

Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated:
2. Country: Algeria
3. Name of wetland: Oases of Tamantit and Sid Ahmed Timmi
4. Geographical coordinates:

 0° 15' North latitude
 27° 45' West longitude
5. Altitude: 252 to 282 metres
6. Area: 95,700 hectares
7. Overview:

This wetland is a group of several oases, including the main oases of Tamantit and Sid Ahmed Timmi. Each oasis is dominated by a fortress (*ksar*), which is the village and part of the oasis. The palm grove is located farther down the slope. The irrigation system, the *foggara*, is an underground gallery cut with a slight slope in the Albian aquifer of the northern Sahara, formed by permeable sandstone over a limestone intrusion. The region of Touat and Gourara constitute a natural outlet for the groundwater close to the surface and allows water to flow by gravity to the surface. This is confirmed by the string of *sebkha* that extends from north to south. The system is made up of a gallery of varying section and a chain of shafts every 10 to 20 metres. The shafts play no hydraulic role, but make it possible to cut the *foggara* and to maintain it later. The length of the galleries varies from 100 metres to several kilometres. In 1963, there were 572 *foggara* in this area with a total length of 1377 kilometres. At the surface, the galleries are marked by mounds of dirt dug out from the shafts (see photo 1). The *sebkha* is part of the proposed wetland. It is seldom flooded, but plays an important hydraulic role.

8. Wetland type:

Marine/coastal: A, B, C, D, E, F, G, H, I, J, K, Zk(a)

Continental: L, M, N, O, P, Q, R, Sp, Ss, Tp, Ts, U, Va, Vt, W, Xf, Xp, Y, Zg, Zk(b)

Man-made: 1, 2, 3, 4, 5, 6, 7, 8, 9, Zk(c)

The dominant type of wetland is Y

9. Ramsar criteria: 1, 2, 3, 4, 5, 6, 7, 8

Criteria that best characterize the site: 3

10. Map of site included? Please tick yes -or- no

11. Name and address of the compiler of this form:

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Justification of the criteria selected under point 9, on previous page:

Criterion 3:

The isolation of the oasis and its unfavourable environmental conditions have promoted biological diversity that is significant at the level of the Sahara. Among the species of economic interest are the date palm, which has a large range of varieties. At the Tamantit Oasis, 25 varieties have been identified, of which two are resistant to *Fusarium oxysporum*. Man, either through deliberate or accidental selection, has contributed to the creation of new varieties. Among the legumes grown at this oasis are two local cultivars of lentils and green peas. There are also many Saharan cultivars of wheat and barley. Cotton, introduced by the early Jews coming from Cyrene, is still grown today only at this oasis. This species is perfectly adapted to the environment and has been able to develop favourable genetic characteristics. Among the domesticated animals, there are breeds of local chickens, sought after for certain genetic characteristics, and a breed of local sheep (*Ovis longipes*). The Sahara oases in general and specifically that of Tamantit (the oldest) harbour important and diversified genetic resources. There has been no survey of its resources, and conservation measures are necessary to prevent the loss and genetic erosion of local breeds and varieties. Among the wildlife, it is important to point out the presence of fish in the network of canals, which according to tradition come from a large underground water table in the Sahara. These fish have lived here for the past 10,000 years, and because of the darkness there they became blind and reportedly have a membrane instead of eyes. Unfortunately, these fish have not yet been studied. The oasis is a perfect model of sustainable management of

natural resources by man. The wise use of water resources in an environment without rain, the creation of the oasis and the cutting of *foggaras*, has created biological diversity and has maintained it under hostile conditions during thousands of years.

Criterion 4:

The oases are the habitat for several plant and animal populations that live under extreme conditions. Animals and plants adapt to the dry air and the intense luminosity and use only a minimum of water. Over the course of time, these species have developed mechanisms and survival strategies suited to these environments, either through morphological and physiological changes or by complete changes in their life cycle. The oasis constitutes a refuge for sedentary fauna, offering favourable conditions of shelter from the wind and the heat. The oasis is a true ecological niche for many animals.

Criterion 7:

The open canals of the *foggaras* are the habitat for many fish, but at the present time there is no scientific data for the identification of this species.

13. General location:

The oases of Tamantit and Timmi and the *sebkha* are located 12 kilometres north of the main town in the wilaya of Adrar. They are bordered on the south by the Bouffadi Oasis. The two oases are in the communes of Fenoughil and Adrar.

14. Physical features:

Geomorphology: The region has the following varied morphological forms: *hamada*, plateaux, *sebkha* and dunes (*ergs*), which were formed during the early Quaternary in this region. Erosion determined the placement of stream beds and *sebkhas*, then there was a period of highly sandy sedimentation that covered the continental parts during the lower Cretaceous. Paleontological studies have confirmed the existence of freshwater wildlife, and this fauna leads to evidence of a lake that had the Tanezrouft as outlet that existed over a long time in the Touat depression.

Geology: In the region between Reggane and Timmimoun, the soils of this structural formation are sandstone over an intruded continental mass. In the Touat, this facies is heavily fossilized clay in a sandstone conglomerate. Geologically, this is referred to as the Touat depression, which explains the presence of water from the plateau of Tademaït and Ouled Messaoud.

Origin: The oases are not the spontaneous creation of nature, but the result of an effort by man. Wherever it was possible to reach the ground water, oases were created in the Sahara. The *foggara* is a water system that was used to counter the aridity of the climate. It originated in Persia and then spread with human

migrations to the Middle East, before being introduced by the Arabs to the Maghreb. In the Algerian Sahara, the *foggara* is found in the Touat, Gourara and Tidikelt. According to very early manuscripts in the possession of the religious community, the Tamantit Oasis is very old and dates from the seventh year before the hajj and was probably inhabited at the time of the pharaohs. Its *foggara* was reportedly constructed by the Copts, and there is still a *foggara* called Hannou, the name of their god. This oasis was described already in 1445 by a Genovese, Antonio Malfante, who described it “as being surrounded by walls and divided into sections, each protective of its rights.” He gives information on the geographical position of this city as an important centre in West Africa, located 20 or 25 days on horse from several Muslim kingdoms, with intense trade with caravans from Egypt and those coming from Timbuktu. In order to create a *foggara*, the ground water must be higher than that of the area to be irrigated. This condition is usually fulfilled when a flat region is drained by a system of depressions, *oued* or *sebkha*, which cause the ground water to back up. Water from the *foggara* is available year round and its flow is steady. The flow can be increased, if necessary, by extending the subterranean galleries. In Tamantit, there are a total of 42 *foggaras*, of which 20 are still functioning. The two most important are Hannou with a volume of 7 litres/second and Harmoune with 8 litres/second. The *foggarates* used for domestic water in the event of shortages or breaks in the A.E.P. are Harmoune with a volume of 8 litres/second, Anhil with 4.5 litres/second and Mazel with 2.5 litres/second. The depth of the *foggarates* is between 12 and 14 metres upstream at the source (*kraa*) and 0 metres at the basin. The length of the *foggara* (underground gallery and *segua*) is from 4 to 10 kilometres. At the Timmi Oasis, the main *foggaras* are Bouaïssa, Sidi Salem, Lardh Djedida, Barakasse and Boubeker.

Climate: The climate is Saharan, hyper-arid characterized by high evaporation. The coldest month is January (12–16° C), and the hottest month is July at 36.19° C. Average monthly precipitation varies between zero (July) and 3.6 millimetres/year (October). Annual rainfall is 10 millimetres/year. The dry period is from June to September with no rainfall. During the rest of the year, precipitation is very light. At the level of the oasis, there is a microclimate because of the presence of water and vegetation.

Hydrology: Water resources available in this region are ground water from the continental intrusion, where most of the *foggaras* are dug into the aquifer. However, there are some streams in the mountains that make an important contribution to the ground water in the western *erg*.

Factors affecting the area are a decrease in available water, drought, violent, hot seasonal winds, sand storms (January–April) and the sirocco.

15. Hydrological values:

In spite of the rarity of precipitation, the Sahara does not lack water resources. The water cycle takes place completely under ground. The underground water comes from the infiltration of surface water from springs, deep aquifers or condensation during the night at the surface of the *ergs*. This reaches the sediments of the *oueds* and is stored in the porous strata and in the sand. Through capillarity, this water reaches the surface of the large depressions in the *sebkhas* or limestone and sandstone buttes. Water makes possible the creation of an oasis, in a fundamentally different context, and its resources are concentrated and recycled continually. Water resources are used and recycled through this system.

16. Ecological features:

The vegetation at the oasis is formed by several strata. Date palm dominates the tree stratum and is associated with fruit trees at the level of the substrata and with many annual crops in the herbaceous stratum. Palm groves are formed by many varieties of date palms whose economic importance varies from one variety to another. The orchard is composed of a wide diversity of species: almonds, lemons, grapes, figs, oranges, olives, grenadine and apricots. Forage species, such as acacias, are also present. Annual plants are represented by cereals, such as oats, barley and wheat. The market garden plants include tomato, potato, beet, turnip and others. The cultivation of henna (a plant used for dying hair and hands) and the peanut also occupy an important place because of their high sales value. At the oasis, space is used vertically as well as horizontally in order to optimise its use. Date palms form a shade canopy that protects crops on the ground. The vegetative cover promotes the regeneration and conservation of humus and creates a microclimate, thus initiating a cycle capable of conserving humidity and provoking condensation. The water network and the storage basins form a special habitat for fish, amphibians, dragonflies and many species of wildlife that come to drink here. The *sebkha* is also a special habitat because of its temporary nature and its brackish water. It attracts many birds during the period of migration. The oasis is surrounded by a system of dunes and rocky plateaux.

17. Noteworthy flora:

Cultivated plants: the date palm plays an important economic and ecological role in the oasis with a large diversity of varieties. At the Tamantit Oasis alone, 25 varieties of palms have been recorded, including two species resistant to *Fusarium oxysporum albidius*. This disease has destroyed many palms and the resistant varieties are important for scientific research. It plays a stabilizing role in the local communities. At the Tamantit Oasis, there are many local cultivars, for example, Saharan wheat, barley, lentils and peas. The growing of cotton was introduced long ago by Jews from Cyrene and still survives today. The cotton plants have adapted well over time to the drought conditions and are the object of research.

Spontaneous flora: Among the spontaneous flora, there are many species of interest to medicine. This is the case of *Zygophyllum*, fenugreek and nigella. There are also many ecotypes of domesticated species. This is the case of *Erica sativa*.

18. Noteworthy fauna:

Domesticated animals: The oasis in general and that of Tamantit in particular is the habitat for many varieties of domestic species. This is the case for a species of sheep locally called *d'man* (*Ovis longipes*) and a breed of chickens with very short legs, which are of special interest for study because of their adaptation to the environment and their interesting genetic characteristics.

Wildlife: The sedentary wildlife is typically Saharan with many species threatened or protected by law. This is the case of the Dorcas gazelle (*Gazella dorcas*), the North African hedgehog (*Atelerix algirus*), the fennec (*Fennucus zerda*), the sand cat (*Felis margarita*) and the *goundi du Sahara* (*Ctenodactylus vali*). There are also several protected reptiles such as the Agra lizard (*Varanus griseus*) and the black spiny-tailed lizard (*Uromastyx acanthinurus*).

The oasis is a place of transit and is a stopover for many migratory birds. During migrations, there are two stopovers: the first stopover takes place in September–October during the north–south migration and the return stopover is between February–April. During these periods, the birds remain 20 to 30 days in the wetland.

19. Social and cultural values:

The oasis is the symbolic transposition of a mythological concept tied to the early development of agriculture. The close relationship between the garden and the notion of a paradise is part of Islamic tradition and is found in classical culture. At the oasis, the cultivated fields are called *jenna*, a word which means garden or paradise. The oasis, usually considered to be a natural system of vegetation, was entirely created by humans, from the conception of the project to its architectural realization. In order to function, it needs a high level of technical skills. Man has established and managed space in its minute details through a rigorous process of selection and with attention to even minor resources; from the simplest element of architecture to the most sophisticated engineering works. More than just a technique, the *foggara* is a social organization. Based on this ingenious system, there is a whole traditional social organization that makes it possible to ensure the sustainable management of the system, distribution of water, equitable access to this resource for all the village (*ksar*) and preservation of water quality. The basis for this social organization is participation in a general assembly of co-owners (*djemâa*), which decides which repairs or maintenance is to be carried out, resolves conflicts and approves changes, sales, rentals or

sharing of water quotas of their owners. The manager (*chahed*), who is chosen for his wisdom and stature, is usually the imam of the local mosque. He acts as secretary-general of the *djemâa* and keeps a registry of the *foggara* with information concerning them, including a list of the co-owners with their quotas and all transactions. In return, he receives a share of the water. The water measurer (*kial el-ma*) possesses knowledge for measuring water in the field. He uses a calibrated instrument called the *chegfa*, which is based on the bi-duo-decimal system with the basic unit of *el-habba z'rig* (in the Middle East the unit is the carat). The measurement is immediately written on clay tablets, which are stored after drying. The *hassab* is a specialist in the calculation of quotas, shares and heritages. Although the water is considered to be the property of the co-owners of the *foggara*, all of the population of the *ksar* has free access to it for domestic uses. This access is guaranteed at the main canal that crosses the village. In compensation, the whole population participates in the maintenance of the system. The *foggara* contributes to the maintenance of community ties for mutual assistance (*touzia*) and solidarity. The *foggaras* have exercised a strong influence on the existence and evolution of the oases in this region to the point that social relations themselves depend on the details of the organization of water. An important cultural activity is based on visits (*ziarates*) to the mausoleums where important religious figures (marabou) are buried. The inhabitants of the region and from other areas meet there for a pilgrimage. These activities attract many tourists and foreign visitors. In the region of Tamantit, there are 10 mausoleums in the *oueds* of Si Bey Si M'hamed, Baba M'hamed, Sidi Nadjem, Ba l'Hadj, Sidi Youcel, Si Baali, Ba Ghrib, Moulay El-Arbi, Sidi l'Yamani and Sidi Moulay Abdelkader El-Djillali.

20. Land tenure/ownership of:

The palm grove is collective private property, and the land surrounding the site is government property. The *sebkh*a is part of the public water domain. The regulations governing transfer of water ownership are dominated by the fact that in the desert water is the main aspect of the ownership of property. Land is not the real capital; it has value only because of the water rights attached to it. Although religious considerations play a determinant role, local customs have determined the regulations governing property and water use.

Ownership of water is acquired through work or contribution to the system. This fundamental principle in arid regions seems to be at the origin of the concept of private property in the areas of Touat and Gourara. Each person is the owner of a share in proportion to the expenses provided for the construction or expansion of the *foggara*. Individual or collective water rights can be rescinded over time. In contrast to other Saharan oases, which use sharing in turns (*nouba*), in Touat and Gourara, water is divided by volume, using mathematical calculations.

21. Current land use:

The main activity is the growing of palms, and a large part of the land is devoted to the date palm and associated crops, forming gardens. Traditional mud houses occupy the highest part of the oasis, which is surrounded by dunes and rocky plateaux.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

Among the threats to the oasis are the use of modern agriculture in the Sahara, which has promoted the use of new agricultural techniques based on the large areas of monoculture and irrigation using high-volume pumps. This system is a large consumer of energy and capital and is the cause for the decrease of the aquifer which has had the consequence of a decrease or drying up of the flow of the *foggara*. The oases are directly threatened and the whole system of oases will be lost if steps are not taken to protect the *foggara* and with them an ecological, biological, social and cultural heritage of world importance.

One of the main problems facing the oasis is encroachment by sand. It is a daily concern, requiring owners to maintain the canals of the *foggara* open constantly. It is also a potential problem to the extent that the oasis is surrounded by *ergs*, and the sand dunes that move with the wind can bury an oasis, if the local inhabitants do not take action using local means for stabilizing the dunes with dry palms. This technique, although effective, requires intensive labour. In the southern oases, the system of mutual aid (*touiza*) allows the undertaking of work like this.

Water requirements are increasing along with the population. The population of the commune increased from 5300 habitants in 1997 to 7922 inhabitants in 1998. Because of the danger inherent in the cleaning of the wells and underground networks, recent generations do not want to participate in this work. Most of the labour force has aged, and maintenance of the system is compromised.

23. Conservation measures taken:

The Tamantit Oasis has been designated as a cultural and architectural national heritage monument (Journal Officiel N° 87, 3 November 1999, see annex) because of the architecture of its *ksar* and the civilizations that have occupied the oasis. Several religious communities (*zaouïa*) possess very old manuscripts. Under the project Grands travaux du Sud begun by the Ministère de l'Agriculture, the oasis has benefited from three years of stabilization and restoration of the open canals (*seguias*). This oasis has benefited from a project to rehabilitate the palm grove under the Générale des concessions agricoles initiated by the Ministère de l'Agriculture which covers reconstruction of the *seguiates*, cleaning and digging of wells, installation of windbreaks, improvement and construction of roads and a drainage network. In 1999, through the Fonds National de Développement Agricole, the Ministère de l'Agriculture planted 30 hectares of

palms, constructed an irrigation basin and a network of *gouttes à gouttes*, and treated palms suffering from *Fusarium*. The Ministère de la Culture intends to restore the old Tamantit fortress (*ksar*).

24. Conservation measures proposed but not yet implemented:

The site of Tamantit has been proposed for designation as an UNESCO world heritage site.

25. Current scientific research and facilities:

The Institut National de la Recherche Agronomique, through its station at Adrar carries out research on *Fusarium*, a disease affecting the date palm that is called *bayoud* locally, which threatens the palm grove. Surveys have been made of the varieties of date palm, especially those that are resistant to this disease. The Ecole Nationale d'Architecture is studying the local architecture and building materials.

26. Current conservation education:

Because of its historical and cultural past, its architecture and social organization based primarily on the growing of the date palm and its ingenious water system (*foggara*), this oasis constitutes an important tourist site. It is in all the tourist brochures for the region of Gourara.

27. Current recreation and tourism:

The region of Tamentit is part of the main tourist routes in the region of Gourara. Several circuits and visits for walking eco-tourists or camel rides are organized. Guided visits to the old *k'sours* to admire the local architecture based on local clay bricks and the trunks of the date palm. The *foggara* is also a curiosity that every visitor should see. There is a traditional medical treatment, *erredim*, which is a natural treatment for arthralgia. It consists in burying a person in the sand. Local handicrafts are sought after by national and foreign tourists, especially the pottery of Tamantit, which is black. There are also woven baskets, silver items and leather goods.

28. Jurisdiction:

The palm grove is collective private property. It is managed by the owners, and the area surrounding the oasis is under the jurisdiction of the government. The *sebkha* is part of the public water domain and is under the jurisdiction of the decentralized services of the Ministère des ressources hydriques of the wilaya of Adrar.

29. Management authority:

Management of the *foggara* and the oasis in general is the responsibility of the co-owners through the *djemâa*. The creation of a water system as important as the *foggaras* has led the local inhabitants to develop a very elaborate legal and technical system over many years for the management of water and the water system. This management system was strongly influenced by social, cultural and geographical factors in the region. The government supports the local communities with assistance for the rehabilitation of the palm groves and the repair of water networks, when the local community cannot meet these expenses.

30. References: