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► **To cite this version:**

Elsa Faugere. The botanists and the conservation of dry forests in New Caledonia : an ethnographic approach. 6. Conference of the European Society for Oceanists ESFO, Jul 2005, Marseille, France. 8 p. hal-02827247

HAL Id: hal-02827247

<https://hal.inrae.fr/hal-02827247>

Submitted on 7 Jun 2020

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The botanists and the conservation of dry forests in New Caledonia : an ethnographic approach

2005, in ESFO, 6th Conference of the European Society for Oceanists, Marseille.

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Introduction :

After my Ph.D in economical anthropology in New Caledonia, I began to work in anthropology of environment in the south of France since 1999. Then, I tried to make some links between these two very different research programs. That is why I have begun to be interested by nature and environment in New Caledonia.

When I was searching some information on this topic on Internet, I was quite surprised to find a very interesting document of the WWF that was untitled : "Conservation Program. Tropical dry Forests in New Caledonia". This document dated the January 2000. And I discovered it in November 2003. When I was reading it, I was surprised by two points :

- first of all, although I did my fieldwork in New Caledonia from 1994 to 1998, I did not know that the nature of New Caledonia, what has been called its biodiversity was so internationally recognised, by the natural scientists and by what we call "the conservationist community" ;
- and, second point, the lands concerned by such a conservation program were owned by European (caldoche) farmers. In the political context of New Caledonia during the nineties with the main objective of "rééquilibrage" between what were considered as "underdeveloped" areas inhabited by Kanakas people and the "developed" areas inhabited by Europeans people, it was surprising that a public policy, a conservation program, seemed to be mostly directed in favour of white farmers. I was then wondering where was social justice in such conservation program ? When people are talking about conservation of biodiversity, what else is conserved and protected ? And what else is changed ? In what ways do conservation of biodiversity leads or not to some change in local societies concerned ? Could conservation of biodiversity be used to conserve social injustice and social relationships of domination ?

These questions were the starting point of my research. I was then wondering how and why tropical dry forests of New Caledonia were considered, during the nineties, such an important ecosystem that it has led (raised ?) to the creation of an important international conservation program ? How this ecosystem has become in the focus of the international conservationist community ? In this paper, I will try to give some answers to these questions.

The conservationist classification

The word 'biodiversity' is a neologism built from the words 'biology' and 'diversity'. It is the diversity of the living world, within nature. The biodiversity term (formed by Walter Rosen and) was popularized by the american professor Edward O Wilson (University of Harvard), in the eighties. There are three levels of biodiversity :

- genetic : the diversity of genes ;
- specific : the diversity of species ;
- ecosystemic ; the diversity of ecosystems

At the end of the eighties and in the nineties, New Caledonian's biodiversity was mentioned in two of the most important international classification of biodiversity :

- as one of the 25 *hotspots* of biodiversity in the world. This classification was made by the very influent NGO called Conservation International ;
- And it figures four times in the 238 **Ecoregions** identified by the WWF, in its strategy called Global 200. The four new Caledonian Ecoregions identified by the WWF were :
 - **Rivers and streams** ;
 - **Moist Forests** ;
 - **Barrier Reef** ;
 - **Dry forests**.

Based on a comparative global analysis and synthesis of five extensive regional studies, the WWF identified **238 ecoregions as priority targets for conservation action** because they harbor the most outstanding and representative examples of the world's diverse ecosystems. It is called **the Global 200**¹. Selection of ecoregions was based on analyses of species richness, species endemism, and so on".

Methodology

To understand such classifications and how and why New Caledonia has become one of the 25 hotspot of biodiversity, we need to take an historical perspective of natural sciences in New Caledonia because these international conservationists classifications are grounded in the results of scientific knowledge.

I did not find any historical research on such topic made by historians. But I have found some papers written by naturalists who wrote a brief history of their own science. The most interesting and synthetic paper I have found on this subject was written by a very well known botanist called Hugh Mac Kee. The title of his paper is : "Les étapes de la connaissance botanique de la Nouvelle-Calédonie". And it was presented in a congress of natural sciences organized by the CNRS in Nouméa in april/may 1964.

I have found other interesting papers, and I have made interviews of four naturalists (Bouchet, Morat, Papineau, Vallauri)

When I have sent my summary to Michel Naepels, I thought I would have time to go to New Caledonia before this congress. But that was not the case. So the title I gave : "ethnographic approach" is not completely appropriate even though we can consider,

¹ **THE GLOBAL 200: A REPRESENTATION APPROACH TO CONSERVING THE EARTH'S DISTINCTIVE ECOREGIONS**, October 2000, David M. Olson, Eric Dinerstein, Robin Abell, Tom Allnutt, Christopher Carpenter, Loren McClenachan, Jennifer D'Amico, Patrick Hurley, Ken Kassem, Holly Strand, Meseret Taye, and Michele Thieme, Conservation Science Program, World Wildlife Fund-US, 1250 24th Street, NW, Washington, DC, 20037 USA, E-mail: david.olson@wwfus.org / eric.dinerstein@wwfus.org

together with some American anthropologists like James Ferguson and Akhil Gupta that ethnographical fieldwork has to be completely renewed because of the new research objects on which ethnographers work today. For example, how can we apply the canon of ethnographical methods when we are studying a scientific network which is all around the world ? Another question of method concern the uses of Internet in the production of data. That raises important question of methodology but they are not the core of my paper today.

In this paper, I have focused on the study of vegetation because since the end of the eighties, naturalists were interested mostly by New Caledonian vegetation and because the concept of hotspot of biodiversity is precisely based on vegetation : "it is plant diversity that is the biological basis for hotspot designation"².

Let's now begin with a brief explanation of what an hotspot of biodiversity is. Then, I will give a brief history of natural sciences in New Caledonia. And finally, I will talk more specifically about the conservation program of dry forests.

The concept of hotspot

In 1988, an important scientific publication is written by a well known British botanist called Norman Myers. In this article, Norman Myers defined what will become the very successful concept of **hotspot of biodiversity**. The aim of such a concept was to give some answers to the conservationists who were in front of a very difficult dilemma : which territories, which countries, which regions in the world are the most important to conserve the species ?

Two main factors were considered for hotspot designation. Hotspots are :

- regions that harbor a great diversity of endemic species and, at the same time,
- have been significantly impacted and altered by human activities³.

[Plant diversity is the biological basis for hotspot designation. To qualify as a hotspot, a region must support 1,500 endemic plant species, that is 0.5 percent of the global total. Existing primary vegetation is the basis for assessing human impact in a region; to qualify as a hotspot, a region must have lost more than 70 percent of its original habitat. Plants have been used as qualifiers because they are the basis for diversity in other taxonomic groups and are well-known to researchers. Each hotspot faces extreme threats.

"New Caledonia is characterised by a particularly high rate of endemic species, specially within its flora. More than 3000 endemic species of plants have been identified on the island. This is known to be a unique adaptation to "toxic" soil , due to high mineral content such as nickel and copper"⁴.

Let's now continue with an overview of the history of botanical science in New Caledonia.

A brief history of the botanical science in New Caledonia

² Norman Myers, <http://www.northeastvigil.com/ecology/ecopas/hotspot-ci.htm>

³ <http://www.biodiversityhotspots.org/xp/Hotspots/hotspotsScience/>

⁴ Giraud-Kinley, C., 1997, Preserving Megadiversity : the case of New Caledonia, in Asian pacific Journal of Environmental Law, vol 2, Issues 3 and 4 : 277-92.

As you probably know, in the XVIIIth century, scientists (botanists, zoologists, geologists, geographers, and so on) were travelling all around the world with an important mission : to discover, from the European point of view, the nature of all the continents, to describe and to study it in order to exploit it.

It is precisely during one of such a discovery travel, the one James Cook made between 1772 and 1775 (seventeen seventy two and seventeen seventy five), that he discovered in september 1774 (seventeen seventy four) New Caledonia. And it is since this period that New Caledonia's biodiversity began to be studied by European scientists. Three german naturalists, George Forster, his father Johann Reinhold, and Anders Spaarman were on board. When they returned in Europe, they published some texts in which they described the New Caledonian nature (flora, animals...). George Forster has left very good descriptions and drawings of flora and animals of New Caledonia. And his father Johann Reinhold, published in 1778 scientific observations which were important at this time.

These scientific publications have began to catch the attention of the scientific community on New Caledonia's biodiversity. According to a contemporary American ecologist called Peter Lowry, compared with most of the tropical regions, the flora of New Caledonia is well known and well documented since a long time. I quote Peter Lowry⁵ :

"New Caledonia received much attention from plant collectors, starting with the Forsters, who accompanied Capt. Cook on the first European expedition to visit the island, and continuing throughout much of the 20th century⁶. The origin, evolution, and biogeographic history of New Caledonia's native plants and vegetation have been the subject of many publications during the last 125 years"⁷.

We can consider that there are three main periods in the history of botanical science in New Caledonia :

- 1774-1868 : it is the period of the first discoveries of the nature and of the biodiversity of New Caledonia. If many botanists came to collect plants, and then, sent them back to Europe where they were described and analysed, during this period, these explorations and these scientific work were not organised neither structured. The most important works of this period were these of : La Billardière (1804-1806) ; Montrouzier (1843-1860) ; Vieillard (1855-1867).
- 1868-1946 : after 1868, the history of botanical science have changed because the Muséum National d'Histoire Naturelle of Paris has sent a botanist called Benjamin Balansa. A structured organization of scientific work was then created, between the collectors in New Caledonia who were collecting plants in the

⁵ P. Lowry, DIVERSITY, ENDEMISM, AND EXTINCTION IN THE FLORA AND VEGETATION OF NEW CALEDONIA, <http://www.mobot.org/MOBOT/research/newcaledonia/intro.html>, first text, 1996.

⁶ cf. H. S. MacKee, 1964; M. E. MacKee, 1972; Morat, 1993, 1995.

⁷ Balansa, 1873; Brousemiche, 1884; Schlechter, 1905; Sarasin, 1917; Guillaumin, 1921, 1924, 1928, 1934, 1948, 1953a, b, 1954, 1964; Däniker, 1929, 1931, 1939; Good, 1955; Baumann-Bodenheim, 1956, 1988, 1989a, b, c, 1990; Viro, 1956; Balgooy 1960, 1971; Thorne, 1963, 1965, 1969; Raven and Axelrod, 1972, 1974; Jaffré, 1974, 1980, 1993, 1995; Holloway, 1979; Raven, 1980; Morat et al., 1981, 1984, 1986; Jaffré et al., 1987, 1993; Schmid, 1987; Lowry, 1991; Jaffré and Veillon, 1991, 1995; Morat, 1993; Bouchet et al., 1995.

countryside, and the taxonomists in Paris who were receiving the species, the specimens, and who were trying to classified them. This work of classification has revealed the great originality of kanaka flora and has permitted to describe the new species, the new families and so on. In his article Hugh Mac Kee is quite impressed by the excellent botanical work made by Balansa during this period. "For the history of botany in New Caledonia, this was a watershed (tournant décisif)", write Hugh Mac Kee in his article. Others great botanists of this period are Schlechter (1902-03) ; Däniker (1924-25) ; Guillaumin (1952-53)

- from 1946 : most of the intensive botanical exploration of New Caledonia has been conducted since the mid of the fifties (1950). In 1946, the Institut Français d'Océanie (French Institute of Oceania) was created in Noumea. In 1964, it became ORSTOM (Office de Recherche Scientifique et Technique Outre-mer) and in 1998 IRD (Institut de Recherche sur le Développement). With the implantation of the IFO, began new scientific activities : ecological inventories on flora, and medicinal plants will lead to the creation of the herbarium of New Caledonia in 1963.

In summary, we can say that the botanical science in New Caledonia has begun with the very first expedition of James Cook in 1774. Even if it was not structured and organized before 1868, some important discoveries and explorations were made during this first century of botanical history.

Two main scientific research institutions have played a great role in the history of the botanical exploration : the MNHN (National Museum of Natural History) and the IRD (Research Institute for Development). More recently an American institution has also played an important role : it is The Missouri Botanical Garden.

An important point to be observed is the international dimension of the botanical science in New Caledonia : since the very beginning, botanists from many different countries were concerned and interested by the exploration of New Caledonia (England, Germany, Switzerland, Australia, United States...).

If this international dimension exist since the beginning, at least two important English and American botanists played a great role in the second half of the XXth century : Hugh McKee and Peter Lowry.

Hugh Mac Kee has collected about 45,000 numbers between the 1960s and his death in 1995. He is considered by the specialists as the best collector (curator) of New Caledonia.

The other important modern field botanists are French : Jean-Marie Veillon, Tanguy Jaffré and Philippe Morat. They worked at the ORSTOM during the 70's and the 80's. And it was their work that has first revealed the importance of dry forests during the eighties.

From the extinction of *Pittosporum tanianum* to the international conservation program of dry forests

It is in 1981 that the expression 'sclerophyll (dry) forests' was employed for the first time in New Caledonia by some botanists of the ORSTOM (P. Morat, T. Jaffré, J. M. Veillon) and by Hugh Mac Kee in the atlas of New Caledonia⁸.

⁸ J. M. Veillon, G. Dagostini, T. Jaffré, 1999, Etude de la forêt sclérophylle de la Province Nord en Nouvelle-Calédonie, Conventions Sciences de la Vie Botanique, n°10, IRD, Nouméa : 1-54.

It designated the forests, well or bad conserved, which are developed under the altitude of 300 meters in the western part of New Caledonia⁹.

In July 1988, an important discovery was made in these sclerophyll forests : only two specimens of an unknown specie were discovered in the Special Reserve of Fauna of Leprédour (near Nouméa) : this specie was called *Pittosporum tanium* Veillon & Tirel (from the name of the botanists who have discovered it). The botanical interest of this specie was immediately noticed¹⁰.

In 1993, when the botanists went back to Leprédour, these two specimens were died. So they considered that *Pittosporum tanium* is an extincted specie because the probability to find it in other dry forests of New Caledonia was very very tiny. Botanists have prospected the whole territory of New Caledonia for a very long time and if this specie was in other parts of the territory they would have found it. The simple fact that they discovered it for the first time in 1988 show the extreme rarity of it.

So, Philippe Bouchet and al. wrote in their article, "*Pittosporum Tanium* has the sad privilege of becoming the first documented plant extinction in New Caledonia"¹¹.

Following this important botanical discovery, the botanists urged Province Sud to take appropriate measures to safeguard what remained of sclerophyll forests¹².

In 1990, the Southern Province asked the ORSTOM to make the first systematic study of dry forests (cartography, flora inventories and so on)¹³.

The scientific report that has been written at the end of this study was the first one on this subject : it has tried to alert public authorities on the urgent need to protect dry forests. Many other studies on dry forests have followed it during the nineties.

At the international level, it is also in 1988 that Norman Myers published his famous paper in which New Caledonian forests were classified among the 25 hotspots of biodiversity in the world.

So we can say that at the end of the eighties scientists tried to alert New Caledonian authorities to the urgent need to conserve dry forests.

In **1994**, after the publication of another scientific report written by the naturalists of ORSTOM¹⁴, the southern Province concluded a conservation agreement with a farmer (Claude Metzdorf) in order to protect his dry forests.

"New Caledonian authorities negotiated, says Catherine Giraud-Kinley, a type of model conservation agreement with landowners, with the view to protect the dry forests. On 12 July 1994, a convention was concluded between the authorities of the Southern Province and Mr Metzdorf, **a farmer** in the northern district of Poya Sud. The agreement concerns an area of eight hectares of sclerophyll forest located on Mr Metzdorf's property. The agreement's main component is to grant the sum of 1.200.000 francs to the farmer, for him to build a fence around the boundaries of the protected site. It may hence be considered that the payment corresponds to a reimbursement for the service provided by the farmer, rather than a compensation for

⁹ Idem : 3-4

¹⁰ P. Bouchet, T. Jaffré, J. M. Veillon, 1995, Plant extinction in New Caledonia : protection of sclerophyll forests urgently needed, in Biodiversity and Conservation 4, 415-428.

¹¹ Idem : 423

¹² Idem : 426

¹³ T. Jaffré et J. M. Veillon, 1991, La forêt sclérophylle de la Province Sud de la Nouvelle-Calédonie, Rapport Science et Vie, Botanique 6, ORSTOM, Nouméa : 3-39, cité par C. Giraud-Kinley, 1997, Preserving Megadiversity : the Case of New Caledonia, in Asia Pacific Journal of Environmental Law, vol. 2, Issues 3 & 4 : 277-92.

¹⁴ Chazeau, J., Chevillon, C., Garrigue, C., Jaffré, T., et al., 1994, Biodiversité et conservation en Nouvelle-Calédonie, Rapport de synthèse ORSTOM, Sciences de la vie n°1, 32pp.

the loss in value of the site for example. Mr Metzdorf is required to build the fence within a period of 12 months following the conclusion of the agreement. The stated purpose of the fencing is to prevent the grazing of animals in the protected areas. The fencing of the site is to be maintained for a period of ten years by the farmer"¹⁵.

I did not find more precision concerning these agreements. The content of it reveals a conception of nature conservation in which human activities were totally excluded from the territory to be protected and conserved. The fence around the dry forests draw two different areas :

- one in which the farmer can continue his agricultural activities, without changing them in anything ;
- one which excludes all human activities and which try to preserve this area from all impacts which are systematically considered as noxious and disturbing.

In **1995**, an another **scientific publication** by Bouchet and al.¹⁶ made an **urgent call for immediate action** towards the conservation of dry forests.

Thanks to those scientific publications, and in the context of the Eco-regional strategy Global 200 of the WWF, in **1997**, the scientific director of the WWF France came in New Caledonia with two american conservationists experts of the WWF-US to propose to local partnerships a conservation program of the endangered dry forests. With the financial aid of German and American co-operation, the WWF-France in partnership with all scientific and institutional New Caledonia's actors, began to elaborate an important conservation program of the dry forest in New Caledonia¹⁷. In **2001**, the conservation program was signed for 5 years by nine partners :

- the public authorities : French State, New Caledonian government ; Northern and Southern Provinces
- scientific institutions : IRD, IAC, University of New Caledonia
- NGO's : WWF-France, Centre d'initiation à l'environnement, and, since 2003, Conservation International, a powerful north american NGO.

In conclusion

It is important to notice that this conservation program was the first great mobilization for the protection of terrestrial biodiversity in New Caledonia. And it gathers different kinds of partners (public, civil, scientific) which are not used to work together. The director of this program Christian Papineau, told me that one of the objective is now to create a conservatory of dry forests (conservatory of yams). From the local point of view, the existence of such a conservation program means new political alliances and new local strategies.

From the national point of view (from French State), the importance of new Caledonian's dry forests and, more generally, of new Caledonian's biodiversity make France one of the most biodiverse northern country. Such a position have international impact in terms of the image of France.

And, at the international level, the importance of New Caledonian's biodiversity has some impacts on the visibility and the recognition of Kanakas claims. Cultural and

¹⁵ Giraud-Kinley, C., 1997, Preserving Megadiversity : the case of New Caledonia, in Asian pacific Journal of Environmental Law, vol 2, Issues 3 and 4 : 277-92.

¹⁶ Bouchet, P., Jaffré, T., Veillon, J. M., 1995, Plant extinction in New Caledonia : protection of sclerophyll forests urgently needed, Biodiversity Conservation 4 : 415-28.

¹⁷ Lefeuvre, J. C., 2000, Programme de conservation. Forêts tropicales sèches en Nouvelle-Calédonie, Document de programme, WWF : 1-30.

biological diversities are more and more intertwined, thanks to the Convention of Biological Diversity, which was signed in Rio in 1992.