
World and local heritage, the relationships between conservation and development: the example of the Coelacanth

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Abstract: The Coelacanth, single survivor of the zoological group of Crossopterygians, in which is supposed to have appeared the ancestor of terrestrial Vertebrates, represents perfectly the emblematical living heritage of the earth. After the discovery of the first actual Coelacanth (in 1938), specimens have been fished in Comoros waters. The archipelago considers it now as a national heritage. But the fish is endangered and the international community there is attempting to preserve it by creating a marine park. Consequently, the populations on its borders consider it both a local heritage and an economic opportunity for development. This paper explores the meaning that the expressions 'world heritage' and 'local heritage' have for the actors involved and analyses the problems raised by the management of a world heritage on a local scale, in a context of great poverty.

Keywords: Coelacanth; heritage; the Comoros; conservation; development.

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1 Introduction

The concept of world heritage was introduced by UNESCO in 1972 at the time of the first signing of a convention specifically dedicated to it [1]. In 1999, 158 of the 185 states of the United Nations were signatories. The inscription on the world heritage list relates only to natural sites considered as exceptional on a planetary scale, according to one of three criteria: natural beauty, scientific interest, richness in the field of biodiversity. Specific attention is given to habitats whose safeguarding is crucial for the conservation of very rare species, threatened with extinction or having a universal value from a scientific point of view [2].

The approach of the world heritage concept by UNESCO seems too restrictive to us; it is exclusively founded on the concept of scarcity and it applies only to stocks of located

resources, considered to be essential for humanity's future. This might mean that all living species cannot be regarded as a natural heritage. But definitions given of a 'world heritage' contradict this assertion: a good that is common to all the planets' inhabitants, and in daily use, such as the air, is an obvious heritage of humanity. In *The Accounts of The Natural Heritage* [3], Weber defines heritage as:

"All the natural elements and the systems that they form, which are likely to be transmitted to future generations or to change. Belonging to the natural heritage: vegetal and animal species, animal and vegetal populations with a life cycle and a rate of renewal implying the possibility of an accumulation and thus of a transmission, elements and products of the natural environment, which are regularly and quickly renewed or recycled even if they can be apprehended only in term of flow, ecological systems where species are reproducing (including physical support for these systems), physical systems of circulation of matter and of energy, permanent elements of terrestrial eco-sphere, which might be attached to a territory and can thus be owned.

Excluded from the natural heritage are: elements, which cannot be transformed by Man and that one cannot own, elements whose origin and renewal are completely ascribable to Man."

As a living species, the Coelacanth is a natural heritage. But is it possible to regard it as a world heritage? We think it is. Its extreme scarcity, but, in particular, the fact that it owns "a capital of information of a priceless value for humanity" [4], classifies it in this category. This is what we will try to show in the first part of this paper.

The Coelacanth's scarcity implies that it is protected. The international community is attempting to mobilise in order to preserve this world heritage, by installing a marine park on the south-eastern coast of Grande Comore. A first project has been initiated within the framework of the Environmental Regional Program (ERP) of the Indian Ocean Commission (IOC). This project has allowed the concepts of national heritage, and regional and local heritage to emerge. These concepts will be the subject of the second part of this paper.

The third part will be devoted to the relations between conservation and development. In a country such as the Comoros, in such a poor economic context, when fighting poverty is a priority, the question is crucial. How to reconcile the conservation of the islands' natural heritages and their development? The opposition between 'ecology' and 'economy' is obvious at the international level. But is this opposition as clearly perceived by authorities and local communities? Perceptions and representations of the actors concerning the park and its management bring answers that are greater than the Comoros framework and inform the management of a world heritage on a local scale, in a context of great poverty.

2 Exploring the concept of world heritage

2.1 *The Coelacanth, a world heritage?*

There are many vegetal and animal species threatened with extinction. Is scarcity a condition necessary and sufficient to consider them all as world heritage? We do not think so. A heritage-species has to present one of the three following conditions: to be, by its morphology or its physiology, the testimony of a remote past of the earth, to have a

genetic material able to contribute significantly to current and future human development, to have a genetic material potentially able to contribute to future human development. The species answering one of the first two conditions can be regarded as effective heritages. The species answering the third condition are potential heritages.

2.1.1 History of the Coelacanth

For many scientists, studying *Latimeria* leads to an understanding of the Crossopterygian's organisation and, consequently, of the Rhipidistian, ancestor of all tetrapods and of mankind. During the 60 last years, few animals, Man included, have excited the public's imagination and scientists' curiosity as the Coelacanth has done. Data arising from fossil traces acknowledged potentially fantastic discoveries about evolution. The Coelacanth's significance is thus great.

During the 19th century, the fish was believed to have appeared ~ 400 million years ago and disappeared ~ 60 million years ago. This longevity and its evolutionary potential to climb from the oceans onto the earth, to play a pivotal role in the evolution of land-living tetrapods, show it as a 'missing link', an exceptional 'primitive' with a specific place in the evolutionary scale. Later on, zoologists revised the fossil chronology: the fish is not mankind's ancestor [5–8]. Its morphology is not that of a tetrapod's ancestor. Challenging the evolution theory, it became an evolutionary cul-de-sac, when, in 1938 a living specimen was fished in South Africa [5,9]. With Smith, who 'discovered' it, the Coelacanth became a communication phenomenon. The media presented the 'missing link' again. The hunt began. Contradictory information circulated the world. In 1952, what seems to be the single modern biotope of the Coelacanth was discovered: in the Comoros, then a French colony. The Laboratory of Comparative Anatomy of Paris examined a fresh specimen: the Coelacanth was not the 'missing link' between sea and earth, but a 'primitive great-uncle', one of these rare animals morphologically almost unchanged over 300 - 400 million years [10].

Scientific information influences public information and local people's perceptions. For fishermen, the fish had, hitherto, been inedible, with no market value; they caught it only by accident [11,8]. Now, its market value is rising because of its scientific value. Fishermen catch it more and more [12]. In 1975, the Comoros became independent. The scientific hunt stopped. But the islands are overpopulated. People have over fished inshore waters, where they caught inshore benthic fish. Lacking motorboats that would help to fish in offshore waters, they paddle their canoes out to deeper waters off the coastal fringe, where the Coelacanth lives [12].

In 1987, Fricke and Plante were the first to observe the Coelacanth in-vivo, to film it from a submersible. The fish became an extraordinary object for television communication. The team monitored the size of its population, indicating a total of only 200 - 300 specimens on the east coast of Grande Comore; where the parent population has been localised [13], showing the scale of the diminution [12]. They proposed the creation of a Coelacanth park on the site [14].

Science realises that, if *Latimeria* shows some primitive characteristics, it appears more as a fish specialised for living in marine depths [7,15]. Scientific mystery, a living paradox for the knowledge process of Darwinism and western values, the Coelacanth has become a symbol for disparate complexity and the powerful adaptive inventiveness of life.

If most specimens have been then captured around Comoro Islands, some are caught opposite Madagascar and Mozambique, and their DNA sequences are identical [12]. This fact helps the Comoros population to build a feeling of 'heritage membership'. The Coelacanth has become a symbol for the islands, a national heritage. The micro region concerned with the presence of the fish regards it as a local heritage. Its conservation, first of all perceived as a constraint, has become, through the Coelacanth park, an opportunity for economic development and local promotion. However, the funds necessary for building the park are lacking. International organisations do not trust such an unstable country. Global communication regarding the Coelacanth is not wide enough.

When in 1997 and 1998, two coelacanths were fished off north Sulawesi [16,17], revealing a second species (*Latimeria menadoensis*), further questions arose. How many species exist? What kinds of questions regarding the origins and the future of humanity could be answered? How to protect the fish? The Coelacanth has become a communication technology phenomenon through websites and scientific polemics on e-mail [18]. But the scientists' objective remains the answers to their questions.

2.1.2 The Coelacanth, symbols and values

The significance and symbols of the Coelacanth are based on a fundamental idea: by its morphology and its physiology, the fish is a living testimony of a remote past of the earth, of the 'great uncles' of mankind. These significances are many. They are at the roots of values that were allotted to the fish. However, the conference organised by Wilson in 1986 [19], launching the issue of the foundation of the value in the field of the natural environment, to give an intrinsic value to biodiversity and to species, became a way of trying to improve conservation efforts [20-25]. Cross- significances and values of the Coelacanth, defined by answering the questions: 'a value for what?', 'a value for when?', 'a value for whom?', are thus many arguments for the total protection of the fish.

We propose thus to distinguish its value as follows:

- The Coelacanth has a significant evolutionary and educational practical value, because of its contribution to humankind's understanding of a significant evolutionary process, of phylogeny, of modern cladistic [26,8], of conclusions and perspectives of fossil based palaeontology [27,9,28,8], of evolutionary biology, of scientific and general education.
- The Coelacanth presents significant socio-historical and socio-cultural values: western science recognises it as a 'great father', then as a 'great uncle'. The Comoros populations do not take necessarily for granted this western vision, but draw from it their own national symbolism, based on the pride of 'owning' such an icon. They honour it by representing it on many items (street names, stamps, etc.). The Coelacanth, its scarcity, its longevity, are also at the root of many language metaphors, drawings, films, etc. [8].
- The psychological values are drawn directly from the Coelacanth's reputation: observing it has a reassuring, soothing and strengthening effect on people.
- The values of consuming the animal itself are negligible, limited to a laxative purpose [29,30,8] and to a supposed mosquito repellent effect [8]. The anti-ageing

effect that rumours allotted to a liquid drawn from the chord (especially in Asia) was never checked [8]. But there is considerable value in representations and marketed artistic, craft, advertising and media symbols, based still on the of 'the origins' image of the fish. Another use is that of direct observation as a leisure pursuit. However, biological values are becoming more important. The Coelacanth is a bio-indicator for the rising of water temperature. Within the context of therapies or environmental adaptation processes, its potential, morphological, physiological and genetic, can help to understand the 'how' and the 'when' of evolutionary processes [18]. In addition, the Coelacanth might have a genetic material able to contribute significantly to biodiversity conservation and human development. The average longevity of a given species being a million years, the Coelacanth's longevity is 400 million years: it is not a library but hundreds of libraries, with information acquired by evolving throughout these years. The Coelacanth has thus a prime potential value of direct knowledge and of use of this knowledge.

- Its exemplary and educational practical value was revealed in 1997, when Coelacanths were discovered on the northern coast of Sulawesi [17,16]. Relations were established between the Comoros and Sulawesi [31]: the case has become an example in the fields of conservation biology and transnational integrated biodiversity management. The fish has become a symbol of parameters essential to sustainability.
- The Coelacanth has, thus, in itself a restricted economic practical value, especially because of CITES [32] (Convention on International Trade in Endangered Species of wild fauna and flora) protection. It does not apply on the black market where astronomical prices can be given for it [8,12]. However, its economic value might exist primarily on the level of tourism, for potential therapeutic and ecologic use. This value can come not only from the socio-historical, socio-cultural and consumption values mentioned above, but also from its exemplary and educational value.
- Because of its essential characteristics, and as a symbol of past centuries, of the respect granted by the present generations to future generations, the Coelacanth has an unique non-practical value, altruistic and of legacy. As a species, it has a unique value also, for past, present and future living beings.
- Its value of existence is drawn from the fact that it is a fundamental representation of nature, of scarcity in diversity, of complexity, of awareness of humankind's place in nature.
- Symbolising evolution in both permanence and change, in integration within an environment, its essential intangible value is in its prime iconic potential of a biodiversity entity, of ethics in observation, in knowledge process, of the right to life that all organisms have, regardless of human influence, within a context of socio-economic, ecological and cognitive sustainability [18].

The Coelacanth thus fills indeed the first of the conditions to be an effective heritage: through its morphology and physiology, it brings testimony of a remote past of the earth. It also meets the condition required to be a potential heritage, since it has a genetic material potentially able to contribute to future human development.

2.2 *A world heritage, for whom? By whom? Why?*

Legally, the concept of heritage implies the concepts of property or usufruct. Any heritage belongs to somebody or is lent to an individual or to a social group, who is responsible for it. As underlined by Humbert and Lefeuvre in 1992 [33], property confers to its holder the right of use but also of destruction [34]. It is thus necessary in the case of natural heritage, to substitute for the concept of property that of possession which “resting on a control, dissociated from the law principles, gives only to one person the possibility of exerting on a thing the material acts of use, possession and transformation. This person is not allowed to alienate or to destroy the owned thing” [33].

In the case of a world natural heritage, it is fundamental to wonder about the degree of awareness of the world’s population, with respect to the heritage this population owns or uses. When it is a natural site or a species not much publicised such as the Coelacanth, this degree of awareness is nil. Often, the knowledge of the heritage’s existence is missing. The fact that the world’s population is aware of a heritage does not make it a world heritage. It is the action of a ‘promoter’ group that will succeed in promoting the heritage to classify it. It can be a group of individuals recognised on the international scene for their competence, or it can be governments or local councils eager to label their heritage on a worldwide scale by UNESCO.

In the case of the Coelacanth, this group includes barely more than 100 people, of whom the most dynamic belong to three sets, mainly composed of scientists brought together on specific research grounds: South Africa, Comoro Islands and Indonesia. The first unit, heir to the first Coelacanth’s discoverers, is made of up South African scientists. As no specimen had been fished in South Africa for 40 years, this unit was, until 2000, the least dynamic of the three. But in-situ observation of specimens in 2000 and 2001 could change the situation. The second unit joins together German scientists (around Fricke) and French scientists (around Plante). Their work is continuing research done after the capture of the first Comoro Coelacanth in 1952. This unit has continued its research in the islands’ waters since 1986. It is the author of a complete census of the Grande Comore’s specimens in 1995 and 2000. The third unit, more recent, is built around a US team from the University of California (around Erdmann). A French scientist (Pouyaud) is competing with it [35]. The discovery of the Indonesian Coelacanth in 1997 and 1998 had big media repercussions. It pushed them all to compete for the celebrity drawn from these Coelacanth studies. This latter unit is composed of younger scientists, looking for recognition, mastering perfectly the practice of data processing and using easily the most recent communication technologies, including the internet. It is supported as well by an older US group (Cosker, Balon, etc.), which took part in the New-York Aquarium’s expeditions in the 1970s and 1980s. It has more or less distant relations with the Explorers club’s group, built up, in the beginning, by such neophytes as Hamlin, creator of the ‘dinosfish.com’ website [36]. On the periphery, the Japan Research and Study Committee on Coelacanth took part in numerous research expeditions in the Comoros. This should be distinguished from the Toba Aquarium’s team, which tried to capture living Coelacanths, and which is persona non grata in Sulawesi even now. The new US group that refused, until now, the idea of capture, is revising its position, for the ‘necessity’ of having in vitro study material. On that point, it is opposed to the German and French groups, which underline the risk of seeing large aquariums slipping into the breach. Although they have their own practices of research

valorisation and communication, the three groups exchange points of view and deliver the same message to the public: the Coelacanth is an unique animal, to preserve.

One can be astonished that media efforts are primarily turned towards the international scientific community. It is however a mark of realism on behalf of the Coelacanth's promoters: they do not have sufficient means to target another public... and researchers' mobilisation (research combined with calls for conservation, for development etc) is often well publicised. It should help to increase their means, to amplify their message, by creating an *International association for the conservation of the Coelacanth*, giving a structure to all of them. But, in spite of the strong will of some individuals, scientific Coelacanth specialists have not been able to do it until now. The implications of such an association largely exceed the professional framework, requires that part of the working time is devoted to research or teaching is reallocated with the association's functioning. Few researchers concerned about their career are ready to accept this. Moreover, an essential difficulty remains: their message has to exceed the framework of the international scientific community. But which other public could they target?

On a planetary scale, no existing organisation can give to a species the label of 'world heritage'. The single large-scale action consists in prohibiting the international trade in plants and animals threatened with extinction within the framework of CITES. In its preamble, the CITES allots de facto the 'quality' of world heritage [37] to the species it is concerned with, but does not recognise the statute. Until now, the Coelacanth was the subject of no organised commercial fishing, but a market exists. Hamadi and Ahamada explain in 1998 [38] that, at the end of the 1970s, a living specimen was worth approximately 70 000 Comoro francs for the fisherman. In the middle of the 1990s, a dead specimen was negotiated for 60,000 Comoro francs. To repress the international Coelacanth market is thus necessary to protect the species. The inscription on the CITES list completes the labelling of threatened species by world scale legal measures, which are applicable to the police and customs of the Washington Convention's signatory countries. This inscription allows the fish 'to integrate' not only the network of the international scientific community, but also that of nature protectors. The CITES is indeed helped in its actions by the network TRAFFIC, a structure common to the IUCN (International Union Committee for Nature) and to the WWF (World Wildlife Fund). However these international NGOs are frequently requested to offer scientific expertise by UNESCO, UNEP and UNDP (United Nations Development Program), on which the GEF (Global Environmental Facility) depends [39]. The influence of the IUCN, of the WWF is thus considerable on financiers and environment and development UNO operators. But these financiers intervene only on state request, pointing out that the national level should not be forgotten in nature conservation's 'world game'.

Is it a dream to consider the Coelacanth as a world heritage? A dream shared by very few persons and that, in addition, would not bring anything to this species' conservation, the animal being already protected from international trade by the CITES? It is probably a dream, if promoters of the 'Coelacanth – world heritage' remain confined to the scientific communities and if the single scale of intervention remains the international one. 'Coelacanth – world heritage' can be an operational concept only in the framework of a set of scales between the international, the national and the local.

3 The various levels of heritage

3.1 From world heritage to national heritage

Temporal continuity is probably heritage's most essential characteristic. However, heritage does not exist *ad vitam aeternam*. Natural heritage can depreciate, even disappear. It is thus necessary to manage it with a durability objective. This management often has to implement different spatial scales according to intervening actors. For a good as common, as daily shared as the air, management needs two kinds of protagonists:

- states or international organisations that establish management rules
- moral persons (firms) or private persons (individuals) who apply or do not apply these rules and can go beyond them by deciding to implement best practices (that can be more effective than rules).

This kind of management has thus two fundamental aspects: awareness and individual action extended to all users. It needs three levels of decision: the international, the national and the individual. But the scale remains that of the planet, spatial expansion's field of the considered heritage.

For a good, scarce and concentrated in few places, like the Coelacanth, management requires geographical proximity. In fact, national and local scales are then requested. Two cases are possible:

- a country (or local communities) manages, on its own account, a heritage. The world dimension of this heritage is calculated compared to its national and local dimensions: it is thus a national or local heritage
- this country or these communities act within the framework of an international management mandate, granted by a regional organisation such as the IOC, by a financier such as the European Union (EU), or by an agency of the UNO such as the UNDP

First of all, the relations between the various actors are clear: for the defence of a world heritage, national level or local level intervene only as service providers of international level. But reality is different. In spite of globalisation, international relations rules remain. An international organisation is allowed to intervene in national fields only at the request of the states. This request might be dictated by the international level. But usually, the request emanates from the state. In this case, a state rarely offers spontaneously to protect a part of the world heritage, if it has not regarded the considered site before as national heritage.

In the Comoros, the Coelacanth has been considered as national heritage only recently. After independence in 1975, the country went through a series of coups d'état, which has given a very unfavourable image of the Comoros on the international scene. Research undertaken by Fricke and Plante since 1986 has influenced the Comoro authorities' perception of the Coelacanth. They realised that it was an essential asset to develop the image of the country abroad. Reinforcing this was the fact that no specimen had been captured for a long time near Mozambique or South African coasts. It became logical to think that the Comoros was its single biotope. In 1994, a French television report, made by Bontemps for *Thalassa* [40], and then, in 1996, the broadcasting of Hulot's, *Okavango* [41], showed for the first time in situ Coelacanths. Then, reports from

other countries' television networks concretised the image of the Comoros, which became the Coelacanth's archipelago. The fish became their national identity's symbol: a timeless, positive symbol, facing a hostile and indifferent world. It became thus a national heritage. In 1997, a specimen was caught in Madagascan waters, and exposed as a Madagascan heritage. In a paradoxical way, it reinforced the Coelacanth's heritage and identity value for the Comoros. Scientists indeed agree that specimens found around Madagascar are not a population distinct from that of the Comoros, but individuals carried by currents [12]: the 'Madagascan' specimen would be a 'Comoro' one lost near Madagascar. The episode reinforced the fact that Comoro authorities regarded the Coelacanth as a national heritage and that it was important to protect it. The action of protection began within the ERP of the IOC. At the request of the Comoro state, this program envisaged the installation of a park dedicated to the Coelacanth in the waters next to the south-eastern part of Grand Comore [42].

3.2 The difficult emergence of the concept of regional heritage

The IOC, as a regional organisation, is authorised to deal with protected areas only for the creation of a protected area network or for the installation of a regional protected area. In this framework, the Coelacanth became a regional heritage as '*ocean's unique emblematical species*' [43]. The park's building was presented as the regional protected area. But the concept of a regional heritage species remains an administrative creation. For the Comoro people, the fish is a national heritage. For the people of Reunion Island, Mauritius and the Seychelles, it is a 'foreign' fish. In Madagascar, few scientists and politicians regard it as a Madagascan heritage. The emergence of the regional natural heritage concept is difficult as well: regionalism is still not shared among Indian Ocean islands. IOC's construction remains foreign to most inhabitants of the countries that make it up, and to most of their political elite.

3.3 From national heritage to local heritage

Both concepts of the 'Coelacanth as national heritage' and of the 'Coelacanth as local heritage' are recent. The second, emerging on the south-eastern coast of Grande Comore, more recent than the first, has its roots in the scientific work done on the species in the Comoros. Concerned with its conservation, scientists began a campaign to inform local communities, to explain that the Comoro people should not fish the Coelacanth. Before 1952 indeed, it was not a species targeted by fishermen, nor a local emblem. Populations perceived it as an oily fish, caught in a non-intentional way. Thirty years ago, the 'Gombessa', the Comoro name for the fish, was thus far from being a local heritage. Since 1986, this perception has changed. Through the regular visits of scientists, local populations understood that the fish was interesting many foreign scientists. The latter endeavoured to provoke within these populations a protective feeling, with the argument: Gombessa is a fish known throughout the world; it is a vestige of the most remote ages of the planet; it is found only in the Comoros, more especially on the south-eastern coast of Grande Comore [14]. The message was clear, centred on the objective of the species' conservation. The Coelacanth, world heritage, will remain so only by becoming a national heritage and local heritage. The interpretation made by local populations is different. Their motivation is not the species conservation, but the celebrity the Comoros

can get worldwide, thanks to 'Gombessa', and the potential economic development associated with the fish.

Local population awareness and marine biologist efforts to promote the Coelacanth's conservation were concretised in January 1998 by the creation of the Gombessa association. This was initiated by a young biologist who works in the Indian Ocean's ERP [44], has strong local roots: his father is the head of the village of Itsoundzou, which was often used as a base for Fricke and Plante's expeditions. The association aims to protect the fish via the creation of a park that would include the maritime territory of 12 villages of the Grande Comore's south. This park is perceived as the opportunity to initiate local economic development. It is on this objective that villagers accepted the creation of the association and to be part of the thinking. In this context, the local ecological heritage's concept is a transcription of the national ecological heritage's concept applied to the local scale. It is also a way to use this concept for the promotion of a restricted area's economy through the valorisation of a topic of national and international interest. The dimension 'transmission of a natural heritage' is secondary compared to short-term prospects offered by the park's creation. It is the concept of heritage in itself that seems to be diverted from its significance: the Coelacanth is perceived by local populations more as a natural capital, potentially generating economic development.

One of the more striking and more comforting aspects of this local awareness is the investment of fishermen in conservation objectives, without awaiting international subsidiaries. They call themselves 'Coelacanth's protectors', asking for some loans (and not for gifts) in order to buy lamps or to install fish aggregate devices for pelagic fish (to move the fishing effort towards an abundant and renewable resource). Often, fishermen who had captured a Coelacanth cut the line to let it free again.

3.4 When development meets natural heritage

This exploration of the concept of heritage at various levels shows how the involved actors' motivation is a variable criterion. It varies with the scale from which the natural heritage is considered; it allows the quantification of the heritage under discussion. It is thus possible to distinguish 'world heritage' from 'national heritage'. 'World heritage' is a scientific and juridical concept, supported by marine biologists, specialists of the Coelacanth, integrated to international environment law. 'National heritage' is a political concept, justified by geopolitical considerations aiming at improving the international image of the Comoros. As for 'local heritage', integrating a primarily economic dimension: it is comparable to the concept of natural capital, a stock of resources and of environmental supports providing ecological, social and economic services [45].

It is thus at the local scale that, in the case of the Comoro Coelacanth, the concepts of heritage and development meet. It is interesting to note that the association between 'heritage' and 'development' is done by local communities rather than by international experts. The latter, sustainable development specialists, try to apply this association from the global level to the national one and to the local one. This is specific neither to the Coelacanth nor to the Comoros. But it is rare because it requires two conditions. On the one hand, the natural heritage is of world importance, its conservation mobilises thus international financiers. On the other hand, when poverty is great, conservation of natural heritage is not perceived as a restraint on economic development by local communities, but as the main opportunity to develop. This mode of development finds its roots in

conservation. It is not, however, without constraints, driving sometimes to logics that are extremely far from the first intentions of the natural heritage's managers.

4 How to manage a world heritage in a context of great poverty

4.1 The Comoros, an archipelago in the process of impoverishment

In 1995, when the IOC launched its ERP with the financial support of the EU (ERP- IOC/EU), the Comoros were in a disastrous economic situation. After a period of moderate growth, the economy of the country slowed down, and has been in recession since 1988. In 1995, 47% of the households lived below the poverty line. In 1998, the figure was 52%. The national economy up to now has proved unable to generate competitive export sectors or sectors centred on import substitution. The trade balance has experienced devaluation since 1988. The Comoros belongs to the countries of the free zone for which the awaited positive shock of the devaluation of 1994 did not occur. Devaluation had a mechanical effect on import values. Exports: vanilla, ylang-ylang and cloves, whose prices on the world market have fallen under the effect of the increasing use of synthetic products, did not profit from the awaited renewal of competitiveness. Import volumes did not lower after devaluation, whereas prices strongly increased. Import prices of rice (a basic food), increased by 129% between 1993 and 1995 [42].

In parallel, the Comoros knows a fast demographic growth, the population doubling every 26 years. Nothing indicates a fall towards a demographic situation of transition [42]. Populations will have to ensure their essential needs: emigration will ensure the transfer of resources, reduce the number of individuals to maintain, and natural capital 'consumption' by non-sustainable practices of natural resource exploitation will occur.

The last major constraint is the chronic institutional uncertainty of the Comoros, with numerous consequences. The lack of confidence in relations between civil society and state encourages the development of a black economy. Relations between international financial institutions, financiers and national public institutions, have undergone the consequences of a politically agitated life. That is not favourable to the emergence of a consensus on a long-term strategic vision for Comoros development.

4.2 Is a marine park essential to manage Coelacanth heritage?

4.2.1 The logic of conservation

In Grande Comore, the Coelacanth's conservation is a matter of fishing regulation. From 1954 to 1995, 119 specimens were captured. In 1995, Fricke estimated that 200 individuals remained [46]. Grande Comore's population was threatened with short-term extinction if fishing was carried on. Since then, scientists' efforts to make local populations aware have been relayed, with success, by the Gombessa association. No Coelacanth capture has been recorded since 1998, when the ERP of the IOC launched studies for the park's installation [38,42]. At first sight, this park does not seem essential to preserve the Coelacanth. The consensus obtained from village communities is enough, especially because the fish's inscription on the CITES priority list prohibits legal export and exposes contraveners to severe sanctions. Moreover, local adhesion, so difficult to obtain in other protected areas of the region, has been acquired here. It is true that the

cessation of the single fishing technique by which Coelacanth could be taken in an incidental way, hardly injures fishermen economically. This kind of fishing is practised only by the older fishermen, who are gradually stopping this activity. Fishing of the Coelacanth should soon disappear.

4.3 The local population's point of view

If a park proves to be useless for Coelacanth preservation, it is considered by villagers as the opportunity for developing their economy. Based on the world heritage concept, they believe that the Coelacanth's conservation is their responsibility because of their geographical situation, and has to receive a contribution from the beneficiaries of this world heritage: the representatives of our planet's inhabitants. The park would be the remuneration for a service given to the latter by the local population.

The participation of the son of Itsoundzou village's head in the work of the ERP-IOC promoted the idea of the park, contributed to obtaining the local population's adhesion to Coelacanth conservation. Since 1996, he has carried out investigations in villages [44], to collect information on perceptions of the project. In 1998, he helped with the association's creation and was a joint editor of the 'Report of Socio-economic Studies in the Area Planned for the Installation of the Park'. The opinions expressed in this report reflect those of the park's promoters, in particular of the Gombessa association, joined by the majority of the local population:

"the area of the park, covering 12 villages [...] has socio-economic problems. The creation of a marine park could create a new economic dynamic, transform the area into a tourist attraction centre supporting job creation [...], diversification of craft activities, [...] exert an impulse on the economic activities of the area." [47]

The park's main function is of an economic nature. Local populations are waiting for the infrastructures and equipment necessary to ensure tourism or fishery development [42]. It is the emergence of new relations between conservation and development: from biodiversity conservation can come economic development, which, in return, should guarantee conservation durability.

5 The point of view of the financier

For the ERP of the IOC and its financier, the EU, the installation of a park also exceeds the strict conservation of the Coelacanth. The local population's concern to have activities generating income is recognised as legitimate. "This park will allow to offer alternative solutions for fishing activities' development in the area", other economic repercussions being awaited with the creation "of an educational reception's centre, for tourism development and information of the public" [42]. In order to associate local communities to the park management, the feasibility report recommends the establishment of an inter-village committee within the administration committee. This committee will have to put the rules of good governance into operation. These rules are those which the villagers will follow for the conservation of the Coelacanth. They are also those of integrated management of the coast, in particular with regard to waste and

the extraction of marine aggregates. Another of its tasks will be to solve the conflicts intra or inter-village, which could threaten the correct operation of the park.

In addition, the IOC makes a point of placing the park within an international dimension. It is envisaged to establish “a pole of scientific international research allowing the continuation of research on the Coelacanth in the Comoros, [...] the emergence of national competences” [42].

The scientific promoters of the ‘Coelacanth – world heritage’ will be associated with the park management, in an international foundation of the Coelacanth. This international foundation will bring together international actors working for the Comoro Coelacanth’s protection: scientists, financiers, international NGOs. Based in the Comoros, it will have as principal tasks:

- to bring scientific support to the management structure of the park
- to help to promote the park’s image to the media and the public
- to help to consolidate its financial base
- to advise on the implementation of financing systems such as Coelacanth sponsorships and fiduciary funds
- to control the management, to guarantee its rigour, the adequacy between achievements and aims
- to control the rules of good governance
- to be part of the directors’ board of the management structure

6 When development aspirations run up against insular constraints

Even legitimate communities’ aspirations to development encounter constraints. The first one is economic, related to infrastructures necessary for fishing and tourism, both dependent on transport and market laws. Tourists have to be able to reach Grande Comore’s south easily, to have acceptable conditions of comfort, for a price in conformity with those of comparable destinations. The fish has to be dispatched towards Moroni, which is the main area of consumption in the country. But roads are often in a poor state of repair and badly maintained. Most of the villages of Grande Comore’s south have no electricity, no running water and no modern toilet facilities. The aeroplane service is bad. Only one Sudanese and one Yemeni company operate long-distance airliners, with not enough regularity, safety or service on board for tourism requirements. As for Air Austral, a single company implementing medium-haul airliners in safety, its tariffs make the Comoros the most expensive destination in the area. In this context, international tourism will have difficulty in assisting the future of the park.

The second constraint is of a financial and institutional nature. Infrastructure and equipment required by local communities for tourism and fishing development comes to several hundreds of thousands of Euros. Generally, the financial set up for the creation of protected areas does not include any significant budgetary heading dedicated to development [48]. Another source of funds than the one financing conservation must be requested. But it is appropriate to present a specific project, with the hope of implementation concomitant with that of the conservation project. The procedure offers

the advantage of making a difference between the conditions and finalities of biodiversity conservation and development (even sustainable). It is not because 'protectors of nature' are competent that they are specialists in development. If they want to protect the Coelacanth by moving the fishing effort towards pelagic fish species, they may have to build a real program for fishing development. The danger is then that their potential lack of competence in this latter field will ruin their entire professional credibility, leading to the failure of both development and conservation projects.

7 Conclusion

In an economic context as poor as that of the Comoros, any project carried out by an international organisation is often the only opportunity given to local communities to obtain infrastructures and equipment essential to development. Biodiversity conservation projects do not escape this logic. Contrary to what is often observed on national and international scales, no antagonism exists, on the Comoro local scale, between natural heritage protection and economic development. The first is essential to attract the international funds necessary for the second, which, in return, ensures its durability. The more symbolic or rare is the site or the species to protect, the higher is the number of potential financiers, and the more significant can be a contribution. It would be thus more remunerative for a local community to protect a world heritage than a local heritage. But the Coelacanth's case shows that freedom granted to this community to manage the protected area is much greater in the second case than in the first, for which international community supervision can exist. The latter is likely to be stronger as development projects associated with the protected area creation is on a large scale, financiers participating more and more in the governance of the projects they finance.

However, even if local communities assert the right to development as a counterpart of a service to the international community (by preserving a heritage of world interest), financial and institutional mechanisms for systematically associating these objectives do not exist yet. The projects must deal with development or with the environment, often reproducing artificial antagonisms between both concepts. So that natural heritage conservation can be accompanied by local development or that symmetrically local development does not threaten natural heritage, it is imperative that mixed projects associating both objectives are proposed to international financiers. An essential corollary is that the sector's division of financiers declines. The projects of heritage management and integrated development should have a positive future.

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