

# Parks for People:

## A Case Study from the Aïr Mountains of Niger

### Introduction

**T**he Republic of Niger is a vast, land-locked Sahelian nation with a population of over 7 million inhabitants. For the majority of these people life depends on the country's limited natural resources: soil, surface or shallow water tables, pasture, and a variety of forest products, including timber for fuel and construction. Agriculture is predominantly seasonal and herding extensive, with both taking place under a climatic regime that heavily underlines their subsistence nature. Whilst socially and economically the only realistic options available for the time being, these activities are not only prone to the effects of drought, poor land use and desertification, but also contribute to their propagation.

The Aïr Mountains are situated in north-central Niger and cover some 125,000 sq km of arid terrain, ranging from granitic and volcanic peaks up to 2,000 m, through stony plateaux, and into the sandy, desert country of the Sahara. Drainage features are prominent within the landscape, and, with their relatively dense vegetation, contrast starkly with the largely abiotic surroundings.

The climate of the Aïr is hot and extremely arid with temperatures ranging from just below freezing in January to around 50 degrees C in May and June. The average annual temperature is about 28 degrees C. Lying as it does at the northernmost reaches of the Inter-tropical Convergence Zone, rainfall is both sparse and seasonal in occurrence. Furthermore, its distribution—and therefore that of any resultant pasture—is totally unpredictable. Rain-

fall varies from between 10-125 mm annually, depending on the locality. As an indication of aridity and water deficit, measured evaporation is on the order of 3,000-4,000 mm annually. Perhaps more important than rainfall is the concentrating effect of the drainage patterns on the large volumes of water that run off the rocky slopes and mountain sides after even the briefest of showers. As a consequence, the vegetation of the larger wadis [dry watercourses] is more typical of areas benefiting from higher rainfall (de Miré and Gillet, 1956).

Because of its location, bridging the Sahara and the Sahel, and mountainous nature, the Aïr is both topographically and biologically more diverse than the lowland, desert, and sub-desert habitats surrounding it. As a result, the Aïr has consistently attracted the attention of travellers and

scientists. The technical notes made by Barth during his travels in the region in 1850 (Barth, 1857-8) have been supplemented by the writings and collections of a number of authors, including Foureau (1902), Buchanan (1921), Rodd (1926), Chopard and Villiers (1950), Lhote (1961), Fairon (1975), Peyre de Fabregues and Lebrun (1976), and Morel (1985).

Since 1979, the biology of the Aïr has come under the close scrutiny of both the World Wide Fund for Nature (WWF) and the World Conservation Union (IUCN). Attracted by the area's relatively unspoilt nature, and more specifically by the need to protect some of the last remaining populations of addax (*Addax nasomaculatus*), ostrich (*Struthio camelus*), and dama gazelle (*Gazella dama*) in West Africa, scientists have added considerably to knowledge on this unique area's fauna and flora (Newby and Jones, 1980; Dulieu, 1981; Grettenberger, Newby, and Monson, 1984; Monson, 1985; Grettenberger and Newby, 1986; J. Watkins, 1986; L. Watkins, 1986; Grettenberger, 1987; Newby, Grettenberger and Watkins, 1987; Magin, in prep.).

To date, some 40 species of mammal, 160 of bird and 350 of plant have been identified. Besides rare mammals, like the addax, cheetah (*Acinonyx jubatus*), and slender-horned gazelle (*Gazella leptoceros*), the Aïr harbours small populations of the wild relatives of several crops: olive (*Olea lapperinei*), millet (*Pen-*

*nisetum glaucum*), and sorghum (*Sorgho aethiopicum*) (Newby, 1986; Ingram, 1990).

Archeological research has shown that the Aïr and Ténéré have been occupied for at least 30,000 years (Durand et al., 1983; Roset, 1989). The area is rich in stone-age sites, many of them internationally important (Adrar Bous, Iwelene, Areschima). The existence of numerous ruined settlements, abandoned over the past 200 years, testifies to a sizeable sedentary population in the recent past. Historical records (Barth, 1857-8; Lhote, 1976) indicate the existence of an important trans-Saharan trade route through the Aïr Mountains. Whilst undoubtedly suffering the effects of the opening up of coastal trade routes, the population of the Aïr was also influenced by a number of other factors that include colonisation, tribal warfare, drought, and disease (Fugelstad, 1983). French colonisation of the Aïr began in 1898, but it was not until the 1920s that the region was completely 'pacified'. The period from 1910 to 1920 was particularly disruptive, including not only a severe drought and epidemic of influenza, but also a civil uprising that was severely quashed by the French (Salifou, 1973).

These events appear to have had serious implications for the indigenous systems of conservation and management of the Aïr's pastoral resources. Tribal ownership of the land was irrevocably disrupted by the mass exodus and weakening of formerly powerful groups. With them went the

traditional mechanisms and checks that had insured a certain degree of rational land use.

### **The Situation Today**

Today, some 5,000 Twaregs inhabit the northern Aïr, half of them living in and around the villages of Ifrouane and Tin Telloust. Like their forebears, their livelihoods depend for the most part on the cultivation of small plots of land irrigated by animal traction from shallow wells. A variety of cereals and vegetables are grown, including wheat, maize, tomatoes, peppers, and onions (Hammer, 1990). The remainder of the population raises small herds of goats, sheep, and camels. Unlike the plains-dwelling nomads of the Sahel, the herders of the Aïr practice a transhumant form of husbandry, frequenting the wooded valleys during the dry season and the lower, fringing plains during the rains (Hagener, 1990).

Although a shadow of its former self, the caravan trade still contributes to the local economy, providing an outlet for garden produce and a means of procuring cereals from the grain-producing regions of southern Niger (Bernus and Bernus, 1973). Unfortunately, the caravan trade has been hit in recent times by the effects of drought on the pack camels and by competition from motorised transport. Whereas the caravan trade used to function on a mutually acceptable and interdependent system of barter (garden produce and meat for salt and dates; salt and dates for cereals and other necessities), modern com-

merce has introduced a monetary dimension that favours few but the rich, truck-owning merchants.

Considering the Aïr's environment and ecology, the land use currently practised would seem not only the most appropriate but also by and large the most sustainable. Whether due to its isolation, the sparsity of its resources, or the rigours of its climate, there appears to exist a rude but effective balance between the Aïr's relatively small human population and its natural resources. The fact that wildlife and stands of healthy trees can still be seen bears witness to this. During times of plenty, the people are able to satisfy their basic needs without endangering the survival or perennity of the resources they rely upon. In periods of drought, however, the demand on the limited supplies of water and vegetation increases and, if prolonged, leads to crop failure, widespread overgrazing, loss of livestock, mass exodus of the human population, and, not infrequently, death from disease or starvation. Although the well-adapted, aridland ecosystems of the Aïr exhibit a high degree of resilience to drought, natural regeneration may take several years, even in the absence of continued use. Inevitably, habitats rarely fully recover from prolonged drought, and although rehabilitation is theoretically possible, it seldom occurs without considerable external assistance (reseeding, afforestation, watershed management).

If left 'untouched' by the outside world, the Twareg of the Aïr might

well manage to remain in balance with their environment for some time to come. Although the fluctuations in the brutal equilibrium they do maintain may be ecologically 'acceptable', it is not so ethically or politically. In spite of its capacity to cope with the rigours of survival in a marginal environment, the nomadic tradition is hard pressed to keep up with the political and climatic changes that have effected the Twareg and their social fabric during the 20th century.

In the absence of viable alternatives, the future of the Aïr Twareg would seem tied to their ability to pursue traditional, natural resource-based occupations whilst exploiting any other appropriate opportunities that arise. The latter already include employment in the nearby mining towns, temporary emigration towards the labour markets of North Africa, and the expanding tourist industry. In short, the survival of the Aïr Twareg is dependent on their maintaining as broad-based a socioeconomic strategy as possible.

### **Protected Areas and Development**

In West Africa at least, it is clear that protected areas are rapidly becoming the only places where a semblance of former ecology and biological diversity persists. Besides their intrinsic cultural or scientific values, these parks and reserves are often critical for the maintenance of life-support systems such as watersheds and fisheries.

Much as parks and reserves are highly important tools for the conser-

vation of nature, the protected areas concept needs to be adapted and applied more widely to the management of the less exotic but equally important utilitarian resources such as land, soil, pasture, and water. While change is on its way in the form of Biosphere Reserves, progress is still hampered by the misconception that parks and reserves should, almost by definition, be 'no go' wildlife areas, where the human being is seen more as an inconvenience than an integral part of the ecosystem. While there will always be a need for traditional parks and reserves to conserve and protect representative or spectacular parts of the planet, much greater areas of land need to come under rational management or suffer the consequences. This is particularly true of the Sahel, where large tracts are already severely degraded. Without some kind of management structure, the widespread nature of environmental misuse and degradation can hardly be tackled in a radical enough way to prevent natural resources falling below a point of no recovery, or beyond the threshold at which they can no longer sustain humans and their use of them. Having said this, however, it is important to realise that although most Sahelians do appreciate the consequences and the 'follies' of overgrazing, inappropriate, agriculture and soaring fuelwood consumption, there is precious little they can do about it in the absence of socially, politically, and economically acceptable alternatives. In theory at least, the protected areas

approach of identifying conservation or land use problems in a well-defined area, and then tailoring legislation and management to deal with them, would seem a good way of tackling those problems in accordance with local needs and conditions.

### **The Aïr And Ténéré National Nature Reserve**

When the establishment of a protected area for the Aïr was first proposed in 1982 (Newby, 1982), the initiative was primarily motivated by concern for the region's increasingly unique and threatened fauna and flora. Wildlife was under pressure from uncontrolled hunting and tourist harassment, and, after several years of drought, woody vegetation was being rapidly destroyed by overuse and abusive cutting. By the time a reserve was finally gazetted in January 1988, its vocation and objectives had evolved considerably to take into full account the human dimension to the area's ecology. With an area of just over 77,000 sq km, the Aïr and Ténéré National Nature Reserve is one of the largest protected areas in the world (about twice the size of Switzerland). It is managed by the Nigerien wildlife service and boasts a staff of over 40 people, ranging from foresters and wildlife experts to guides, nurserymen, and extension agents. Funding of the Reserve's conservation and development activities is assured by a consortium of donors that include WWF, IUCN, the Swiss and Danish gov-

ernments, and Band Aid.

Without neglecting the Reserve's unique role as a refuge for endangered fauna and flora, work is being increasingly geared to addressing the vital problems of natural resource use, management and planning. While it is clear that the peoples' impact on the environment often calls for conservation measures to be taken, it is equally as clear that conservation goals will not be met without their support. This implies more than a purely sectorial approach to the problem and, in the case of the Aïr project, has led to the execution of a large number of accompanying rural development activities, ranging from well digging and health training to adult literacy and woodless, adobe construction (Newby, 1989).

The Reserve not only provides a physical, administrative, and legislative framework for natural resource management, but is also a focal point both locally and nationally for pride and involvement. The Reserve and the IUCN/WWF project that supports it are generally perceived as an innovative attempt to reconcile conservation with development through a broad-based programme geared to the protection, restoration, and sustainable use of the area's natural resources. Because of its breath-taking desert scenery, its cultural and prehistoric sites, and its unique wildlife, the Reserve is becoming a popular tourist venue, and as such is contributing to the limited development possibilities otherwise available. Unlike agriculture or stock rearing, tourism and the

economy derived from it are largely sheltered from the vagaries and perturbations of the climate. With this in mind, an information centre has been built, incorporating educational displays, a local guide service for trekking, and a crafts shop.

### **Site-Specific Rules and Regulations**

Establishment of the Reserve has enabled legislation to be tailored specifically to the area's needs and potential. Unlike national law regulating natural resource use and abuse, which tends to be either too general, out of date or inappropriate for real management purposes, the Reserve's regulations are site-specific and as a result entirely relevant.

Although some authors (Bourgeot, 1988) have argued that the establishment of the Reserve has had a detrimental effect by depriving people of access to resources or land previously available, there is on the whole no evidence of this. In fact, many people living outside the Reserve have asked that its boundaries be extended to encompass their own land. Without the Reserve's regulations and, more importantly, management capacity, adjacent land is being plundered to satisfy the ever-increasing fuel-wood needs of nearby towns.

To a large extent the legislation covering the Reserve reiterates, albeit in a site-specific way, national law and has brought with it no fundamental changes and restrictions to the people's way of life. Although access is prohibited to some 12% of the Re-

serve's desert centre (an IUCN Category I wildlife sanctuary), the land in question was very rarely used by the local population.

The same is true of bush meat and a ban on hunting. In days gone by, the people used to hunt for food and for meat for the caravan trade (Lhote, 1951), but this is rarely done today: wildlife is too rare and inaccessible to render it profitable. In fact the general attitude to wildlife is one of benevolence, the Twareg often stressing its cultural and aesthetic values. As might be expected of a people almost wholly reliant on natural resources for its existence, perception of environmental health is acute and wildlife is seen as both an indicator and a product of environmental well-being. If wildlife populations are under threat today, it is not from the Twareg but from drought, desertification, harassment from tourists, and, above all, hunting by the armed forces.

National restrictions on the use of certain species of tree have been enforced, affecting to a certain extent the livelihoods of the local artisans that produce household objects such as mortars, spoons, saddles, etc. In this case, compensatory action is being taken through the importation of mortars and it is hoped to establish a commercial network with the artisans affected. Whatever the resource, the ultimate aim is to permit use within sustainable limits. In the absence of data to define these limits, however, the approach is one of measured caution. Over the next 3 years, ecological and socio-economic research is to be

undertaken to better understand and define both the potential and the constraints on natural resource use.

Predator control is perhaps the major bone of contention between the Reserve's authorities and the local population. Although the law specifically forbids it, the use of poisons such as strychnine to control jackals (*Canis aureus*) and hyaenas (*Hyaena hyaena*) is generally condoned by local administrators. The Reserve's managers recognise that livestock predation is a problem but can hardly be expected to accept the use of such environmentally dangerous poisons. Local use of strychnine has in the past killed non-target species like crows, ravens, and vultures, and beneficial carnivores like the fennec (*Fennecus zerda*) and Rüppell's fox (*Vulpes rüppelli*). In an attempt to solve this particularly thorny issue, a compromise is being looked for that might entail granting the people living in high-risk areas periodic dispensation to use traditional methods of control (destruction of breeding dens, foot-traps). Experiments will also be carried out using live-traps and non-lethal, leg-hold traps.

Although it is clearly impossible to please all of the people all of the time, it is fair to say that the positive aspects of the Reserve's creation by far outweigh the disadvantages. Results to date have been encouraging and, in spite of the fact that habitat rehabilitation takes a long time in drought-prone aridlands, improvements are already discernible. More importantly, these have been noticed by the

local population and have heightened their appreciation of the Reserve's value. Wildlife is more abundant and forest resources, after years of drought and overuse, are recuperating. The acid test will come when the next drought hits the area and it is possible to monitor the results of better range conditions and, hopefully, management practices on the local population's ability to support its effects.

### **Local Participation and Responsibility**

Ultimately, the aim is to transfer as much responsibility as possible for the Reserve's management, law enforcement, and surveillance from the largely 'alien' government staff to the land users themselves (DFPP, 1990). To facilitate this, a network of voluntary Representatives, composed of locally respected farmers and herders, has been set up. The Representatives form the vital link between the Reserve's managers and the people. Together with locally recruited extension agents, the Representatives are essential for developing the understanding and consent required to undertake not only wildlife protection and habitat rehabilitation, but also experiments to identify and demonstrate alternative forms of land and natural resource use.

Politics and practice apart, the development of a truly popular and participatory approach is by no means easy considering the immensity of the Reserve and the highly uneven distribution of its population.

The issue is further compounded by the prickly question of common resource management, where land use may at best be only temporary. Until real ownership of resources such as wildlife, pasture or water can be established, responsabilisation is an extremely tenuous concept. Traditional ownership or rights to land and resources have been totally deformed by the political, social, and climatic changes of the past century, and it is only now that Niger is tackling the problem through the development of a Rural Code.

The project's rural development and land rehabilitation activities do benefit from a high degree of local participation, but this has invariably been developed on an employer-employee basis. On the whole it has been found difficult to mobilise true participation. The reasons for this are several-fold: lack of conviction, fatalism, precedents set by other projects, politics, etc. Project 'philosophy' is based on the premise that popular support and voluntary participation can only come about through greater responsabilisation and conviction in what one is doing. Its approach is to try and produce tangible evidence for the application of such and such an activity or measure; as a result, emphasis is put on experimentation with the risks and costs being borne mainly by the project. Clearly, unless the people perceive real benefits for the use of their time and energy, they will not voluntarily undertake new or extra activities. Having said this, the project has nonetheless made consid-

erable progress in several fields, including well construction, woodless home building, flood protection for gardens, and solar drying of vegetables. In all these cases emphasis has been placed firmly on the dual aspects of demonstration and training.

### **Discussion and Conclusions**

Given the fact that the conservation of natural resources and the modification of traditional land-use practices are both long-term undertakings, the results so far are encouraging. It is fair to say that the Aïr Mountains experience has to date confirmed the role that appropriately designed and run protected areas can play in natural resource management and, by extension, sustainable rural development. What guarantees are there, however, that the short-term gains and benefits made possible by the Reserve's presence can be sustained, or that the resources eventually restored will be used correctly? In theory at least, the solution lies in effective management. In reality, however, management is unlikely to work unless enjoying popular support, and as such needs to be totally realistic.

As we near the end of the 20th century, the Twareg of the Aïr can look back on a time that has seen the world around them change enormously. For many, though, life goes on much as before, tied inextricably to nature and the natural world, to the coming and going of the seasons, to the good years and to the bad. Existence in the Aïr is harsh, but by and



large its nature remains bountiful. There are gazelles, Barbary sheep and ostriches, deep waterholes in the mountains, and well-wooded valleys. Protected areas can help maintain and improve this desirable situation.

In other parts of the Sahel, however, the land can no longer sustain the peoples' modest needs: pastures are overgrazed, soils are eroded, wildlife has disappeared. More and more people are obliged to compete for diminishing returns and, be it their fault or not, the fact remains the same: human beings no longer live in harmony with the resources they require for their subsistence. Seemingly bereft of viable alternatives, people are obliged to go deeper and deeper into environmental debt until the inevitable happens and the land is destroyed or can no longer support even sub-subsistence requirements. It is difficult to see how the Sahel and its

natural resources can be restored, nurtured, and coaxed back into providing sustenance to growing populations. Here again, protected areas offer considerable potential for innovative management and habitat rehabilitation.

In a rapidly changing world, protected areas must also change to meet the demands of new situations. It is no longer reasonable to 'set aside' large tracts of Africa for the unique benefit of wildlife or privileged visitors. It is equally as unwise to throw the baby out with the bathwater and reject the whole concept of protected areas because some parks and reserves are no longer appropriate. On the contrary, the protected areas approach to sustainable development, through the conservation and management of land and natural resources, is more urgently needed than ever before.

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