



Conservation Action
Plan for the
Barbary macaque
(*Macaca sylvanus*)
in Morocco



2012



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ABBREVIATIONS

PANSM:	Plan d'action national pour la conservation du singe Magot
HCEFLCD:	Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification
CRF:	Centre National de la Recherche Forestière
PNI:	Parc National d'Ifrane
IS:	Institut Scientifique de Rabat
MPAM:	Ministères de l'Agriculture et de la Pêche Maritime
DRT:	Délégation Régionale du Tourisme
MPC:	Fondation Moroccan Primate Conservation
CITES:	Convention sur le Commerce International des Espèces de Flore et de Faune Sauvages menacées d'Extinction
UICN:	Union Internationale pour la Conservation de la Nature
IFAW:	Fonds International pour la Protection des Animaux
AAP:	Centre de réhabilitation des Primates
CNRS:	Centre National de la Recherche Scientifique (France)

1- INTRODUCTION

The Barbary Macaque (*Macaca sylvanus*) is a primate endemic to North Africa, classified in the family of old world monkeys, known as the Cercopithecines. This species, once widespread in the Mediterranean, is now confined in the wild with only small populations in the forests of Morocco, Algeria and the Rock of Gibraltar where they were introduced by humans.

It is classified as «endangered» on the Red List of threatened species (IUCN), it is listed on Annex II of the Convention on International Trade in Endangered Species of Wild Flora and Fauna and Flora (CITES) and is protected by national legislation in Morocco. Several studies and reports on the Barbary macaque have expressed their concerns for the future survival of the macaques, due to the reduction and fragmentation of its natural habitat, largely due to strong human pressure on natural resources such as logging, deforestation and overgrazing. Other experts believe that human impact on this species such as poaching are real threats to the macaque's survival.

As a result, it has become a cause for concern for Morocco. Morocco is home to the largest wild population of Barbary macaques in the world. Guidelines are needed to conserve this unique species and its habitats. For this reason the High Commissioner for Water, Forests and Desertification Control (HCEFLCD) decided to work together with the Moroccan Primate Conservation foundation (MPC) to develop a Conservation Action Plan (CAP) aimed at conserving the Barbary macaque in Morocco and stopping the strong reduction in numbers over the last decades.

This plan, which resulted from a workshop held in October 2011 in Azrou, elaborates on the threats to the species in the three habitat regions and based on these threats, actions and aims are described within a time frame. The CAP has been developed with input and expertise from various (inter)national NGOs, experts and universities.

2- GENERAL INFORMATION

2.1. Taxonomy and morphology of the Barbary macaque

The Barbary macaque is a member of the primate order, residing in the Cercopithecine family, genus *Macaca*. This genus comprises of about twenty species which have populations in most of Asia. The Barbary macaque (*Macaca sylvanus*) is the only species in the *Macaca* genus that can be found in Africa.

This species has some morphological characteristics that differentiate it from other species of macaque, including the absence of the tail and the presence of a nasal groove. The species is known by its dense fur which is yellowish-brown to grayish on the back and beige on the stomach. Its head is round with a wide muzzle and its face has no hair and appears pale-pinkish. This darkens with time and season. Males are larger than females.

2.2. Biology and ecology of the Barbary macaque

2.2.1 Diet

Barbary macaques are omnivorous. They feed on plants, fruits, roots and invertebrates. Their diet varies with season, environment and resources. In the spring and winter they are essentially folivorous, eating mostly leaves, shrubs and trees. In summer and autumn they mainly feed on fruit and berries. The Barbary macaque feeds on a wide variety of plants and some invertebrates, which explains its great capacity to survive in different habitats characterized by seasonal fluctuations in the quality and quantity of food available. It consumes, also, roots, lichens, seeds and arthropods (Drucker 1984, Ménard 1985, Ménard & Vallet, 1986, 1988, 1997; Qarro & Menard, 1999).

2.2.2 Reproduction

The Barbary macaque is a seasonal breeder, and mating takes place in autumn/ winter, and births in the spring and early summer with generally one infant per litter. Its gestation period is 5.5 to 6 months. Females are philopatric, they remain in their birth group and reach sexual maturity between 3.5 and 4 years, while males are mature between 4.5 and 7 years. In nature, the average age of first birth is 5.3 years (Menard and Vallet, 1993, 1996; Lindenfors 2002) and the average interval between two births is 1.3 years (Taub 1974 1984 in F; Menard and Vallet, 1993, 1996). Males migrate to different groups during the breeding season.

2.2.3 Behaviour

The BM lives in social groups of up to 80 individuals, but the ideal size is 40 individuals (Menard 2002). Their communication is vocal and by physical postures. They spend most of their time in the daytime looking for food and retire to the trees or caves at dusk. Its lifespan in the wild is around 22 years (Lindenfors 2002).

2.2.4 Habitat

The Barbary macaque lives in the cedar forests, oak forests, coastal scrublands and rocky slopes covered with remnants of vegetation high above sea level. The presence of oak species is common to all habitats throughout the range of the Barbary macaque. In Morocco, this species is found in the mountains of the western Rif, Middle Atlas and the northern slope of the High Atlas. It occupies mainly the cedar forests, mixed cedar / oak forest, pure oak forest, cliffs and gorges dominated by scrub vegetation.

The mixed cedar / oak forests in the region of the Middle Atlas are home to the largest population of *M. sylvanus* and are considered the most favorable habitat for this species (Camperio Ciani et al. 2001). In habitats with cedars, macaques can reach densities of 25 to 40 individuals/ km² or more, whereas in habitats without cedar, densities are generally much lower, around 5-7 individuals/ km² (Fa 1984, Mehlman 1989).

However, pure oak forests, where densities may exceed 20 individuals/km² (Fa, 1984) are also quite favourable habitats for macaques. These habitats are to be considered with caution because they may represent a potential for the future survival of the species in case of further degradation of the cedar forests.

2.3. Distribution and trends

2.3.1 Range

The Barbary macaque used to be widespread across Europe and throughout northern Africa (Delson 1980, Camperio Ciani 1986). Today, the presence of this species is limited to isolated forests and scrublands of the Middle Atlas, the High Atlas and the Rif in Morocco and in Chiffa, the Grande and Petite Kabylie in the Tell Atlas in Algeria (Fa 1984, Waters et al 2007; Camperio Ciani 1986, Ménard and Vallet 1993, Scherzahn et al.1993) (Fig. 1, Fig. 2).

A semi-wild population still lives in Gibraltar, where they were introduced and are currently found in semi-wild conditions. (1981 F, von Starck 1990, Hodges and Cortes 2006).

The species lives at elevations between 0 and 2600 meters (Taub, 1984; Mehlman, 1984; Cuzin, 2003) where temperatures can reach 45° C in summer and -10° C during the coldest months of the winter (Mehlman, 1984). It can also be found at sea level, in a more temperate climate, for example in the Rif in Morocco.



Figure 1: Natural distribution of the Barbary macaque (*Macaca sylvanus*) in Northern Morocco and Algeria (● one group, ■ more than one group) - Encarta 2004, modified - (Mouna)



Figure 2: Global distribution of Barbary macaque (Morocco, Algeria and Gibraltar)

On national level, the Middle Atlas is home to the largest population of Barbary macaques, which are confined to the cedar forests of Sidi M'guild, Ifrane and Mishlifene and green oak forests of Ain Leuh, El Hammam and between Azrou and Ain Leuh and in the forests of southern Ouiouane. Populations of this species are also found in mixed forests of cedar and oak in Tamjilt Tafert in the east part of the Middle Atlas.

This species can be found in some areas on the north side of the High Atlas mountains, in particular in the regions of Azilal, Oued el Abid gorges, Ahansel Akhacham, Ouzoud and Ourika valley, which is part of the Toubkal National Park (PNTb). In the Rif, they are found in Jbel Moussa, Jbel Bouhachem, Jbel Tissouka, Lakâa, Talassemtane and Jbel Tizèrène.

2.3.2 Status and populations trends

Until recently, the only population estimates were based on relatively incomplete and old data. The total number of macaques was estimated at around 22.000 individuals (Taub, 1977, Fa et al., 1984).

In the Middle Atlas, where the largest wild population of Barbary macaque lives which contains approximately 67% of the remaining population of *Macaca sylvanus* in the world (Taub, 1977), the numbers have declined around 65% over the three recent decades, from 15,000 (Taub 1977) to 5000 (van Lavieren & Wich 2009, N. Menard et al, in press. 2011).

In the Rif mountains, the average group size is much closer to the natural group size found in other studies; around 40 individuals (Menard, 2002). The remaining sub-populations in the High Atlas mountains of the High Atlas are fragmented. Fourteen small populations, generally isolated, were identified in the High Atlas (Cuzin 2003). In the mid-70's, the Barbary macaque density in the cedar forests of the Middle Atlas was estimated at about 60-70 individuals/ km² (Deag 1974) or 43 individuals/ km² (Taub 1975). Later studies have shown that population density in this region fell from 44 to 25 individuals per km² over the last two decades of the twentieth century (Camperio Ciani et al. 1999). Other recent studies in the Middle Atlas show that the average density is today about 15 to 20 individuals per km² (van Lavieren 2010) in some areas, while in other areas the density is no more than 7 to 10 individuals per km² (Camperio Ciani et al. 2005).

Furthermore, surveys conducted in 2006-2007 showed that some habitat fragments contain only one or a few small groups, with a density sometimes close to 0 individuals per km², where local extinction appears imminent. The total population is estimated at about 5,000 individuals with an average density of 9 ind. /km² in the Middle Atlas (Menard et al., In press).

2.4. Legal protection status of the Barbary macaque

The Barbary macaque is listed on Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and considered, since 2008, as «endangered» on the Red list of threatened species by the World Union for Conservation of Nature (IUCN).

It is also classified by the national legislation (Decree of the Minister of Agriculture November 1962 regulating permanent hunting) as a protected species. This means the capture, hunting, possession, sale and hawking are prohibited.

Moreover, it is expected that the recent adopted Law N° 29-05 on the protection of flora and wildlife and regulating the trade, in which the protection level is linked to the CITES Appendix listing, will further contribute to strengthening the protected status of this species in Morocco.

2.5. Conservation status of the Barbary macaque and its habitats

The Barbary macaque has been an interest to researchers and conservationists since the 1940's. This led to many research papers being published relating to the ecology and habitat of species. In recent years, due to its threatened status, the species is subject of special attention from wildlife managers, researchers, international organizations and NGOs.

Considerable efforts have been made in research and monitoring of the species to provide scientific justifications and arguments about the decline of the species and degradation of its natural habitat. Measures that have already been taken to improve the conservation status of this species and to address threats to the species:

- The creation in 2004, the National Park of Ifrane (PNI), and developing its management plan, which aims to maintain the equilibrium in the ecosystem and the protection of species, including Barbary macaques, and their natural habitats
- Increasing the surveillance against poaching and illegal trade of the species
- Organisation of awareness campaigns in partnership with national and international NGOs
- Implementing the restoration of the Barbary Macaque populations and its habitat in the Middle Atlas, in cooperation with international partners

International organizations and NGOs have increasingly shown their interest in working to conserve the now endangered species. Thus, given the problems encountered during the implementation of some projects initiated by various partners and to create a synergy of efforts of all stakeholders, it was considered important to develop an action plan with clear goals, that provides a framework, in which all the contributions of all organizations interested in conservation of this species are described.

For this reason a workshop was organized in October 2011 in Azrou. Experts, wildlife managers, NGOs and universities gathered together to analyze the threats to the species and reach a common understanding of issues related to the Barbary macaque, identifying actions to achieve the objectives set for the next twenty years.

2.6. Problem analysis

The approach proposed by the participants was based on a logical analysis of cause and effect. This included the identification and analysis of the problem, the stakeholder analysis and identification of objectives and actions (see the summary in 2.7).

2.6.1 Identification of the problem

An alarming decline of the numbers of wild Barbary macaques

2.6.2 Identification and analysis of the causes of the decline

Although the importance of different threats to the Barbary macaque varies depending on the region: human pressure, degradation and habitat loss and illegal trade have been identified to be the main causes of the decline of this species.

A- Human pressure

Human pressure can be divided into 4 main categories that contribute directly and indirectly to the decline of the Barbary macaque in Morocco: overgrazing, conflicts of interest, the effects of tourism and poaching.

1- Overgrazing

This phenomenon, which is caused by a discrepancy between livestock density and the area's capacity to withstand grazing and trampling, is considered a threat to populations of the Barbary macaque.

Overgrazing, exacerbated by successive years of drought, and increased by the settlement of pastoralists, accelerates the loss of biodiversity and degradation in quality and quantity of food resources. The livestock grazing of young shoots, prevents natural regeneration of trees, shrubs and vegetation cover. This enhances the disappearance of several plant species and loss of plant diversity in these environments, which is an important food source for the macaques.

2- Impact of tourism

Recently concerns have been raised by several experts on the negative impacts of tourism on Barbary macaques. Indeed, it was shown that the presence of tourists and their frequent physical interactions with the monkeys can affect the normal behavior of these primates, such as increased aggression and reduced social behaviors (El Alami et al 2012). These changes can increase the level of physiological stress in animals with negative consequences on their health and reproduction.

A study by Marechal et al (2011) highlighted the impact of tourism on male Barbary macaques in Ifrane National Park, more precisely the factors affecting these animals, ie, levels of anxiety and stress. Anxiety levels in males increased with the number of tourists present. Stress levels of animals increased accordingly to the numbers of aggressive interactions between tourists and macaques.

A second study in the same region was conducted by Borg et al (in prep, submitted) also indicated that members of groups exposed to tourists were more obese, and had a reduced physical fitness and were more exposed to infection than those groups not exposed to tourists.

Studies such as these can help develop effective tourism management that takes place in proximity of Barbary macaques. By reducing or removing the feeding of monkeys by tourists we will mitigate the impacts related to stress and will reduce the problems of obesity, poor physical and other health problems related to diet.

Measures to minimize interactions between humans and macaques (particularly attacks) have a high priority. The exact reason for the high rate of parasitism in the groups in contact with tourists is not clear, but the establishment of closed bins and toilet facilities on the sights is recommended to eliminate potential sources of contamination between macaques and humans. Moreover, the feeding by tourists near the roads causes that the macaques are more exposed to poaching and being killed in road accidents.

3- Conflict of interests

The conflict between man and Barbary macaque is caused primarily by three factors: 1) competition for access to food and water, especially with livestock 2) conflicts with farmers due to the destruction of their crops and 3) conflicts with the forest because of bark stripping (Ifrane National Park). Managers from the forestry department in Morocco believe that the main cause of degradation of the cedar trees is the increase in the density of Barbary macaques. A plan for mass relocation of certain populations of macaques in the cedar forests was even considered. Consequently the Barbary macaque may appear to some groups of people as a pest, and thus condemn it to poaching.

4- Predation

Attacks by shepherd dogs is another threat to the Barbary macaque. Several individual macaques were attacked by dogs (N. Ménard 2006), others were found beheaded and gutted by humans, probably after being attacked by dogs, and certain organs were used, most likely for herbal medicine and spiritual trade, including the brains of the animal.

B- Degradation and habitat loss

Habitat degradation is considered the main threat to the species. The destruction of the forest, mainly caused by overgrazing, such as de-branching, clearing land for crops and logging, has reduced the habitat area and has fragmented the populations of the species into small isolates, which weakens the entire population of Barbary macaques' chances of survival. This fragmentation of habitats and its effects on the isolation of populations was well demonstrated in several research studies (Menard and Vallet, 1986, 1997) in the Middle Atlas, where forest management methods were considered inappropriate, for example the removal of old cedar trees that provide shelter for monkeys and the reduction or clear cutting of green oak, which is an important resource for the macaques.

It should be added, that the elimination of green oak forests by clear cutting in the High Atlas and their replacement by coppice has resulted in large open clearings containing immature and degraded wild oak, which are unfavourable to the survival of the macaque. Furthermore, it should also be noted, that the settlement of shepherds near water points/ sources and their herding practices, in addition to water shortage due to the successive years of drought in recent years has made it difficult for wildlife (including macaques) access the water (Camperio Ciani and Castillo, 1998).

Finally, tourism is also responsible for degradation of the habitats. Garbage, forest fires and the degradation/ disappearance of the undergrowth and low vegetation due to tourist activities should also be taken into consideration in forest management activities.

C- The illegal trade

Although the Barbary macaque is classified by national law as a protected species, prohibiting the hunting, capturing, holding, selling, offering for sale and purchase of the macaques, the illegal trade in live specimens poses a significant danger to the wild populations. Seizures of live animals at the borders with Europe, and the number of animals offered by the authorities and former owners to European zoos and sanctuaries clearly demonstrate that this animal is the subject of illegal international trade, which mainly affects juveniles and infants.

As victims of deforestation and various anthropogenic pressures, these animals are wild caught to be sold, generally, as pets to tourists. A study in the Middle Atlas N. Menard between 2007 and 2009 shows an unusual severe drop in the number of juvenile macaques in both study groups with a disappearance of all infants and nearly all females. This was most likely the result of poaching (N. Menard, pers. Comm. 2011). In the same period, repeated surveys of 38 groups in the same areas showed a loss of juveniles (individuals of 1 and 2 years) of which the number was minimized to a third of the original numbers, which largely exceeds the probability of natural deaths (Ménard et al., in prep). These extreme disappearances can only be attributed to poaching (N. Menard, pers. comm. 2011). Furthermore, 80% of the juveniles that were counted in a different study had disappeared between the summer and fall of 1994 (Mouna et al. 2006).

Additionally it is apparent that in Morocco certain numbers of individual macaques are found in certain public places for sale (illegal), to take pictures with tourists and to conduct performances with trainers of monkeys (for example on the cultural space of the place Jemaa El-Fna square in Marrakech, classified by UNESCO as a world heritage site). The law N° 29-05 provides for measures to regulate the possession of this species for cultural purposes, particularly in Marrakech, through the proof of certificate of ownership per specimen.

The analysis of the problem of illegal trade of the species has identified the main causes of the increase in the trade. This is, essentially, poaching, lack of border controls, lack of awareness, ineffectiveness and negligent law enforcement and the high demand for the species, mainly in the European Union.

2.7. Analysis of the actors involved in the implementation of PANSM

To effectively work on the conservation of the Barbary macaque, it is very important to identify the stakeholders involved in every issue and their interests and potential contributions

A- Human pressure

Stakeholder	Interests	Problems	Potential contribution(s)
HCEFLCD	Preservation of biodiversity	Illegal trade in Barbary macaques	- Anti poaching police - Management plan - Technical support
Managers, judicial police	Respecting the law	Anarchy in the use of the forest area's	Improvement of the management of forest ecosystems
Managers national parks	- Sustainable management of protected areas - Conservation of the Barbary macaques	- Degradation of ecosystems - Poaching	Create protected zones
Tourists	- To see the animals - Ecotourism	- Need for professional guides - Feeding, touching and influencing macaques' behaviour	- Education - Public awareness/ publicity
Scientists	Study the macaques		Knowledge on how to conserve/ protect the species
BMCRIF	Conservation of Barbary macaques and its habitats	Over exploitation of natural areas	Education and awareness

B- Habitat degradation and loss

Stakeholder	Interests	Problems	Potential contribution(s)
CRE, Universities	Surveys of the macaque populations	Too little research on this species as of yet	Establish long term research on macaques
Rabat Zoo	Stop the decline in the species		<ul style="list-style-type: none"> - Give shelter to confiscated macaques - Reintroduction - Public awareness - Participation in the funding of conservation projects
Consultant/ Naturalist	Ability to observe the species	Macaques are becoming harder to observe in undisturbed areas	Discuss and educate the shepherd
Eco-guards			<ul style="list-style-type: none"> - Fight against poaching and other illegal activities in natural areas - Education
HCEFLCD	Conservation of Barbary macaques	Limited interest/ priority	Make the macaques a priority for conservation efforts
DPEFLCD	Reforestation in degraded forest regions	Limited surveillance: no interventions take place when law is broken	More staff in the field, technical support, forest police/ eco guards

Stakeholder	Interests	Problems	Potential contribution(s)
Researchers/ scientists	Provide knowledge and recommendations for conservation of the species		Knowledge, recommendations
MPC, Intistus Scientifique, IFAW	<ul style="list-style-type: none"> - Contribute to the decrease of human pressure in the habitat regions - Organise a training PNI to monitor the macaques in the national park 	<ul style="list-style-type: none"> - Over exploitation of natural recourses - Lack of knowledge on how to do a monitoring programme 	Provide knowledge, organise the training and create a monitoring protocol

C- Illegal trade

Stakeholder	Interests	Problems	Potential contribution(s)
SPANNA	Conservation of the macaques and its habitats		Education, awareness, partnership
Managers of natural resources	Conservation of biodiversity	No cooperation with other organisations	Mobilisation of human and material resources
Scientific research and national awareness	- Study the populations (dynamics, behaviour, ecology and demography) - Educational support	Disturbance, collection, enhancement of the status of the species	- Help conservation - Awareness
Tribes that exploit the forest	Preserve the forest		- Engage in activities - Support Eaux & Forêts
Media and NGOs	Conservation of threatened species		
Judicial authorities (Customs, Police, E&F)	Confiscate macaques	No sanctuary No national confiscation protocol	Control and law enforcement
International organisations	Conservation		Technical support and funding
MPC	- Education and awareness - Support HCEFLCD in creation of rehab. center/ confiscations of macaques	Illegal trade in national and international level	- Expertise - Creation and find funds
Rehabilitation center	Rehabilitation of the macaques	Too many macaque's in need of shelter	- High penalties - Reintroduction programme

3- THE ACTIVITIES/ ACTIONS

3.1. Vision of the PANSM

The vision is to have viable populations of Barbary macaques in their natural habitat:

- A total population size of minimum 15.000 macaques
- An average density in the 3 sub populations of 25 à 30 ind/km²
- Average group size of 30 à 40 macaques

3.2. Aim / goal of the PANSM

The PANSM is created to be executed over a period of 20 years. Its goal is the preservation and restoration of the current populations of macaques.

3.3. Objectives of the PANSM

Three objectives have been defined:

Objective 1 : Restoration of suitable/ optimal macaque habitat

Objective 2 : Decrease human pressure

Objective 3 : Controlling the poaching and illegal trade

3.4. Activities of the PANSM

The activities are the actions that need to be implemented to achieve the objectives. The actions proposed for each objective are listed below:

Objective 1: Restore suitable/ optimal macaque habitat

1.1 Restoration/ creation of corridors

- 1.1.1 Identify and select areas that could be potential corridors for the populations of the macaques (to reduce the isolation of subpopulations of the macaques and provide additional food resources)
- 1.1.2 Study and assess the potential of the selected corridors (status, importance to the population of the macaques, food resources)
- 1.1.3 Designate sites to rehabilitate (degrees of success of rehabilitation, the site's importance, ...)
- 1.1.4 Create or restore the corridors in selected areas by planting local tree species that
- 1.1.5 Propose, in consultation with the human population that lives in the proximity of the macaques, modes of management of these corridors to conserve and promote the rehabilitation and growth of the key vegetation species for the macaques

1.2 Maintenance/ preservation of refuge zones that are of great value for Barbary macaques' survival

- 1.2.1 Inventory and mapping of the boundaries where there are patches of cedar and oak trees, which are of particular interest for the macaques (sleeping areas, shelters, food) and geo-reference the data (GIS);
- 1.2.2 Stop systematic cutting of old Cedars and clear cutting of oak trees in the identified patches of forest
- 1.2.3 Inventory and marking of selected trees for logging and add to GIS
- 1.2.4 Set up a system for consultation and control of operating/ exploitation activities at local level, to form a team between the forestry management and conservation community (managing authorities, experts, NGOs)
- 1.2.5 Reduce the impact of logging activities by using low-impact logging techniques and thus to minimize the secondary damage to the environment caused by the logging
- 1.2.6 Reinforce the surveillance on the illegal wood cutting, topping and other invasive illegal logging activities
- 1.2.7 Expanding protected zones that are habituated by macaques in areas that currently are not part of Talasemtane national park in the Rif

1.3 Reduce the impact of the exploitation of natural resources in Barbary macaque habitat

- 1.3.1 Encourage the use of low-impact logging techniques (planning of logging operations, limit the number of exploitable trees, optimizations of the dirt roads, training of staff, implement tax incentive for exploiters)
- 1.3.2 Enhancing natural regeneration through selection and conservation of tree stands or seed trees, that will contribute to the restoration of the standing forest crop of exploited blocs/ areas/ forests
- 1.3.3 Establish a system for regular monitoring of logging activities
- 1.3.4 Reduce pressure on and around grazing paths
- 1.3.5 Gradually reduce the mixed herds of livestock
- 1.3.6 Implementing a system of temporary and rotational system of soil & water conservation that will create a livestock grazing reserve
- 1.3.7 Enforcement of existing relementation pertaining to forest land grazing (duration of stay of the flock, illegal settlements, grazing in relation to the carrying capacity of the land (preventing overgrazing).

Objective 2: Reducing human pressure

2.1 Sustainable management and exploitation of natural resources

- 2.1.1 Support the establishment of sylvopastoral associations
- 2.1.2 Develop new systems of participatory community management of forest grazing resources
- 2.1.3 Training farmers and shepherds to improve breeding techniques
- 2.1.4 Support the development of energy alternatives and improve energy efficiency of heating with wood
- 2.1.5 Implementation (at local level) of agreed and endorsed forest exploitation activities, by bringing forest stakeholders together with the communities responsible for the protection of the natural environment (managers, experts, NGOs)

2.2 Promote local eco-development activities as a useful tool to improve the conservation of the macaques

- 2.2.1 Encourage employment preferential to the local population (forestry, Eco-guard, research, tourism...)
- 2.2.2 Support the development of local cooperatives
- 2.2.3 Promote beekeeping in the surrounding villages of the forest
- 2.2.4 Promote the development of sustainable tourism in the areas of distribution of the macaques
- 2.2.5 Encourage development of lucrative fruit plantations
- 2.2.6 Provide financial assistance for the creation of eco-development projects, through the granting of micro-credit
- 2.2.7 Develop a program for local development (schools, health centers, roads, acquisition of energy, electricity, drinking water supply)

2.3 Reduce conflicts with macaques

- 2.3.1 Conduct surveys to identify the areas where conflicts with macaques take place
- 2.3.2 Propose and experiment with the use of methods of deterrence used in crop raiding situations (increase surveillance, physical barriers, visual methods, acoustical methods...)
- 2.3.3 Encourage the change of land-use (shifting cultivation, crops scheme change, increase in productivity to reduce the use of the land)
- 2.3.4 Maintain buffer zones that are open ground (not forested) between macaque habitats and the areas cultivated by humans;
- 2.3.5 Provide access to the water points for both humans and macaques

Objective 3 : Controlling the poaching and illegal trade

3.1 Strengthening control and surveillance at the borders and on national level

- 3.1.1 Capacity building of the judicial police (organization of training for the customs, gendarmeries, foresters)
- 3.1.2 Promote and implement the provisions of law 29-05 (inventory of people who use macaques for tourist and cultural reasons, marking the macaques, issuing certificates of ownership and those provisions that are part of CITES)
- 3.1.3 Implement surveillance in urban areas (markets), in consultation with local authorities
- 3.1.4 Reinforce the current surveillance teams through recruitment of new staff, and training and installation of eco-guards, particularly at the level of the PNI, High Atlas;
- 3.1.5 Creation of a national surveillance network consisting of NGOs and volunteers interested in the conservation of the macaques

3.2 Promote educational activities on Barbary macaque conservation

- 3.2.1 Raise awareness at national level about the illegal / criminal dimensions of capturing and selling of monkeys, by using the press, radio and TV.
- 3.2.2 Develop educational tools focused on the protection and conservation of the macaques for the general public, tourists (signs, brochures, flyers...) Organize awareness campaigns for tourists, including Moroccan residents abroad, on the negative impact of the trade of these primates on the preservation of this species, through the distribution of awareness materials at the level of the ports and airports;
- 3.2.3 Organize awareness campaigns for the local population (shepherds, monkey handlers/ entertainers) about the need for preservation of the macaque populations and their natural habitats
- 3.2.4 Encourage educational initiatives for the conservation of the Barbary macaques at the level of schools, parks, zoo, tourist centers

3.3 Rescue and rehabilitation of Barbary macaques

- 3.3.1 Create a protocol and an agreement between the HCEFLCD, the Zoological Garden in Rabat and the customs concerning the logistics and shelter of confiscated macaques
- 3.3.2 Create a protocol and an agreement between the HCEFLCD and SPANA for the rescue, care and medical health screening of confiscated or illegally kept macaques
- 3.3.3 Implementing a free phone number to receive claims and any complaints relating to the sale, mistreatment and the illegal possession of macaques, as well as informing people about the possibilities relating to voluntary giving up of a macaque for shelter
- 3.3.4 Create a social network to denounce any illegal acts or abuse of macaques (facebook page)
- 3.3.5 Create a team or a Committee, consisting of managers, scientists, experts, who will have the task to decide on the final destination of the animals after confiscation (delivery to specialized institutions or reintroduce back to the wild)
- 3.3.6 Conduct a feasibility study for the creation of sanctuary/ rehabilitation center for Barbary macaques in Morocco

3.5 Time frame implementation activities

Activities	Organisations NGOs/ Institutes/ Responsible	Years															
		1	2	3	4	5	6	8	10	12	14	16	18	20			

Objective 1: Restore suitable/optimal macaque habitat

1.1 Restauration of corridors

1.1.1 Identify and select areas that could be potential corridors for the populations of the macaques (to reduce the isolation of subpopulations of the macaques and provide additional food resources)	IS, CNRS/Univ Rennes, PNI, HCEFLCD, MPC, ENFI, Univ. Meknes															
1.1.2 Study and assess the potential of the selected corridors (field status, importance to the population of the macaques, food resources)	IS, CNRS/Univ Rennes, PNI, HCEFLCD, MPC, ENFI, Univ. Meknes															
1.1.3 Designate sites to rehabilitate (degrees of success of rehabilitation, the site's importance, ...)	IS, CNRS/Univ Rennes, PNI, HCEFLCD, MPC, ENFI, Univ. Meknes															
1.1.4 Create or rehabilitate the corridors in selected areas, by planting local tree species that are of great value to the macaques	IS, CNRS/Univ Rennes, PNI, ENFI, Univ. Meknes HCEFLCD, MPC															
1.1.5 Propose, in consultation with the human population that lives in the proximity of the macaques, the modes of management of these corridors to conserve and promote the rehabilitation and growth of the key species for the macaques	IS, CNRS/Univ Rennes, PNI, ENFI, Univ. Meknes HCEFLCD, MPC, Local community															

Activities	Organisations NGOs/ Institutes/ Responsible	Years										
		1	2	3	4	5	6	8	10	12	14	16

1.2 Maintenance/ preservation of refuge zones that are of great value for the macaques' survival

1.2.1 Inventory and mapping of the boundaries where there are patches of cedar and oak trees, which are of particular interest for the monkey (sleeping areas, shelters, food) and geo-reference the data (GIS)	IS, CNRS/Univ Rennes, PNI, HCEFLCD, MPC, ENFI, Univ. Meknes																		
1.2.2 Stop systematic cutting of old Cedars and clear cutting of oak trees in the identified patches of forest	HCEFLCD																		
1.2.3 Inventory and marking of selected trees for logging and add to GIS	HCEFLCD																		
1.2.4 To set up a system for consultation and control of operating/ exploitation activities at the local level, to form a team between the forestry management and conservation community (managing authorities, experts, NGOs)	IS, CNRS/Univ Rennes, PNI, HCEFLCD, MPC, ENFI, Univ. Meknes, ONG																		
1.2.5 Reduce the impact of logging activities by using low-impact logging techniques and thus to minimize the secondary damage to the environment caused by the logging	HCEFLCD, Forest exploiters																		

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

1.2 Maintenance/ preservation of refuge zones that are of great value for the macaques' survival

<p>1.2.6 Reinforce the surveillance on the illegal wood cutting, topping and other invasive illegal logging activities</p>																		
<p>1.2.7 Expanding protected zones that are habituated by macaques in areas that currently are not part of Talasemtane national park in the Rif.</p>	HCEFLCD																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

1.3 Reduce the impact of the exploitation of natural resources in Barbary macaque habitat

1.3.1 Encourage the use of low-impact logging techniques (planning of logging operations, limit the number of exploitable trees, optimizations of the dirt roads, training of staff, implement tax incentive for exploiters)	HCEFLCD, IS, Experts																	
1.3.2 Enhancing natural regeneration through selection and conservation (protection) of tree stands or seed-trees, that (will) contribute to the restoration of the standing forest crop of exploited blocs/ areas/forests	HCEFLCD, Experts																	
1.3.3 Establish a system for regular monitoring of logging activities	HCEFLCD, Forest exploiters																	
1.3.4 Reduce pressure on and around grazing paths	HCEFLCD, Shepherds/ grazing associations																	
1.3.5 Gradually reduce the mixed herds of livestock	HCEFLCD, Shepherds/ grazing associations																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

1.3 Reduce the impact of the exploitation of natural resources in Barbary macaque habitat

<p>1.3.6 Implementing a system of temporary and rotational system of soil & water conservation that will create a livestock grazing reserve</p>	<p>HCEFLCD, Shepherds/ grazing associations</p>																	
<p>1.3.7 Enforcement of existing reglementation pertaining to forest land grazing (duration of stay of the flock, illegal settlements, grazing) in relation to the carrying capacity of the land (preventing overgrazing).</p>	<p>HCEFLCD, Shepherds/ grazing associations</p>																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years															
		1	2	3	4	5	6	8	10	12	14	16	18	20			

Objective 2 : Reducing human pressure

2.1 Sustainable management and exploitation of natural resources

2.1.1 The establishment of sylvopastoral associations	HCEFLCD																
2.1.2 Develop new systems of participatory community management of forest grazing resources	HCEFLCD, Shepherds/ grazing associations																
2.1.3 Training farmers and shepherds to improve breeding techniques	HCEFLCD, grazing associations																
2.1.4 Support the development of energy alternatives and improve energy efficiency of heating with wood	HCEFLCD, MPC grazing associations																
2.1.5 Implementation (at local level) of agreed and endorsed forest exploitation activities by bringing forest stakeholders together with the communities responsible for the protection of the natural environment (managers, experts, NGOs)	HCEFLCD, Forest exploiters																

Activities	Organisations NGOs/ Institutes/ Responsible	Years															
		1	2	3	4	5	6	8	10	12	14	16	18	20			

2.2 Promote local eco-development activities as a useful tool to improve the conservation of the macaques

2.2.1 Encourage employment preferential to the local population (forestry, eco-guard, research, tourism...)	HCEFLCD, Forest exploiters, MPC, scientists,																
2.2.2 Support the development of local cooperatives	HCEFLCD, MPC, Local NGOs																
2.2.3 Promote beekeeping in the surrounding villages of the forest	HCEFLCD, MPC, IS, GEA, MAPM																
2.2.4 Promote the development of sustainable tourism in the areas of distribution of the macaques	HCEFLCD, MPC, DRT																
2.2.5 Encourage development of lucrative fruit plantations	HCEFLCD, MPC, MAPM																
2.2.6 Provide financial assistance for the creation of eco-development projects, through the granting of micro-credit	Banks																
2.2.7 Develop a program for local development (schools, health centres, roads, acquisition of energy, electricity, drinking water supply)	HCEFLCD, MPC, local NGOs, local community																

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

2.3 Reduce human - wildlife conflicts with macaques

2.3.1 Conduct surveys to identify the areas where conflicts with macaques take place	HCEFLCD, MPC, Scientists																	
2.3.2 Propose and experiment with the use of methods of deterrence used in crop raiding situations (increase surveillance, physical barriers, visual methods, acoustical methods...)	HCEFLCD, Agriculture experts																	
2.3.3 Encourage the change of land-use (shifting cultivation, crops scheme change, increase in productivity to reduce the use of the land)	HCEFLCD, MPC, MAPM, Agriculturists																	
2.3.4 Maintain buffer zones that are open ground (not forested) between macaque habitats and the areas cultivated by humans	HCEFLCD, MPAM, Agriculturists																	
2.3.5 Provide access to the water points for both humans and macaques	HCEFLCD, MPC, MAPM, NOGs																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

Objective 3 : Controlling the poaching and illegal trade

3.1 Strengthening control and surveillance at the borders and on national level

3.1.1 Capacity building of the judicial police (organization of training for the customs, gendarmeries, foresters)	HCEFLCD, MPC, IFAW, Customs, Police, Gendarmerie																	
3.1.2 Promote and implement the provisions of law 29-05 (inventory of people who use macaques for tourist and cultural reasons, marking the macaques, issuing certificates of ownership and those provisions that are part of CITES)	HCEFLCD, Gendarmerie, Police, Customs																	
3.1.3 Implement surveillance in urban areas (markets), in consultation with local authorities the use of the land) local population (forestry, eco-guard, research, tourism...)	HCEFLCD, Gendarmerie, Police, Customs																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

3.1 Strengthening control and surveillance at the borders and on national level

<p>3.1.4 Reinforce the current surveillance teams through recruitment of new staff, and training and installation of eco-guards, particularly at the level of the PNI, High Atlas</p>	<p>HCEFLCD, MPC, IFAW</p>																	
<p>3.1.5 Creation of a national surveillance network consisting of NGOs and volunteers interested in the conservation of the macaques</p>	<p>HCEFLCD, MPC, NGOs</p>																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

3.2 Promote educational activities on Barbary macaque conservation

3.2.1 Raise awareness at national level about the illegal / criminal dimensions of capturing and selling of macaques by using press, radio, tv etc)	HCEFLCD, ONG, Press, MPC, AESVT, TV																	
3.2.2 Develop educational tools focused on the protection and conservation of the macaques for the general public, tourists (signs, brochures, flyers, ...)	HCEFLCD, MPC, IFAW, AAP, AESVT, SPANA ONG																	
3.2.3 Organize awareness campaigns for tourists, including Moroccan residents abroad, on the negative impact of the trade of these primates on the preservation of this species, through the distribution of awareness materials at the level of the ports and airports	HCEFLCD, MPC, AAP, IFAW, ONG, Customs																	

Activities	Organisations NGOs/ Institutes/ Responsible	Years															
		1	2	3	4	5	6	8	10	12	14	16	18	20			

3.2 Promote educational activities on Barbary macaque conservation

<p>3.2.4 Organize awareness campaigns for the local population (shepherds, monkey handlers/ entertainers) about the need for preservation of the macaque populations and their natural habitats</p>	<p>HCEFLCD, MPC, IFAW, ONG, Grazing associations</p>															
<p>3.2.5 Encourage educational initiatives for the conservation of the Barbary macaques at the level of schools, parks, zoo, tourist areas</p>	<p>HCEFLCD, MPC, SPANA, AESVT</p>															

Activities	Organisations NGOs/ Institutes/ Responsible	Years										
		1	2	3	4	5	6	8	10	12	14	16

3.3 Rescue and rehabilitation of Barbary macaques

3.3.1 Create a protocol and an agreement between the HCEFLCD, the Zoological Garden in Rabat and the customs concerning the logistics and shelter of confiscated macaques	HCEFLCD, JZN, experts																		
3.3.2 Create a protocol and an agreement between the HCEFLCD and SPANA for the rescue, care and medical health screening of confiscated or illegally kept macaques	HCEFLCD, SPANNA, experts																		
3.3.3 Implementing a free phone number to receive claims and any complaints relating to the sale, mistreatment and the illegal possession of macaques, as well as informing people about the possibilities relating to voluntary giving up of a macaque for shelter	HCEFLCD, SPANNA, MPC, IAM																		
3.3.4 Create a social network to denounce any illegal acts or abuse of macaques (facebook page)	HCEFLCD, MPC, IFAW, AAP, ONG, IAM																		

Activities	Organisations NGOs/ Institutes/ Responsible	Years																	
		1	2	3	4	5	6	8	10	12	14	16	18	20					

3.3 Rescue and rehabilitation of Barbary macaques

<p>3.3.5 Create a team or a Committee, consisting of managers, scientists, experts, who will have the task to decide on the final destination of the animals after confiscation (delivery to specialized institutions or reintroduce back to the wild)</p>	<p>HCEFLCD, IS, Experts, MPC</p>																	
<p>3.3.6 Conduct a feasibility study for the creation of sanctuary / rehabilitation center for Barbary macaques in Morocco</p>	<p>MPC, SPANNA, AAP, HCEFLCD, JZN, IS</p>																	

3.6 Evaluation indicators

Objectives	Indicators
1. Restore suitable/ optimal macaque habitat	<ul style="list-style-type: none"> - Increase of 50% in Barbary macaque populations in current habitat regions - Recolonisation of Barbary macaques in regions where densities are low/ absent
2. Reduce human pressure	<ul style="list-style-type: none"> - Strong decline in numbers of livestock herds in important Barbary macaque habitat regions - Reduction in numbers of cases of human – macaque conflicts
3. Controlling the poaching and illegal trade	<ul style="list-style-type: none"> - 80% reduction of numbers of confiscated Barbary macaques in Morocco compared to the average number of confiscations in the first three years after implementation of the law n°29-05.

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