's health and protection in the highlands, but also that of their animals and a prosperous summer period, all the families come together with food for a ritual group meal or *maarouf*. The people cook butter, they bring in with them and those who do not have butter bring rice, pasta, or couscous. All of the food is shared equally, among the rich who contributed more and the poor who contributed less, in front of the saint's tomb. At the same time, animals such as goats, up to seven for the whole community in 2006, are sacrificed (only by males) for the collective meal, and the blood is supposed to be consumed by spirits (*djin*) that help the saint to guarantee a good period in the summer pastures.

This brings about an opposite migration of people going up from *Ikiss* and *Tifni* towards *Warzarzt*, where about a month later (at the end of June) the barley harvest starts. During this period, virtually all the *Aït Ikiss* migrate towards the highlands.

Also, the two shops in *Warzarzt*, which had been closed since September, reopen with the arrival of the people. In fact, the two shop owners (former local herders themselves) and the *fqih/imam*, move with the group from *Ikiss* to *Warzazt*. Just beforehand, they sacrifice animals in the hope of a good stay in the high pastures.

End of June/Beginning of July–28 September

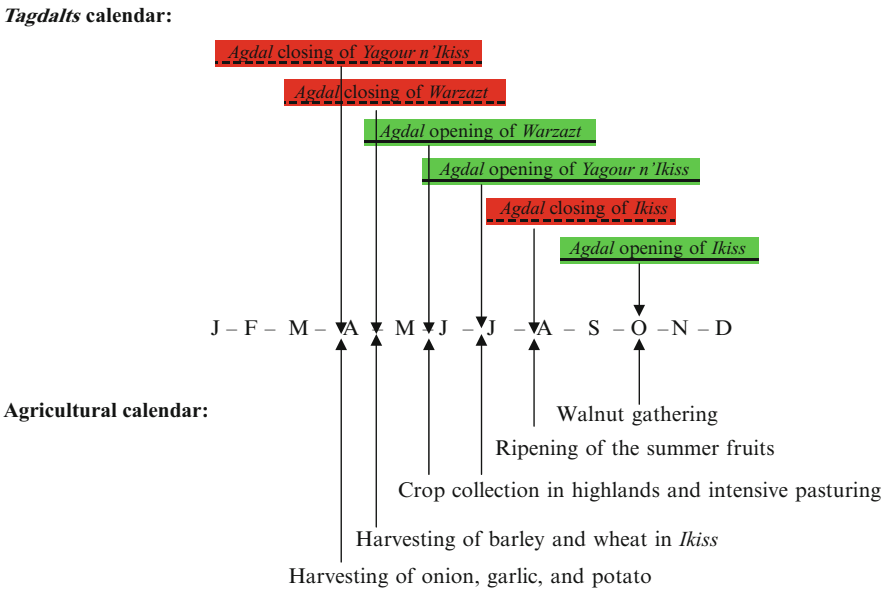


At the beginning of summer, the *Yagour n'Ikiss* opens up again. Depending on the ecological conditions of the year, the *Yagour* opens up at around the beginning of July, according to the decision made by the *jmaa*. Until the 1970s, the opening of *Yagour* took place on a set date, the first Friday (the big Muslim day of prayer) after the start of the Berber summer, the 28th of July, and it was blessed by the family of the macro-regional saint, *Sidi Boujmaa*. Nevertheless, the present growing demography, cultural contact with external Islam, and climatic changes, have forced this date to be brought forward and have made it flexible, adapting it to the climatic variations and needs of every year. Thus, depending on the year, at the end of spring or beginning of summer, the migrant *Aït Ikiss* take their animals up the slopes leading to their richest pastures and prepare to enjoy the most abundant period for the community, which is seen by many children as the holiday period. Presently the descendants of the saint *Sidi Boujmaa*, receive only sporadic visits (four or five decades ago they used to be many) from people who want to give them vegetables, butter, or other alimentary products, or sacrifice an animal, in the hope of receiving the blessing of this great saint, from the beginning of the summer onwards.

The opening of the *agdal* of *Yagour* is an event of great local importance because it provides excellent grazing for the herds, and also an opportunity for the people to meet the inhabitants of other, lower villages altitude after over 9 months of staying apart. Other ritual sacrifices of animals and festive events also take place at this time all over the territory. In those areas that are most favorable for agriculture, the harvesting of cereals is carried out just a few days before the opening of *Yagour* or in

the following weeks. At the same time, the *Ait Ikiss* assembly authorizes the collection of fodder for the winter season, where (only during the first 3 days after the opening of *Yagour*) families can mow as much pasture as they can. A few weeks later, in mid-July, following the same community logic, the *Ikiss* area is put in *agdal* too and herding becomes prohibited once again. This prohibition particularly helps to protect fruit trees in the valley that are ripening at just this time, and also the lowland pastures that had previously been grazed, and which may be severely affected by summer drought. Only every 15 days or so, the fruit tree *agdal* is lifted at *Ikiss* to prevent the rotting of certain fruits that had ripened on the trees before the 28th of September, when the whole *agdal* prohibition at *Ikiss* is officially lifted. When all the people return to their winter houses which they left 4, 5, or 6 months earlier, they hold one last ritual meal or *maarouf*, in which they honor once again the locally buried saint, that of *Ikiss* (*Lalla Tacheikht*). In this way, the end of the cycle is reached, the whole system returns to the situation shown in the first diagram and after the gathering of the walnuts, most of the people stay in *Ikiss*.

As we have observed, the dates and access rules to the renewable resources of the *Ait Ikiss* are closely related to pastoral and agricultural requirements, and also to the system of production (availability of good pasture, mowing of fodder for the winter, fruit trees, cereals, horticulture, grass strips between the terraces, animal manure as agricultural fertilizer, etc.). Below is a schedule for the various *tagdalts* of the *Aït Ikiss* in relation to the agricultural calendar. The schedule evolves with time affected by different socio-ecological changes that take place as new products and economic or ecological conditions are incorporated to the routine. It reveals the overlap between the *tagdalt* and the pastoral and agricultural calendars.



Discussion

This study examined diverse aspects of the *tagdalts* system followed by the *Ait Ikiss*, an adaptive and traditional Berber mode of administrating access to the communal natural resources with its own history and endogenous development. In the last centuries the territory has been appropriated by different users (Dominguez 2010), and *agdal* rules have been updated to fit the particular circumstances at each period. Through the research presented in this study, we have gained better understanding of an ingenious system of agro-pastoral land rotation that has evolved through time until its present forms, which has been observed. Currently, as the study area is concerned, the system has been adjusted to enforce prohibition of herding in different locales during some months of spring and summer in order to maintain sufficient animal fodder all year round, but also to make it compatible with the emerging local agricultural capabilities. At the same time, it remains closely linked to a complex but also changing cosmological system, a holistic set of rules and beliefs which shows concern in the conservation of the biophysical environment, the performance of local economy, and the maintenance of social cohesion, and cultural continuity. Overall, this analysis reveals the importance of the four pastoral lands of the *Ait Ikiss* and explains the collective action embedded in the institution of *agdal*, and helps in answering the question why it endured through centuries even if it has constantly kept evolving and still continues to do so (Dominguez et al. 2010). The answer, in my opinion, is because the *agdal* has always played a crucial role within the local agro-economy, and all of it through the compatibility of local meaning and justice. The indigenous profile of the institution, its local emergence as the result of local negotiation linked to each historical environment, but always built and rebuilt in a certain context of meanings and cultural heritage, gives the *agdal* a character and a legitimacy, which cannot be simply replaced with other external, western, or global proposal.

The herding prohibition discussed here allows the vegetation's flowering, reproduction, fructification, and establishment of young seeds and thus promotes the continuity of the pastoral ecosystems. Also, the *agdal* protection and the nonintensive exploitation of the lands encourages a denser plant cover than that which could be found if spaces were herded simply as "open access" (Kerautret 2005). Thus, *agdals* appear to possibly help fight erosion as well. Also, the system of different *agdals*, closing and opening of places at different times, involves an *ecological mosaic* effect throughout the whole territory of the *Ait Ikiss* due to a specialized and differentiated use of the four key sites discussed above. Backing up or inhibiting the expression of different species depending whether one *agdal* or another is applied also fosters genetic plant diversity (Dominguez and Hammi 2010) and entertains a *pool of biodiversity* that serves as a point of diffusion of different seeds (Auclair et al. 2007).

Concerning the performance of the local economy, we found that the *agdal* management of the pastures fosters continuity and durability of the pastoral economy by creating the conditions for sustainable existence of the people within the current

ecosystem, as discussed above. In fact, the current system based on ecological and economic equilibrium would simply collapse and change its essence should the *tagdalts* disappear, since without the resting period the pastures would lose their *carrying capacity* and ability to reproduce and regenerate the vegetation. Moreover, the fodder contribution accumulated after the herding prohibitions in all the areas controlled through *agdal*, arrives in late spring, summer, or the end of summer, when other pastures are dry and when fodder demands are higher as young animals are still being milked or mothers are pregnant with the second annual offspring. This gives an extra economic value to the fodder that has been accumulated during *agdal* prohibitions. In fact, natural grasses of *Yagour* can seasonally reach the cost as tilled barley!

Nevertheless, it would be too reductionist to limit the analysis to the ecological durability of the system or the *tagdalts'* economic productivity, since the *agdal* has other less materialistic or quantitative functions. First, it gives equal access to pastures for the entire community and highlights a certain social justice among herders. All *Ait Ikiss* benefit from the collective nature of the *tagdalts*, which is the fruit of the agreement of all users who participate in managing of these grasslands and securing access to them for all shepherds. Such arrangements prevent conflicts as *agdal* prohibitions are always imposed after negotiation during the local assembly. *Agdal* is in fact also a tool for social justice that regulates competition among the users. Although it is always the richer herders with more cattle who will make the most profit from the communal pastoral resources, as the *agdal* only establishes a limit for collective time use and not the number of livestock grazing, they will never be allowed to herd during the critical prohibition periods. While the "majority" of users still maintain the rules of *agdal,* the poorer will always have a way of stopping the richer owners. In this way, but also through the emotional appropriation of the territory, *agdals* also participate in local identity building and the feeling of "belonging" to a certain group that regulates rights and duties over those commons.

On a more general cultural level, *agdal* is also one of the main vehicles of a complex cosmological system that gives meaning to the social organization and to the inhabitants' own lives, which is also a value in itself. We have seen how a migration towards the *agdal* managed pastures is an occasion of intense deployment of social and cultural activities, a meaning of normality, of local homeostasis, mixed with a *frenzy* of religious celebrations, as discussed in Sect. 2. All of it takes place in a totally multidirectional and interconnected way and contributes to consolidating the collective discipline that assures the success of this management model of the *agdal*, and by doing so, gives a sense and importance to the activity and its existence. The migration towards the *agdal* is multidimensional and not acknowledging it would distort any analysis. This is a type of social organization where the sacred, traditional, or new formulations of the sacred, hold an important place and give "meaning" to the material activities. The *tagdalts* in turn involve meanings and rites that contribute effectively to the social cohesion and the reproduction of the ecological and cultural order. What we could finally conclude from this discussion is that if we want to have a more complete and holistic vision of the whole practice, an eco-anthropological and transdisciplinary approach is necessary to show all the dimensions of such dynamic collective action around natural resource management as *agdal* systems.

Conclusions

We conclude here that the system of communal management of the *agdal* must be seen and encouraged as a socioculturally resilient, economically sustainable, and ecologically enriching approach to land use. In fact, the system of *agdal* could be used as a tool for designing local developments as it has shown its pertinence through the centuries and different epochs. The *agdal* of *Yagour* is an example of evolutionary "conservationism," which puts forward the role of human agro-pastoral activities in the maintenance, landscaping, and conservation of the environment rather than the "preservationism-sanctuarism," which would exclude humans and their different activities from environmental conservation. In this sense the *agdals* could become a fundamental tool of extensive gardening and territorial management that should not be ignored. This argument should be taken into account if we consider that we are discussing an institution with a very long history and a strong local legitimacy, supported by real competences in matters of renewable resource management.

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