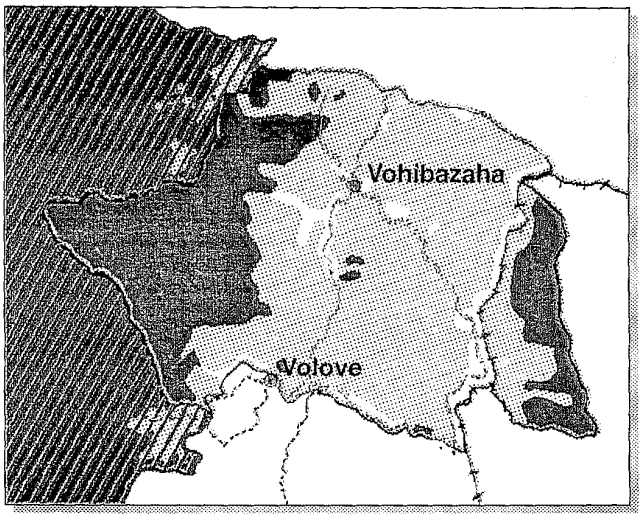
PN-ACB-637

BASELINE DATA : ICDP PROTECTED AREA PROGRAM
(1994 - 1996)



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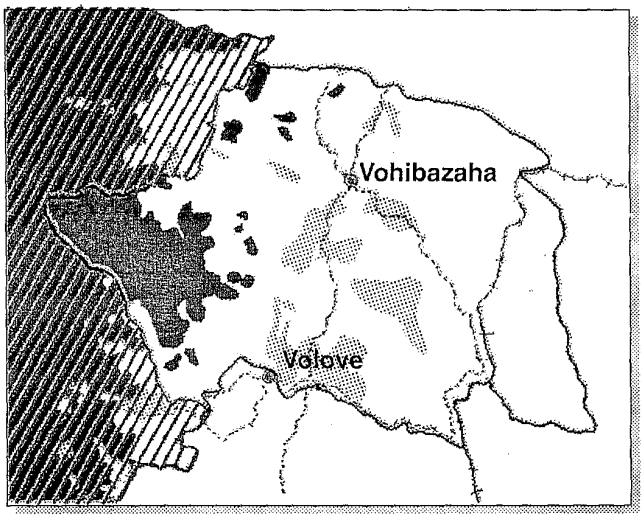

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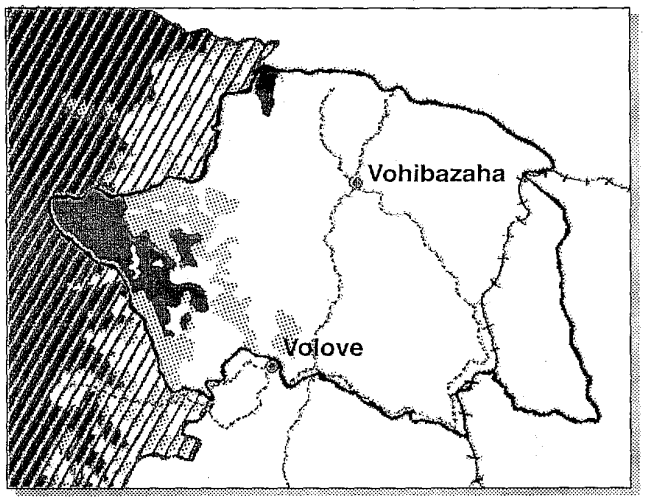


1994

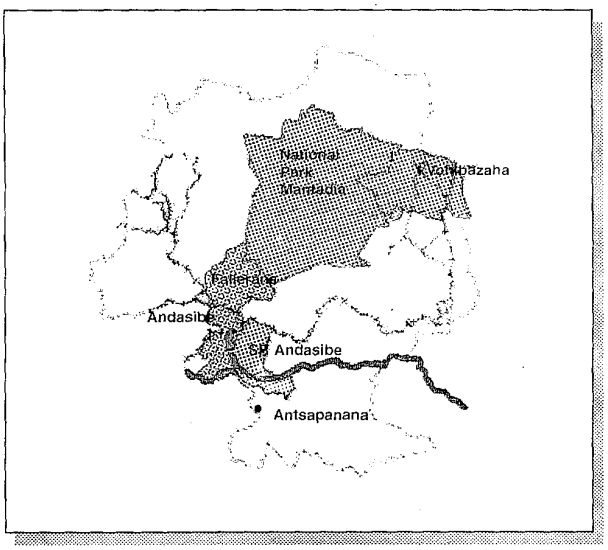
VEGETATIVE COVER EVOLUTION
TARGET ZONE VOHIBAZAHA

Dr. Richard Swanson
Anthropologist
Principal Technical Adviser, ANGAP
Tropical Research & Development
December 1996

LEGEND

- Primary Forest
- Secondary Forest
- All Others
- Target Zone : 2761Ha
- Protected Area
- Village
- Protected Areas (9960 + 865)
- TZ Vohibazaha : 2761 Ha
- TZ Falierana : 1512 Ha
- Trail
- Roads suitable for vehicules
- Railways
- Logging road
- Path
- Hydrography
- National road
- Limite PZ : 43.115 Ha
- TZ Andasibe : 1074 Ha
- TZ Antsampanana : 424,7 Ha

Peripheral & Control Zones of ANDASIBE - Mantadia National Park



ANGAP/DIVB/GIS

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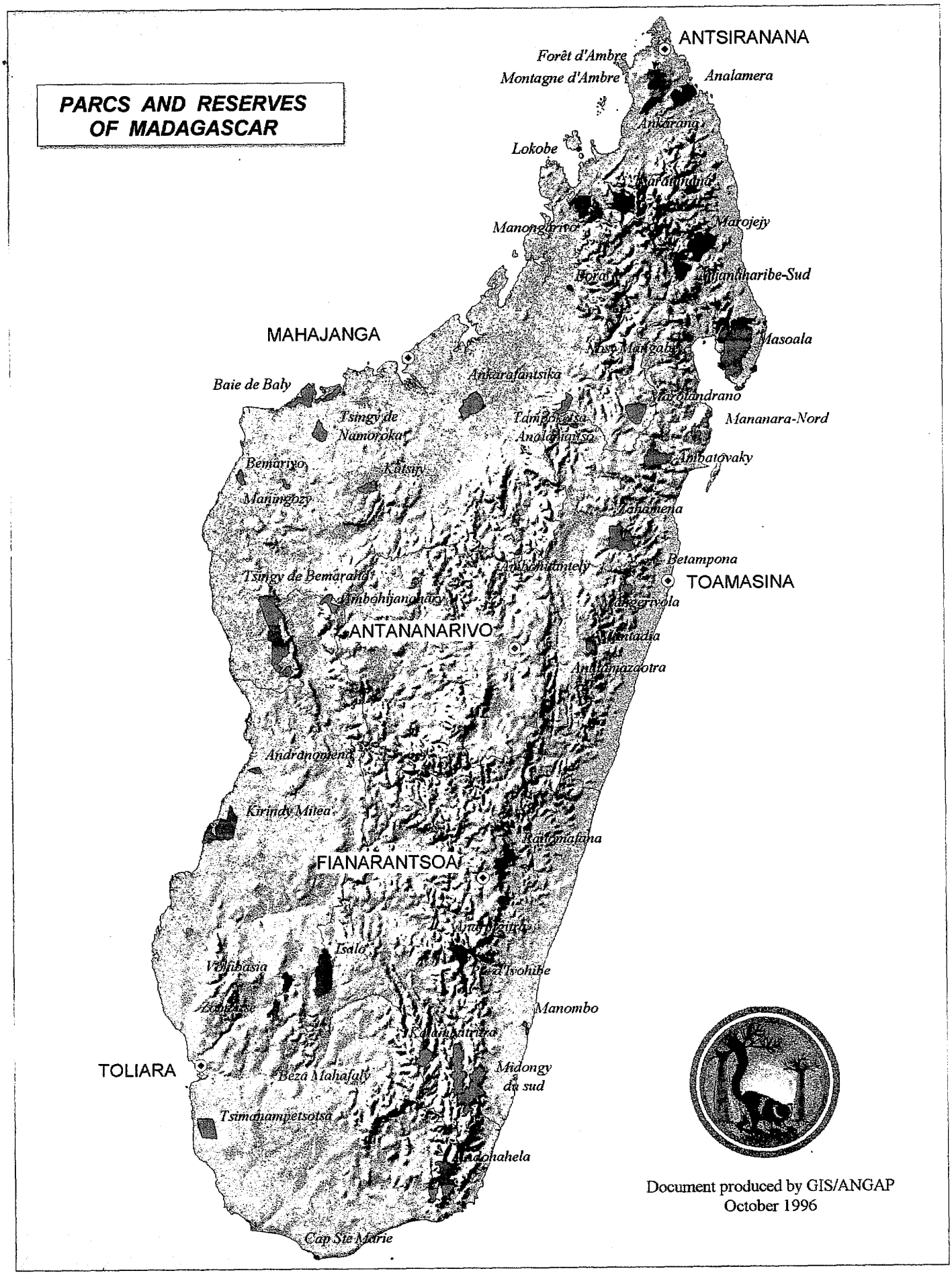

Document produced by GIS/ANGAP
October 1996

Acknowledgments

I wish to thank the many ANGAP and ICDP field staff who worked together through the past couple years in putting into place these base line data for the protected area program. To accomplish this appeared at first a daunting task - as starting anything new can be. However the work was well done and updating of these data in future years will be fairly simple. I would like to particularly recognize the efforts of ANGAP's Department of Monitoring, Evaluation, and Planning staff, Mr. Randrimamoha Mamison, Mr. Alphonse, and Mr. Razafindrakoto Jaona, and Mr. Joseph Ramamonjisoa and Tina Razafimahatratra of PACT/GMU who also provided a great deal of assistance during the implementation of the M&E system through many joint SAVEM ICDP field visits over the past three years. I also wish to thank the superb staff at ANGAP's DIVB office in Antananarivo, benefiting from the technical support of Mr. Jean-Michel Dufuls. Specifically, I would thank Miss Andrianjanaka Lantotiana Maria, Miss Andriamanga Tiana, and Mrs. Rasoarinoro Voahanginirina, who put in much time in coordinating the preparation of the spatial maps at the end of this report. Field socio-economic and GIS ICDP field personnel who deserve particular mention include: Baolalao Rakotoarisoa and George Rakotondrabe of Ranomafana, Herinirina Ramanankirija and Rakontondravony Fanja of Andasibe, Andriambahiny Dominique and Rakotomanga Solo of Andohahela, Mr. Andriamampiray Fanomezantsoa Jaona, Mrs. Barivelo Patricia Tiana and Andriamampiray Fanomezantsoa of Amber Mountain, Rakotobe Tovondraiaka and Sesy Soja of Zahamena, and Ratsisompatriarivo Jean Solo of Masoala.

I would also like to thank Ratsifandrihamanana Anitry Ny Aina and Ravonimiaramanana Bakoliarisoa for their immense work of translating this document into French, and to Rabesson Haminna for putting it together.

Note:

The author has developed three documents to address lessons learned in Madagascar ICDP programs over the past five years (1991-1996). A first report (Swanson, 1996c), *"National Parks and Reserves, Madagascar's New Model for Biodiversity Conservation"* focuses on the conservation side of the ICDPs and on ANGAP's evolution as an institution and its future. The second report (Swanson 1996a), *"ICDP Protected Area Program Baseline Data (1994-1996)"* presents the existing state of socio-economic, ecological, and program baseline data for current and future monitoring needs of the protected area program in Madagascar. A third document (Swanson, 1996b), *"Hypothesis Testing: Do Targeted Activities Reduce Pressures on Parks/Reserves through Changed Human Behavior"* focuses on the development side of ICDPs and draws lessons on those which have proven most promising to date. This document represents the second of these three documents. All observations and concluding remarks are my own and are not necessarily those of TR&D, USAID, or or ANGAP.

0.0 Overview

The ICDP concept was taken as a primary methodological tool to justify the approach taken during the first phase of EP-1 (1992-1996). The basic philosophy upon which various USAID funded SAVEM ICDPs developed, stated as a hypothesis, declared that

"*Economic development activities, linked to the conservation objectives of protected areas, will produce benefits which attract and focus the productive forces of a local population into sustainable and environmentally sound activities.*"(Swanson, 1994:5). Stated another way, "*Unless people most directly impacted by conservation perceive their interests in the manner in which conservation is being promoted, it is unlikely that over the long-term any combination of electrified fencing and guarding will prevent unsustainable resource utilization in wild lands and protected areas*" (Brown & Wyckoff-Bairn, 1991:3).

This was the philosophical approach of the USAID funded SAVEM project in Madagascar - and popular in a number of programs being funded by USAID and other donors worldwide. One frequently forgets, however, that a hypothesis does need to be tested. At the beginning of SAVEM, it remained an untested hypothesis. Is this statement really true? Experience in ICDP programs in other countries until that time had not been conclusive - one might even say discouraging. Maybe we could do it right! The Madagascar SAVEM project optimistically (1991-1996) set out to confirm this hypothesis. But many difficult issues quickly became evident. Posed as questions, these include:

1. What kind of "economic development activities" are we talking about?
2. Do these activities HAVE to be *linked* to conservation objectives?
3. Should such linkage be *direct* or *indirect*, or both?
4. What kind of "benefits" to local populations are we speaking about? Material, immediate benefits, long term sustainable benefits? Can you have both?
5. How do we know these "economic development activities" are in fact sustainable and environmentally sound? How do we measure (monitor) these?
6. What do we mean by "sustainable resource utilization"? Is the emphasis on bio-diversity sustainabilty or on economic activity sustainabilty? Is there a difference?
7. How and when do we know if an ICDP has been "successful"? How do we define "success"?
8. Some say that parks and reserves are doomed if peripheral zone communities do not become partners in their conservation. Can one really create enough partners, soon enough, in exceedingly depressed rural economies, to make any difference? In the end, doesn't it also (and perhaps ultimately most importantly) require strong "authoritarian"rule by law to protect and enforce regulations governing use of protected areas remaining? Doesn't ultimately a line-in-the sand not need to be drawn beyond which no compromise is acceptable. If not, should we not admit to ultimate failure, only trying to delay the inevitable loss to come?

One reason for the high cost of the USAID funded SAVEM projects (some $40 million), with six ICDP's, was that it was considered important to learn what kind of activities most directly contribute to the conservation objective. It seemed evident, initially, that "Inducing people to change their behavior will be most successful when (1) there is a <u>clear and direct link</u> between the conservation objective and the project component, and when (2) the threats to the resource base are <u>direct and clear</u>, not when they are caused by many actors for many reasons..' (Brandon & Wells, 1992:567). But would NGO ICDP field program leaders under CARE International, WWF, VITA, Conservation International, etc. seriously take this challenge? How would ANGAP carry out its mandate to "coordinate" such an enterprise? At the same time, ICDP's were encouraged to experiment among many activities, in an effort to arrive at such a learning.

In this process, one is required to monitor activities to learn from such experience. "The experience with these conservation and development projects, including systematic data

gathering, monitoring and evaluation, will determine the success of the (Madagascar) National Environmental Action Plan (NEAP) activities in improving knowledge of the underlying causes of key environmental problems" (Larson, 1994 p.684). At the eve of EP-1 in 1996, has this "experience" increased our knowledge of these "underlying causes"?

Furthermore, it is now known that phase two NEAP activities (EP-2) for ANGAP may exceed $ 40 million, with overall EP-2 potential funding to all components at about $150 million. For such funding to be well spent, the information and lessons learned from the first phase of the program are essential. This is why the system wide monitoring efforts which ANGAP, with TR&D assistance, has put into place over the past two and a half years has been so important. ANGAP, as central coordinating body, was mandated by both the Malagasy government and donors, to set up a system for monitoring and evaluating the program and to learn from the experience. We need to learn about the impacts of current efforts to make future program efforts in Madagascar more efficient in terms of human and financial resources and in terms of targeting activities which will best meet the conservation goals of Madagascar biodiversity for the future, and perhaps most specifically for the protected areas.

ANGAP's EP-1 M&E system was focused on putting into place both the baseline data sets needed for the long term monitoring of socio-economic impact of program activities on the biodiversity existing in and immediately around parks and reserves as well as on the ecological indicators reflecting this impact. [1] Initially focused on SAVEM ICDP projects, the system was expanded to other donor funded ICDPs, as funding and personnel permitted. The experience has also helped ANGAP to identify those key indicator sets which will continue into the future, beyond PE-1. A description of the history of the development of this system-wide M&E system can be found in a separate document on the hypothesis testing experience of the SAVEM program (Swanson, 1996b).

0.1 Description of M&E System in Place

The M&E system first proposed in late 1993 (Swanson 1993) and revised and agreed to during the October 1994 Antsirabe M&E workshop, and slightly modified in the October 1995 workshop (cf. Annex 1 for the list of indicators), was built upon four information pillars:

(1) Indicators for monitoring ANGAP and field ICDP institutional and program development and the stages/processes needed to achieve this (annual);

(2) Indicators for monitoring long term impact of program activities. This included development of spatial and ecological monitoring (indicator species, monitoring of plots within protected area and in peripheral zones for biodiversity makeup and change)(annual);

(3) Output indicators associated with annual work plan activities (semi-annual), and

(4) Indicators for monitoring impact of program activities on protected areas, which included development of hypothesis statements for major program activities (annual). To achieve this, ICDPs agreed (at Ansirabe, 1994) to select a sample of between 15-20 households associated with up to four development activities which each program considered well focused towards reducing the four highest ranked threats (and possibly others) upon their protected areas. These were to be the "indicator households/ activities" to be monitored more closely for impact.

[1] Technical assistance for this effort was provided through Tropical Research & Development long term advisor Dr. Richard Swanson, part of USAID's institutional support effort to ANGAP.

ANGAP, TR&D, and GMU personnel devoted a great deal of time in 1994 and 1995, in the field, to encourage ICDPs in prioritizing threats, identifying causes, identifying activities responding to these threats, developing hypothesis statements on cause-effect relationships perceived between proposed activities and anticipated impact, determining scale (sample size) for impact, etc. Ultimate implementation (choice of activity, choice of households) and activity monitoring had to be done by the ICDP field staff itself (M&E person working with personnel of other field departments). ANGAP, with TR&D support, promised technical field support upon the request of these operators.

For information types #1 and #2 above, substantial progress was achieved in some ICDP programs - though some had failed to submit any information at all by the end the October 1995 workshop. For the 1994 year activities, ANGAP only received the tables for this information in the annual reports of Ranomafana, Amber Mountain, Masoala, Andohahela, Zahamena, Marojejy, and Andringritra. Other programs had not fulfilled their designated responsibility in this area. For 1995 year activities, tables were provided by all SAVEM ICDP, in addition to Andringritra and Marojejy.

For information type #3 above (output indicators in semi-annual reports), even less was completed. During 1995, only five of the six SAVEM ICDPs (Ranomafana, Amber Mountain, Zahamena, Andohahela, and Masoala) provided this to ANGAP's DSEP department for periodic reporting requirements to donors and the government of Madagascar. However, this information did serve the basis for ICDP annual reports and therefore served its major purpose.

For information type #4 above, (socio-economic impact at the household level- results of hypothesis testing), there have been mixed results. While most ICDP's went through the process of identifying pressures, causes, developing activities with hypothesis statements, etc., few succeeded even by the October 1995 M&E workshop in taking the next step in selecting the sample households needed to monitor over time the impact of their activities. In many cases this appeared to be because either:

(1) the ICDP in question did not hire the M&E staff needed to organize and implement the program, perhaps reflecting order of priority this activity was given by the operator, or
(2) ICDP field personnel, at both management and M&E levels, constantly changed - frequently as often as twice in one year - with little or no transfer of knowledge of program activities from the one leaving to the one coming.. ANGAP staff arrived in the field to find completely new faces who didn't know a thing about what had already been accomplished, agreed jointly to, etc.
(3) ICDP field management expected one unexperienced M&E person to implement a program which actually required the personnel resources of other field departments to implement. This field M&E person had difficulty in acquiring the support/participation of personnel from these other departments. This suggested that ICDP management did not continually reinforce with their field management team the need and reason for the monitoring underway.
(4) M&E field staff received conflicting messages (from ICDP field management , ICDP Tana central office management, PACT/GMU, and ANGAP) about their priorities in developing field level monitoring activities,
(5) ICDPs perhaps, in some cases, did not feel obliged to follow an M&E plan perceived to be promoted from ANGAP; they could develop their own.

What has been accomplished in terms of information pillar #4 above and hypothesis testing and associated development activities is discussed through a series of case studies from the six SAVEM ICDPs, and 3 other ICDPs in Swanson, 1996b.

This document provide a comparative analytical report of the key indicators monitored through the existing ANGAP/ICDP M&E program in place since 1994. All data provided in the Tables of Indicators of the M&E system reported in ICDP annual work plans

were initially reviewed. These AWPs were received by ANGAP, from the ICDPs, for the 1995 calendar year, between February and June of 1996. After review and analysis of the data available, analytic tables were created. The tables, and the information they contain, should be considered as the base line data for the concerned indicators drawn from the M&E reports furnished by ICDPs and ANGAP itself. Base line data are then compared to progress over the past couple of years. Upon presentation of each table, important information has been drawn out for the reader's attention. Prior to termination of the study, the TR&D M&E advisor also visited each of the ICDPs during the last half of 1996 in order to update information as much as possible.[2] Each ICDP also had the opportunity, following presentation of an initial draft of this report at the October 1996 Antsirabe M&E workshop, to suggest corrections.

This report concerns the first two pillars of monitoring described in (1), (2) above. Recommendations are made concerning those indicators considered essential for ANGAP monitoring and evaluation activities during the second phase of the environmental program beginning in 1997, through the year 2002.

A footnote for each indicator group provides information on how these data were obtained, and the ANGAP department or program field entity most concerned with its use.

1.0 Base Line Data for ANGAP Institutional Indicators

Because of the national importance of ANGAP's developing into the kind of institution capable of effectively managing the network of parks and reserves, it is essential that a selected number of key indicators be continuously monitored by ANGAP itself, by the government of Madagascar, and by interested and concerned national and international partners interested in biodiversity conservation. As part of the SAVEM program, a set of indicators were developed over the past few years which track ANGAP's ability[3] to not only manage such a network, but to also provide, on a regular basis, the information needed on a set of key indicators important not only to program management but to the wider Malagasy and international community.

Ten key indicator groups are being followed to monitor ANGAP's institutional development. ANGAP's M&E unit within the current DIVB[4] is capable of tracking and reporting on each of these. Each of these sets of data are in themselves a synthesis of other data sets. These are:

(1) Area Protected With Parks Network (Table 1)
(2) Personnel and Material Resource Management (Table 2)
(3) Increased Management Authority and Responsibility of ANGAP (Table 3)
(4) Tourist Visits to National Parks and Reserves (Table 4)
(5) Park/Reserve Visitor Categories by Year (Table 5)
(6) Income Generation from Tourist Visits (Table 6)

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[2] The 1996 ICDP annual reports, with the updated M&E tables, will not be available until early to mid 1997, long after this present report is due. Little 1996 data will be included in this report as a result.

[3] When I use the term "ANGAP", I refer to ANGAP national staff, the TR&D team, and field ICDP partners being coordinated by ANGAP.

[4] As part of the transition between EP1 and EP2, and ANGAP's role as a national parks and reserves system, M&E activities formally managed under the EP-1 ANGAP department of DSEP (Department of M&E and Planning) were transferred in 1996 to a new sub-division within ANGAP's department of DIVB (Department of Information and Biodiversity Valorization). The former DSEP has become the department for park operations and management.

(7) Tourism Development Within Peripheral Zone (Table 7)
(8) ANGAP Revenue Sharing with Peripheral Zone Communities (Table 8)
(9) 1995 Operating Costs for Park Management: Program Sustainability (Table 9)
(10) 1995 Operating Costs for ICDP management (Table 10)

1.1 Area (ha.) of Madagascar Protected as National Parks, Special Reserves, Integral Special Reserves, and World Heritage Sites/Biospheres

Only 2 % of Madagascar's 595,700 square kilometers[5] are under the special protected status of national parks, special reserves, and strict natural reserves. One of the latter includes the world heritage site of Bemaraha. Tourists are not permitted access to strict natural reserves. ANGAP analysis of spatial data in and around protected areas demonstrates clearly that park or reserve status indeed has been an important and generally respected deterrent to serious loss of forest and biodiversity cover.[6] Forest areas without such protection are under much greater rates of forest (and by extension) biodiversity loss than protected areas. ANGAP has been delegated to manage these precious resources on behalf of the State. ANGAP statistics as gathered from its monitoring program indicate that about 40% of Madagascar's tourists visit these special areas. Tourism has become Madagascar's number one economic activity - even with the relatively low number of tourists (compared to countries just across the Mozambique channel in Kenya or South Africa) or even the nearby islands of the Seychelles and La Reunion. If tourists are indeed coming to Madagascar because of its unique biodiversity - most of which are seen by visiting protected areas - then the importance of this small percentage of land (2 %) is far greater than its relative size suggests.

Without an effective national parks program as currently being developed through ANGAP, Madagascar could well lose in a very few years its most important economic asset for its millions of inhabitants. The base line indicators were developed for the purpose of assisting ANGAP to communicate the vital role it is playing in not only biodiversity conservation/protection, but also as an engine of economic opportunity for thousands, even millions, of Malagasy throughout the country. Few Malagasy, or their leaders, seem consciously aware (enough to spur action) that their own economic future depends greatly on successful conservation and appropriate tourism development options within these protected areas and in the peripheral zones and regions around them. Most of Madagascar's major river systems are sustained from the forested watersheds under protected area forests. As these disappear, irrigation, hydro-electric power, and drinking water itself for humans and livestock becomes harder to find or disappears entirely.

We have judged it an important national level indicator to monitor *the area* under such protected area status. Efforts are underway to increase this area through extension of existing park boundaries, through the creation of new parks and reserves - some of which will we hope be of a privately owned and managed nature. We hope to see the development of new regional parks and reserves managed by regional entities. There is great need to develop new buffer zones both within and around existing parks and reserves - as well as linking these when still possible by protected corridors to reduce the danger of parks and reserves becoming isolated islands which may, in the long term, not have the genetic diversity to

---

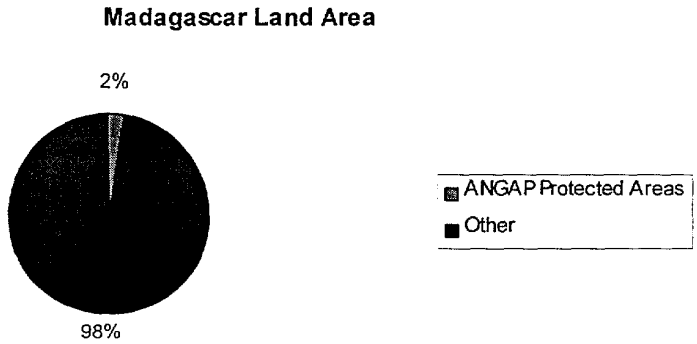
[5] One sees a number of different figures for the area of Madgascar (590,000, 587,000 sq.km.). ANGAP's GIS data base for Madagascar shows a figure of 595,700 - which includes the adjacent islands. We use this figure in our calculations.

[6] Jean-Michel Dufils, TR&D Technical Assistance Document # 80, "Etudes sur le suivi de la vegetatation des zones-cibles", page 3).

maintain healthy populations. Table I below, therefore, as a unit, is to be considered both in its details and aggregately as an indicator[7] of national resolve to protect Madagascar's limited areas of remaining natural biodiversity.

EP-1 program attempts to develop professional park and reserve management systems have faced many obstacles. One of these has been the old concept, as legislated by law, that protected areas are basically to be "protected" from people - including tourist visitors. Rather than developing management systems for parks whereby certain portions of a park are zoned off for complete protection, some parts open to researchers alone, others open to potential tourism, Madagasacar has tended to try to manage this issue through legislation.. Therefore some parks are "national parks" permitting visitors, others are strict natural reserves permitting no visitors, others are "special reserves" where researchers are permitted. However, in fact, these definitions have proven far too constraining and are not in fact actually respected or enforced. Situations arise where visitors indeed visit a special reserve but entrance fees can not be collected because of the reserve status.

DEF (Department of Water and Forests) agents (including some Debt for Nature personnel), in some areas, continue not to be effective in surveillance and legal protection - continuing in some cases to be among those associated with illegal exploitation of the very resources they are to protect. A frequently occurring problem is the issuing of timber harvest or other biodiversity collection permits for areas adjacent to some parks or reserves. In some cases (eg. Marojejy) encountered, everyone knows no timber or the biodiversity to be collected (eg. plant specimens) no longer exists anywhere but within the park or reserve of these areas - and that collection will in fact come from within the protected area. An example of this was reported taking place in the Bemaraha World Heritage Site during the author's visit in August, 1996. A totally "legal" permit, good for several months, apparently had been issued by DEF Tana to collect numerous plant specimens of vegetative material (pachypodiums, etc.). A collector was gathering these and shipping these by Air Madagasacar from Antsalofo to Tana. The permit authorized 20 - 30 "samples" of each of more than a score of rare and endangered species - existing only within the limits of the totally protected reserve. While a protest letter from the Bemaraha Park Director initiated rapid correction by DEF Tana of this situation, such problems are not uncommon.



[7] This spatial data for this table is updated by the DIVB. Information on operators, partners, and funding is provided by the Department of Parks Operations. Responsibility for putting this table together rests with the M&E unit.

TABLE 1: (HA) OF PROTECTED AREAS

N.	PROTECTED AREAS & EP-2 Classification[8]		PROVINCE	YEAR CREATED	AREA (Ha) 1989 Baseline Source[9]	December 1996 AREA (Ha)[10]	SOURCE (Jan. 96)	ICDP During EP-1?	PRINCIPAL OPERATOR	ANGAP Partners[11]	MAIN DONOR
0	ANGAP Central (Parks network below)		Antananarivo	1991	-	-	-		-	Tropical Research & Development,Inc	USAID
	NATIONAL PARKS										
1	Montagne d'Ambre (PN1)	A-1	Antsiranana	1958	18 200	22 740	SIG / ANGAP	yes	WWF	-	USAID / WB
2	Isalo (PN2)	A-11	Fianarantsoa	1962	81 540	86 880	SIG / ANGAP	yes	ANGAP	-	USAID / WB
3	Mananara-Nord / Nosy Antafana	B1-3	Toamasina	1989	23 000	20 649	SIG / COEFOR	no	UNESCO	-	Dutch Gov.
4	Mantadia	A-6	Toamasina	1989	10 000	12 950	SIG / ANGAP	yes	VITA	SAF/FJKM/TFMT	USAID
5	Ranomafana	A-4	Fianarantsoa	1989	41 610	40 613	SIG / ANGAP	yes	Stony Brook	Tefy Saina,Cornel	USAID
6	Masoala	A-3	Toamasina	199?	-	(210 260)	SIG / ANGAP	yes	CARE	WCS/TPT	USAID
7	Zombitse/Vohibasia	B1-4	Toliara	199?[12]	-	(41,964)	SIG / ANGAP	yes	WWF	Peace Corps	Norway
8	Baie de Baly	C-7	Mahajanga	199?	-	(69,350)	SIG / ANGAP	no	-	-	-
9	Midongy du Sud	B2-10	Fianarantsoa	199?	-	(197,900)	SIG / ANGAP	no	-	-	-
10	Kirindy-Mitea	C-9	Toliara	199?	-	(72,700)	SIG / ANGAP	no	-	-	-
	TOTAL				174 350	183 832					
	STRICT NATURAL RESERVES										
1	Tsingy de Bemaraha (RNI 9)[13]	A-9	Mahajanga	1927 (Dc 1966)	152 000	172 100	SIG / COEFOR	yes	UNESCO	Bemara,VSF	FAC/WB
2	Andohahela (RNI 11) *	A-7	Toaliara	1927 (Dc 1966)	76 020	74 828	SIG / ANGAP	yes	WWF	FAFAFI,PCVs	USAID
3	Zahamena (RNI 3) *	B1-7	Toamasina	1927 (Dc 1966)	73 160	64 378	SIG / ANGAP	yes	CI	-	USAID
4	Ankarafantsika (RNI 7) *	A-8	Mahajanga	1927 (Dc 1966)	60 520	57 750	SIG / COEFOR	yes	CI	-	KFW/WB
5	Marojejy (RNI 12)	B1-6	Antsiranana	1952 (Dc 1966)	60 150	61 970	SIG / COEFOR	yes	WWF	-	KFW
6	Tsaratanana (RNI 4)	B2-2	Antsiranana	1927 (Dc 1966)	48 622	52 130	SIG / COEFOR	no	ORGASYS	GFA	WB
7	Tsimanampetsotsa (RNI 10)	B2-4	Toliara	1927 (Dc 1966)	43 200	45 960	SIG / COEFOR	no	-	-	-
8	Andringitra (RNI 5) *	B1-5	Fianarantsoa	1927 (Dc 1966)	31 160	32 540	SIG / COEFOR	yes	WWF	-	KFW
9	Tsingy de Namoroka (RNI 8)	B2-3	Mahajanga	1927 (Dc 1966)	21 742	28 460	SIG / COEFOR	no	-	-	-
10	Betampona (RNI 1)	B1-10	Toamasina	1927 (Dc 1966)	2 228	2 925	SIG / COEFOR	no	ANGAP	SAF	Brit.Church
11	Lokobe (RNI 6) +Nosy Tanikely *	A-10	Antsiranana	1927 (Dc 1966)	740	1 590	SIG / COEFOR	no	ANGAP	Peace Corps	WB
	TOTAL				569 542	670 056					
	SPECIAL RESERVES										
1	Ambatovaky	C-6	Toamasina	1958	60 050	58 020	SIG / COEFOR	no	-	-	

[8] ANGAP has divided all protected areas into three classes for management purposes, Category A, B, and C parks or reserves. Category B1 parks are currently being managed by ANGAP, Category B-2 by others. Category parks or reserves are those with significant human pressures upon them, needing strong protection measures, as well as high ecotourism potential; they are top priority for development in this sense for ANGAP; category B reserves are under significant pressure from human populations and therefore need strong conservation measures; category C reserves are neither under significant human pressures on biodiversity, nor do they have tourism potential to date (access). Both category A and B parks have been priorities for ICDP programs, and strong partnerships with development orientated institutions will continue with ANGAP during EP-2.

[9] Madagascar: Revue de la Conservation et des Aires Protegees, Nicoll et Langrande, 1989:8-9. Nicole and Langrande actually published this year that there were 1,045,865 ha protected, but this did not take into account three new protected areas created that year, Mananara-nord, Mantadia, and Ranomafana. Adding these three, we get the figure 1,120,472. ANGAP uses these "official" figures in most of its publications. The figures vary from our 1996 data because earlier data were based on original limits which have been subject to change in recent years.

[10] December, 1996 areas are taken from georeferenced data (SIG / DEF / COEFOR and SIG / ANGAP). They are not the "official" data indicated in legal texts and used as 1989 baseline. These georeferenced ANGAP DIVB GIS data are permanently updated as new data become available or new changes take place (re-delimitation, additions, etc.) These figures are considered more accurate than the existing "official" data. SIG/ANGAP data represent the work of, first of all the GIS units based in the field ICDP (eg. SIG/ZAHAMENA), then ANGAP central GIS technicians, working together.

[11] Acronyms: PCV= Peace Corps Volunteers, BTM = Bureau de Travail International; FID = Fonds d'Intervention de Development; FAFAFI = local NGO for development ; WWF = World Wide Fund; WCS = World Conservation Society; CI= Conservation International; WB = World Bank; KFW = German version of USAID; FAC = Fonds d'Aide et de Cooperation (France); GFA= ; SAF = local NGO in development; SAFAFI = Department for Development, Agriculture, & Livestock; DEF = Department des Eux et Foret; SIG= Geographic Information Systems; EP-2 = Environmental Program 2 (1997-2002). VSF = Veterinaires Sans Frontieres. FJKM = Protestant local development NGO.

[12] Five new national parks are before the DEF and the National Parliament, waiting for official decrees opening them. For this reason, the areas of these parks are not yet included in "official" parks areas.

[13] These strict natural reserves are in process of being reclassified into national parks; the texts for this change are before the national parliament. Other reserves are also in process of being declassified into national parks.

2	Marotandrano	B2-8	Mahajanga	1956	42 200	45 930	SIG / COEFOR	no	-	-	
3	Manongarivo	B2-2	Antsiranana	1956	35 250	37 580	SIG / COEFOR	no	ORGASYS	GFA	WB
4	Analamera	B2-1	Antsiranana	1956	34 700	42 190	SIG / ANGAP	yes	WWF	-	USAID
5	Anjanaharibe-Sud	B1-6	Antsiranana	1958	32 100	31 980	SIG / COEFOR	yes	WWF	-	KFW
6	Kalambatritra	B2-7	Fianarantsoa	1959	28 250	31 320	SIG / COEFOR	no	-	-	-
7	Ambohijanahary	C-8	Mahajanga	1958	24 750	20 770	SIG / COEFOR	no	-	-	-
8	Kasijy	C-2	Mahajanga	1956	18 800	23 050	SIG / COEFOR	no	-	-	-
9	Ankarana	A-2	Antsiranana	1956	18 220	25 430	SIG / ANGAP	yes	WWF	-	USAID
10	Tampoketsa d'Analamaitso	C-1	Mahajanga	1958	17 150	22 660	SIG / COEFOR	no	-	-	-
11	Mangerivola	C-5	Toamasina	1958	11 900	12 010	SIG / COEFOR	no	-	-	USAID
12	Bemarivo	C-4	Mahajanga	1956	11 570	12 080	SIG / COEFOR	no	-	-	-
13	Maningoza	C-3	Antsiranana	1956	7 900	5 991	SIG / COEFOR	no	-	-	-
14	Andranomena	B1-9	Toliara	1958	6 420	78 48	SIG / COEFOR	no	ANGAP	Peace Corps	WB
15	Ambohitantely	B2-6	Antananarivo	1982	5 600	4 967	SIG / ANGAP	no	SOFRECO	-	WB
16	Manombo	B1-1	Fianarantsoa	1961	5 020	5 281	SIG / ANGAP	no	ANGAP	-	WB
17	Forêt d'Ambre	A-1	Antsiranana	1958	4 810	4 814	SIG / ANGAP	yes	WWF	-	USAID
18	Bora	B2-9	Mahajanga	1966	4 780	4 070	SIG / COEFOR	no	-	-	-
19	Pic d'Ivohibe	B1-5	Fianarantsoa	1954	3 450	4 044	SIG / COEFOR	yes	WWF	-	KFW
20	Cap Sainte Marie	B1-8	Toliara	1962	1 750	2 918	SIG / COEFOR	no	ANGAP	-	ANGAP/DEAP
21	Andasibe (Analamazaotra)	A-5	Toamasina	1970	810	525	SIG / COEFOR	yes	VITA	Peace Corps/SAF	USAID
22	Beza - Mahafaly	B1-2	Toliara	1986	580	455	SIG / COEFOR	no	WWF	ESSA	WWF/USA
23	Nosy Mangabe	A-3	Toamasina	1965	520	615	SIG / ANGAP	yes	CARE	WCS	USAID
	TOTAL				376 580	404 548					
44	GRAND TOTAL				1 120 472	1 181 421		yes = 19			

1.2 Indicator: Increased Institutional Capacity of National Parks Institution (ANGAP)

Table 2[14] below provides the base line data for macro level indicators to track ANGAP's increasing level of responsibility in managing the network of parks and reserves. This table should continue to be filled out, and added to, throughout PE-2 to at least 2002 by ANGAP. Madagascar's EP-1 commitment to increase significantly such area has been a complete failure, as indicators show. Many field program activities, including development of tourism options, have been on hold for a year or more waiting first DEF, and then Madagascar National Parliament's action on signing into law new parks, changing the status of some parks, or approving new boundaries or declassifications. The seriousness of this can not be underestimated. As an example, ICDP program personnel have spent years and hundreds of thousands of dollars working out new (or revised) limits of parks with local population. The populations agree to this but the ICDP can not put into place "legal" boundary markers until the legislation passes. In the mean time, DEF field agents can go right ahead handing out timber harvest and farming permits within these "newly protected" areas because they are not doing anything illegal. One must even wonder if the delay is not frequently intentional on the part of some State decision-makers to harvest out the valuable assets (as within Masoala) before they become outlawed (by decree) - explaining the delay DEF in experiencing.

Table 2: Increased Management Authority and Responsibility of ANGAP

Madagascar Area: 595,700 sq./kilometers		BASE YEAR	1994	1995	1996	1997	Percent of Target Reached (10/96)
GOM/EP-1 Target Established in 1991:							
Number of Protected Areas Coordinated By ANGAP:	50	14 1992	34	39	39		78%
Number of Protected Areas Under Direct Management by ANGAP	0	0 1992	1 Isalo	4 Lokobe Manombo Andranomena	6 Cap Sainte Marie, Betampona		600%
Number of Protected Areas for Which ANGAP has proposed to the DEF changes in Classification (eg. special reserve to national park)	5	0	0	0	5 Andohahela, Lokobe,Zombitse / Vohibasia, Bemaraha, Zahamena		0%
Number of Protected Areas for Which ANGAP has proposed to DEF changes in Borders	1	0	0	0	1 Ranomafana		0%
Number of Sites Proposed by ANGAP to DEF as New Protected Areas[15]	11	0	0	0	4 Kirindi-Mitea Midongy du Sud, Baie de Baly Masoala		0%
Number of New Parks or Reserves added to Network: [16]	11	0 1993	0	0	0		0%
Area for Parks Conserved:	1,500,000 2.5%	1,120,472 ha.[17] 1.9%	1,120,472 1.9%	1,181,553 2%	1,181,553 2%		16%

The figure (16%) for "percent of target reached" can be misleading. This figure is mostly due to corrections in digital files of already existing "official" statistics and correctly computed figures. The figure is a percentage of the difference between already existing official estimates of protected areas and

14 Data for this table comes from several sources. The Department of Park Operations (DSEP) must provide the actual number of protected areas being coordinated or directly managed. Spatial data updates come from the DIVB. This should be done with reference to Table 1. ANGAP's M&E unit should review this table with the concerned persons in January of each new year.

15 One 'protected area' is not included. Zombitse-Vohibasia is currently a classified forest under DEF management. The proposal will change it to a 'national park' under ANGAP management. For this and all the other four proposed protected areas, ANGAP has for the past year or more already been coordinating ICDP activities.

16 This indicator is not under ANGAP's direct control. The DEF creates and changes the status of parks and reserves; proposed changes, most from ANGAP, have been before DEF for most of 1995 without any action. This figure includes not only creation of new parks, but change in status of park (eg. from RNI to NP).

17 Source: Nicoll et Langrand. Includes area for three parks created in 1989, year when book went to press.

the target. Until new parks and reserves are created, this figure will not substantially change. In many cases, additions to existing reserves has been offset by declassified areas lost to human pressures (villages, slash and burn). Many feel that declassifing already protected areas is bad strategy - for the message it sends to farmers is that they can get away with illegal penetration of protected areas - the government will just declassify it again. I believe declassification should not be permitted - but the area and inhabitants (who in most cases know they have acted illegally and so far gotten away with it) should be classified within a ZOC (Zone d'occupation controllee) - within the protected area where extremely strict controls are put into place if existing cultivation/inhabitation is to continue. Defiance of this should be met by expulsion. A line has to be drawn somewhere; otherwise it will only be a matter of time until all forests and their associated biodiversity are gone. No amount of "friendly" persuasion and ICDP partnerships will take the place of strong surveillance and application of the law. These measures only help.

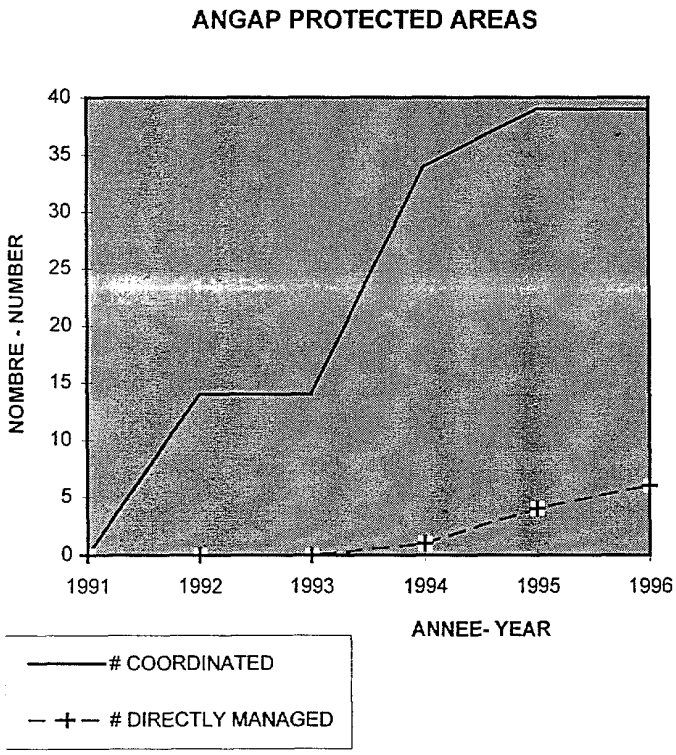


Table 3 below provides information on personnel and material resource management of ICDPs - information which will be useful as ANGAP moves towards direct management of protected areas. Trained human resources of ICDPs will be ANGAP's most valuable inheritance during the coming transition. Given the excellent contribution that women have given to the program, it is surprising that the ratio between women and men is so low - averaging 27%. In terms of involving local community support for enforcing infractions on park natural resources, only one (Andohahela) program has to date succeeded in beginning to effectively involve them. This must be a major priority for EP-2.

Table 3: Personnel & Material Resource Management

	Andasibe	Ranomafana	Amber Mt.	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankaraf antsika
Personnel Resources												
# of km2 of PA by APN/ACD	83	16	54	20	6	69	na	253	35	44	16	.8
# of Inhabitants of PZ per conservation develop. agents	na	622	3,176	1,615	na	na	na	na	2,731	5,675	1,628	0
% of conservation development agents (ACD) from PZ	51%	100%	0%	76%	62%	100%	na	100%	50%	35%	69%	100%
% of program staff from region	70%	80%	na	89%	45%	93%	na	72%	81%	94%	91%	76%
% of program staff are women	18%	20%	15%	9%	27%	16%	na	19%	15%	10%	7%	11%
Material Resourcs												
# of Vehicles (including boats)	4	6	5	3	5	3-7	2	1	6	5	2	2
# of Motorbikes	3	6	14	8	17	0	na	2	6	11	1	0
# of Bicycles	4	25	4	0	1	7	na	0	23	18	0	0
Protected Area Management												
# of Km. of trails in PA	23	34	35	37	0	na	na	na	38	0	55	8
# of Km. of new trails created?	9	0	0	0	0	12	na	86	0	31	0	na
# of Km. of trails maintained	23	23	na	0	0	12	na	11	0	16	0	na
# of Observed Infractions in PA: Average by month	8	23	8	39	1	1.5	na	na	na	na	na	1
% of Total Infractions communicated to DEF	6%	10%	70%	100%	100%	100%	na	100%	100%	100%	na	100%
% of Total Infractions Acted on by Community DINA	0%	0%	0%	na	17%	0%	na	na	na	na	na	0%
Ratio between female/male participating in activities of project: female=	25%	35%	45%	15%	30%	10%	na	na	na	na	na	0

1.3 Indicator: The Impact of Nature Based Tourism in Madagascar Parks and Reserves

Because of the importance of tourism to Madagascar in general, and because much of this tourism is for Madagascar's national parks and reserves, it has become essential that ANGAP, for its own management purposes, as well as for regional and national planning purposes, to develop a set of indicators which monitor, over time, the development of this important component of its activity. Tables 4, 5, 6, and 7 below are comparative tables drawn from data ANGAP collects in the course of its field management, and as part of its regular monitoring. Because of the significant problems encountered by ANGAP in the management of independent (non-professional) guide associations[18] around its four principal parks, there is a real danger that tourists and the tour guides who bring them will begin to bypass entirely the parks for private concerns which have been gaining in popularity in recent years. Privately run Berenty (next door to the future Andohahela National Park) in the south drew over 9,000 visitors in 1995, and the newly organized Vakoama lodge with its similar private park near Andasibe threaten to significantly diminish potential revenue for parks management and revenue sharing with local communities. Table 3 below shows that more than one in three tourist visitors to Madagascar in 1995 visited an ANGAP coordinated/managed park or reserve - the balance would have visited such sites as Berenty, Nosy Be, Cape St. Marie - places which can be visited without having to "touch down" in any other place within Madagascar.

The lack of tourist orientated services, quality hotels and difficulty of travel all tends to encourage all but the most adventuresome to go the easy route (fly in and fly out just as quickly as possible). The recent change to 1 month visas[19] from 3 month visas has seriously impacted tourism in 1996 - resulting in lower rates of growth than anticipated. This unfortunate step by the government has resulted in greatly reduced revenue for both the parks program, the peripheral zone communities, and all the tour operators and hotels (and all the associated supporting services - farmers for food, transporters, etc.) throughout the country who had counted on this revenue for 1996. This loss for ANGAP alone can be estimated at about $50,000 (8000 expatriate visitors * 25,000 fmg entrance fee) and ten times this figure for the concerned peripheral zones in lost business. The indicators below will help track this and similar situations in the future.

The table below includes the Bemaraha *Tsingi* Reserve which has followed a separate evolution from SAVEM ICDPs - though still under ANGAP coordination. Bemaraha as a strict natural reserve could not permit tourist visitors or charging fees - in spite of the fact that adventure seeking and hardy back-packers never-the-less managed to make their way in increasing numbers, over a very difficult road, with two ferry crossings, to the reserve's principal entry point: Bekopoka. In its 1994 delimitation work for the future, the UNESCO led team quickly defined, with local population support, an important and untouched area at the southern end of the reserve and "opened" this to tourist visitors. This area, along with part of the original reserve will become the Bemaraha National Park when the national parliament votes favorably on this No action on this decree has delayed further program development for over a year at Bemaraha Here tourists can take a dugout canoe trip (using local boatmen and canoes) to visit an ancient grave site along the river, a number of caves, and also walk along the cool paths at the base of *tsingi* gorges and climb to view *tsingi*

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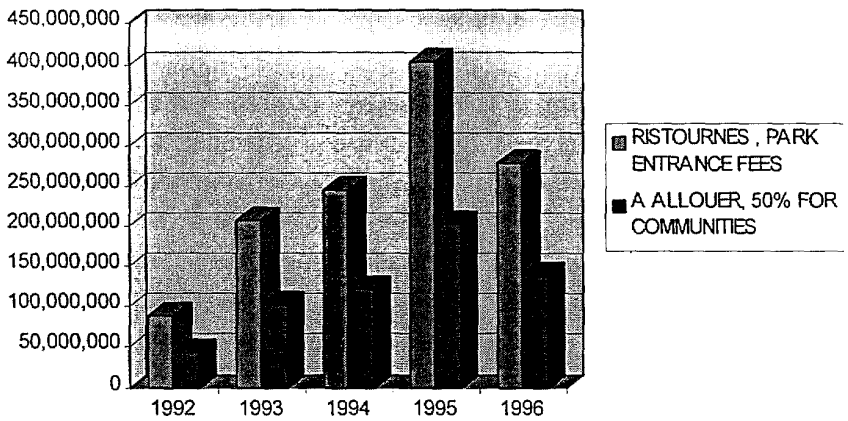
[18] In most cases, these guide associations were untested idealistic approaches promoted by SAVEM philosophers to make direct partners of some peripheral people with park management. The alternative of the park directly hiring and training professional guides (from the same constituency) was not seriously considered early enough. It is not clear how ANGAP, which will inherit this serious problem from its "operators" (WWF, VITA, Stony Brook) will successfully resolve this issue. Stronger program-wide initial guidance could have avoided much of this - an approach not considered acceptable within SAVEM's philosophy of hypothesis testing, consensus building (lowest common denominator management), experimentation and anti- top-down, leadership with authority.

[19] The government changed the maximum visa visit period for a tourist from 3 months to only one month in early 1996. This meant that should someone wish to remain for longer than 1 month, they would have to actually leave the country, get a visa (ie. In Reunion or South Africa) and then come back again. Given the already high prices of air travel to and within Madagascar for expatriate visitors, and the continuing political uncertainties, many tourists apparently simply canceled their Madagascar visit for less complicated destinations. Needless to say, Madagascar has a long way to go to get its political resolve together to begin to put into place the conditions needed to permit the kind of tourism growth projected by the Ministry of Tourism. The out cry from the visa restrictions brought eventually a change back to the 3 month visa by mid 1996 - but too late to prevent the damage already done for the year.

from the top. Because of the "unofficial" nature of the area visited, the park developed its own tourist visitor fees for services and also, like ANGAP general policy, returned 50% of entrance fees to local peripheral zone communities. This is the only reserve in Madagascar where Malagasy tourists pay the same rate as foreign visitors for most services - except for park entrance fees which are 50% of expatriate rates and much higher than ANGAP rates (actually only 4%). The 50% of fees remaining with the park's management went to pay for one full time park guide and other part time guides when numbers of visitors required this. Bemaraha ended up as the only reserve within the system to develop a truly coherent park guide management policy. While not within the official figures followed by ANGAP's DEAP, Bemaraha tourist figures are included here because they are the official data for entrances and revenue generation to date and provide an important lesson for the network as a whole.

Tables 4, 5, 6 and 7 below provide the baseline data which ANGAP monitoring has developed to meet this information need during PE-1 and beyond. They should be updated annually by ANGAP's M&E unit.

ANGAP Park Entrance Fee Revenue (FMG)



1995 Total Visitor Distribution by Park or Reserve

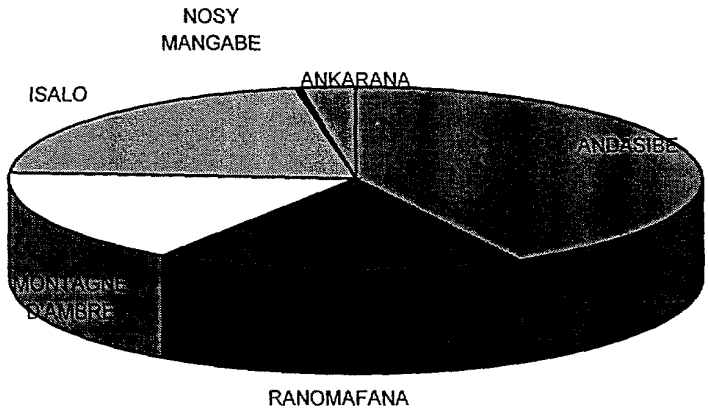


Table 4: Tourist[20] Visits to National Parks and Reserves of Madagascar (% Increase over Previous Years)

Park Visitors as % of Total Tourists[21]	Madagascar National Tourism [22]	Year	Park Visitors Grand Total		Andasibe		Ranomafana		Amber Mountain Complex (2 parks)		Isalo		Beza-Mahafaly		Bemaraha	
					#	%	#	%	#	%	#	%	#	%	#	%
13%	30,047 [23]	1992 [24]	5,984		3,135		649		1,750		321		na		129	
25%	30,857	1993	15,179	155%	6,971	121%	3121	387%	3,498	100%	1,057	229%	294		238	84%
26%	36,869	1994	17,672	16%	5,977	-16%	3256	4%	6,007	72%	2,041	93%	88	-234%	303	27%
41%	41,787	1995	36,720	108%	15,285	156%	6,245	92%	6,840	14%	7,959	290%	0		514	70%
		1996 [25]	25,535		9,678		1,300		6,329		7,088		173		363	
	TARGET:	1997 60,000														

[20] Tourists bring in considerable funds to the peripheral zones and regions in which parks and reserves are located. We estimate that each tourist spends $10/day/tourist within the peripheral zone of parks and reserves, over and above costs of lodging and park fees. This is economic support to peripheral zone populations around such parks and reserves.

[21] Data to calculate this comes from Table 4, on numbers of non-resident expatriates visiting parks. We assume these non-residents are among those counted by the Maison de Tourism as "tourists". While it is possible that a tourist visiting Madagascar may have visited more than 1 park or reserve, for lack of data, we must assume each tourist visitor as visiting only one park.

[22] These statistics come from the House of Tourism representing total numbers of expatriate visitors to Madagascar (July 1996). The statistics come from a study combining 1994 and 1995 data. Results: Total expatriate visitors to Madagascar in 1992: 53,655; 1993: 55,102; 1994: 65,839; 1995: 74,619. Of these the study showed that 56 % were tourists on vacation; 29% on business, 13 % visiting family , and 2% other. Of these totals ('94-95), French nationality represented 30.7%; German: 20.3%; Italians: 8.9%; Swiss: 8.6%; Reunion: 6.4%; Americans 8.1%; English: 6%, Japanese: 5.8% and all others: 5.2%. For lack of other statistics, the '94-'95 data % were estimated on the '92, '93 data for visitors coming to Madagascar for tourism.

[23] This figure was arrived by multiplying the 1992 Maison de Tourism figure of 53,655 by 56%, the estimated number of these visitors classified as "tourists".

[24] Earliest year for which ANGAP has data. Before this, DEF controlled these protected areas and information is to be found with DEF's accounting department. Some of the funds represented here have not been collected from the tour operators and DEF who originally collected them. For this reason, in April 1995, ANGAP terminated the right for outside agencies (eg. travel agencies, hotels) to give out entrance fees , and is now selling them itself or through its own park personnel at the entrance to the various parks. ANGAP began collecting fees itself for Isalo in April 18, 1995, for example, and figures for 1995 are after this time!

Breakdown of Visits by Category of Tourist

[25] 1996 Data are through end November only.

ANGAP has been tracking the total number of various categories of tourists visiting its parks. Table 4 [26] below summarizes the base line available for such data. These tables should be updated annually.

Table 5: Park/Reserve Visitor Categories by Year[27]

	1992	1993	1994	1995	1996	1997
Free Entrance	19	39	24	127	494	
Non-resident Expat.	3811	7692	9578	16977	10,854	
Resident Expatriate	894	3521	3386	4262	3,496	
Malagasy Adult	1020	2843	3408	6027	6,800	
Children	134	777	731	1250	1,816	
Researchers/Filming	19	46	96	79	36	
Students	87	261	449	7998	1,676	
Grand Total:	5,984	15,179	17,672	36,720	25,535	

Tourist Visitors to Madagascar Parks and Reserves (1992-1994)

1992	GRATUIT	Cherc/Cine	Non résidents	Résidents	Nationaux	Enfants nat.	Groupe enfants	TOTAL
ANDASIBE	4	3	2344	384	294	40	66	3135
RANOMAFANA	3	2	451	115	64	1	13	649
MONTAGNE D'AMBRE	12	14	702	266	655	93	8	1750
ISALO			185	129	7			321
NOSY MANGABE								0
ANKARANA								0
BEMARAHA				129				129
BEZA MAHAFALY		?						0
TOTAL	19	19	3682	1023	1020	134	87	5984

1993	GRATUIT	Cherc/Cine	Non résidents	Résidents	Nationaux	Enfants nat.	Groupe enfants	TOTAL
ANDASIBE	21	26	3783	1052	1311	554	224	6971
RANOMAFANA	7	7	1351	1694	0	36	26	3121
MONTAGNE D'AMBRE	8	8	1331	467	1500	173	11	3498
ISALO	0	0	741	281	23	12	0	1057
NOSY MANGABE								0
ANKARANA								0
BEMARAHA		?	238					238
BEZA MAHAFALY	3	5	248	27	9	2	0	294
TOTAL	39	46	7692	3521	2843	777	261	15179

1994	GRATUIT	Cherc/Cine	Non résidents	Résidents	Nationaux	Enfants nat.	Groupe enfants	TOTAL
ANDASIBE		36	3498	987	813	265	378	5977
RANOMAFANA	10	30	2235	698	217	37	29	3256
MONTAGNE D'AMBRE	8	19	2277	1053	2275	363	12	6007
ISALO	6	10	1188	642	99	66	30	2041
NOSY MANGABE								0
ANKARANA								0
BEMARAHA		?	303					303
BEZA MAHAFALY		1	77	6	4			88
TOTAL	24	96	9578	3386	3408	731	449	17672

1995	GRATUIT	Cherc/Cine	Non résidents	Résidents	Nationaux	Enfants nat.	Groupe enfants	TOTAL
ANDASIBE	94	41	5490	1405	2118	585	5552	15285
RANOMAFANA	0	18	2989	900	302	74	1962	6245
MONTAGNE D'AMBRE	7	10	2339	958	1891	355	424	5984
ISALO	0	5	5152	795	1442	199	60	7653
NOSY MANGABE			78	4	94	7		183
ANKARANA	26	5	415	200	180	30		856
BEMARAHA		?	514					514
BEZA MAHAFALY								0
TOTAL	127	79	16977	4262	6027	1250	7998	36720

[26] Data for this table are provided by the Department of Ecotourism & Marketing, through data entry of park entrance coupons collected by the various parks receiving visitors. The department has been encouraged to make this available on a quarterly basis. The M&E unit should provide support that this is done, and communicated to interested parties.

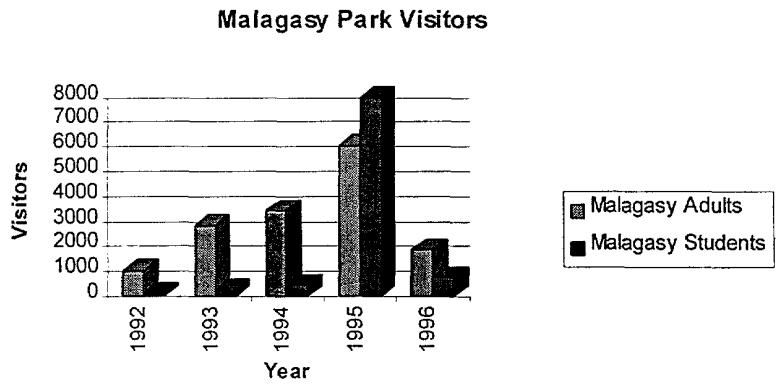
[27] Entrance fees have been frozen since 1989 at 20,000 fmg for non resident expatriates, 15,000 for resident expatrates, 1000 FMG for Malagasy adults (including guides), and 150 fmg for children (up to age 14)., 50,000 for researchers. In US $ terms, the 20,000 fee was worth $11.90 (1,680 fmg = $1) as recently as January 1994. In July 1996, this same entrance fee of 20,000 Fmg. is only worth $5.00 (4000 =$1). . Efforts have been made by ANGAP for over one year to change these rates. A new government decree, passed May 8, 1996, gives ANGAP complete authority to "establish, collect, and manage" park entrance fees. Entrance fees will be raised in the near future.

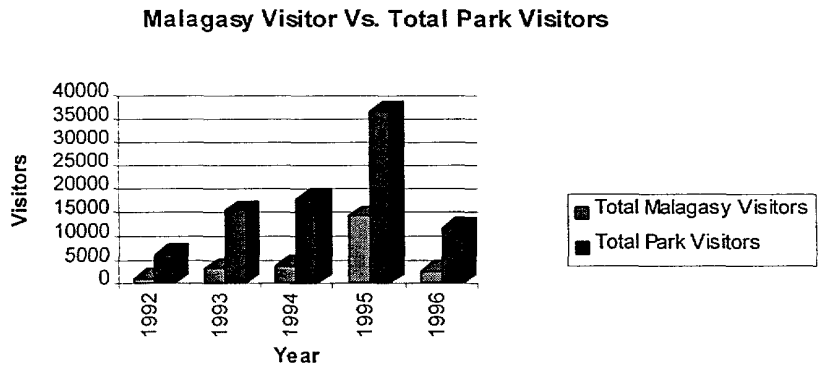
Note: In spite of the higher number of tourists entering Amber Mountain, and associated higher park revenue from entrance fees, ANGAP actually earned twice as much for itself in Ankarana with the lesser number of visitors. This is because DEF requires ANGAP to give them 40% of the entrance fees because of the Forest Station), 50% go to the communities, leaving only 10% for ANGAP operating costs.

1996	GRATUIT	Cherc/Cine	Non résidents	Résidents	Nationaux	Enfants nat.	Groupe enfants	TOTAL
ANDASIBE	272	12	3,982	1,436	1,958	878	1,140	9678
RANOMAFANA	214	4	766	154	109	40	13	1300
MONTAGNE D'AMBRE	3	3	2,073	923	2,365	607	355	6329
ISALO	0	3	3,709	902	2,050	266	158	7088
NOSY MANGABE	5	14	187	45	288	15	0	554
ANKARANA	0	0	0	0	0	0	0	0
CAP SAINTE MARIE	0	0	50	0	0	0	0	50
Bemaraha			363					363
BEZA MAHAFALY	0	0	87	36	30	10	10	173
TOTAL	494	36	11,638	3496	6800	1816	1676	25,535

In Table 6 below, ANGAP's network of parks and reserves is provided with details on current tourist visits and funds collected from park entrance fees. All parks and reserves are included because it is expected over time that many of the reserves to which visitors do no officially go will be reclassified to permit such. This is the case with Bemaraha, Zahamena, Andohahela, Zombitse, and others.

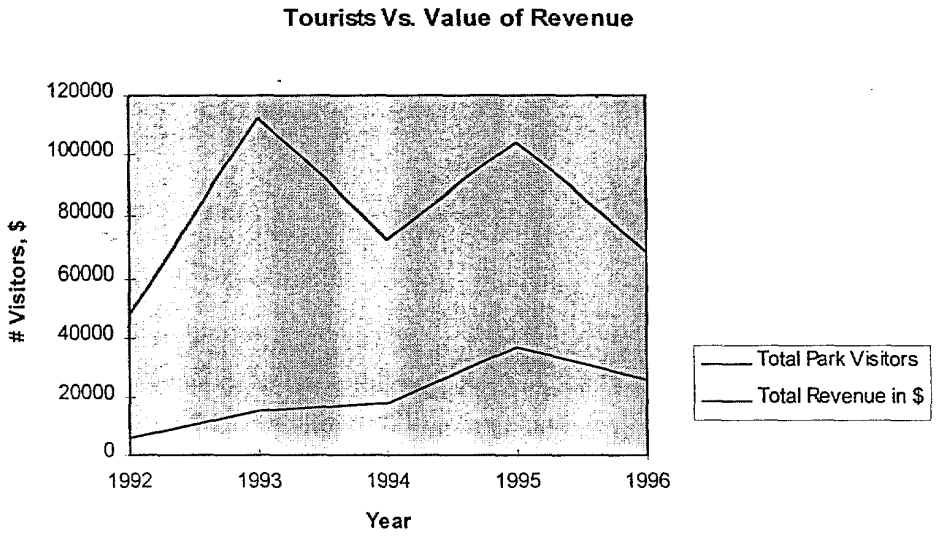
Visitor fees are only collected from the parks/reserves shaded in Table 6 below. The income generated does not include fees charged for permits for research or professional filming within the protected areas. These fees are kept by ANGAP for its own use. Table 6 provides the baseline for ANGAP and its partners to track park entrance fee generation and ANGAP's ability to move the funds intended for sharing with peripheral zone communities to these communities. An important issue which remains to be resolved is the definition of the peripheral zone with which ANGAP shares these funds. With the exception of Isalo, which it manages directly, and Ranomafana, all other parks with tourist visitors have defined very large areas indeed. In the case of Amber Mountain and Andasibe, the peripheral zone is in reality the region around the park or reserve within which the project defined its development program. Because of the large number of villages, and population within such areas, finding a suitable means of dividing what is in fact very little money from the 50% of entrance fees, obvious problems have appeared. These areas are in fact the smallest administrative divisions physically touching the border of the park.





As the operator has sought to find local village management committees to decide on the uses of this money, the political leaders of these units have become involved - seeing it as a means of adding to much needed income they need to run their areas (a state responsibility). Since the money is small, they immediately begin to think they should have not half but **ALL** of the park fees generated by

tourism in their area. This situation could get out of hand. Possible solutions would be for the concerned parks to immediately redefine their peripheral zone of the basis of park entrance fee sharing - not rural development projects within a larger region as is actually the case. Ranomafana's arbitrary 3 kilometer radius around the park is as good a definition as we may be able to find. Exceptions are in areas like Isalo where the villages immediately around the park are obviously within the PZ, with no villages for some distance beyond this ring. Bemaraha has also come up with a fairly restrictive area for a peripheral zone.



The chart above shows the increase in number of total tourists from year during EP-1. Because 1996 data are only through the end of November,1996, they do not represent the complete figure for the year. Nevertheless, it is clear that 1996 is the first year, during the past five, during which there was not a significant increase in visitors to parks. Bad policy (changes in visa regulations) and political instability are major reasons for this. Another problem is that, starting in 1994, revenue greatly decreased. Rather than the significant increase one would have expected, due to rise in tourists, the revenue almost is half of the previous year. This is because between 1992 and 1993 one U.S. dollar would purchase about 1,850 Malagasy francs. A major devaluation took place in 1994, with the dollar rising against the Malagasy franc ($1.00 = 3,900). By 1996 the exchange rate was $1.00 = 4,100 Malagasy francs. Because ANGAP did not have the authority to change park fee rates (set in Malagasy francs), and because ANGAP could not get the Department of Water and Forests and its Ministry to help it make appropriate changes, the protected area program has lost hundreds of thousands of dollars. This situation does not begin to improve until September 1, 1997 when ANGAP will be allowed to put into place a new fee schedule double the old.

Table 6[28]: Parks with Numbers of Tourist Visitors, Income Generated through Entrance Fees and Funds Available Through These Fees for Redistribution to Peripheral Zone Communities

	LES AIRES PROTEGEES	1992		1993		1994		1995		1996[29]		DEAP TOTAL			DEAP DISTRIBUE		
		# VISITEURS	VALEURS	# VISITEURS	VALEURS	# VISITEURS	VALEURS	# VISITEURS	VALEURS	# VISITEURS	VALEURS	ACCUMULE	ANGAP TOT	TOT P/ZP	1994	1995	1996
1	Complexe de la Montagne d'Ambre	1,750	19,399,750	3,498	35,552,050	6,007	64,615,650	5,984	63,636,650	6,329	57,946,550	241,150,650	120,575,325	120,575,325	24,613,500	31,852,975	0
2	Masoala							183	1,715,050	564	5,405,250	7,120,300	3,560,150	3,560,150	0	0	
3	Mananara Nord											0	0	0	0	0	
4	Ranomafana	649	10,910,450	3,121	52,788,000	3,256	56,895,450	6,245	74,689,300	1,300	17,946,300	213,229,500	106,614,750	106,614,750	5,596,750	32,648,350	11,900,0
5	Ankarafantsika											0	0	0			
6	Andasibe	3,135	53,096,600	6,971	94,156,500	5,977	87,455,550	15,285	135,685,950	9,678	103,983,700	474,378,300	237,189,150	237,189,150	0	83,393,996	24,582,6
7	Andohahela											0	0	0			
8	Bemaraha (not official DEAP)[30]	129	460,500	238	799,000	302	1,300,000	514	5,760,000	363	4,649,500	12,969,000	6,484,500	6,484,500	0	4,159,750	0
9	Marojejy/Anjanaharibe											0	0	0			
10	Andringitra											0	0	0			
11	Zahamena											0	0	0			
12	Beza Mahafaly			294	5,624,300	88	1,684,000			173	2,312,500	9,620,800	4,810,400	4,810,400	7,250,000	700,000	0
13	Betampona											0	0	0			
14	Tulear (Biosphere)											0	0	0			
15	Complexe du Sud Zombitse											0	0	0			
16	Parc National de l'Isalo	321	5,642,000	1,057	19,059,800	2,041	34,001,900	7,653	116,692,850	7,088	89,965,700	265,362,250	132,681,125	132,681,125	14,208,150	1,000,000	5,995,68
17	Ambohitantely											0	0	0			
18	Complexe Tsaratanana Manongarivo											0	0	0			
19	Complexe Lokobe /Nosy Tanikely											0	0	0			
20	Andranomena											0	0	0			
21	Namoroka											0	0	0			
22	Manombo											0	0	0			
23	Reserve speciale de Bora											0	0	0			
24	Reserve speciale de Mangerivola											0	0	0			
25	RNI de Tsimanampetsotsa											0	0	0			
26	RS Cap Sainte Marie									50	1,000,000	1,000,000	500,000	500,000	0	0	
27	RS Ambohijanahary											0	0	0			
28	RS Ambatovaky											0	0	0			
29	RS de Maningoza											0	0	0			
30	RS de Kalambatritra											0	0	0			
31	RS de Maritandrano											0	0	0			
32	RS de Kasijy											0	0	0			
33	RS de Bemarivo											0	0	0			
34	RS Tampoketsa d'Analamaitso											0	0	0			
35	RS Ankarana							858	11,734,500			11,734,500	5,867,250	5,867,250	0	0	
	TOTAL	5,984	89,509,300	15,179	207,979,650	17,671	245,952,550	36,720	409,914,300	25,535	283,209,500	1,236,565,300	618,282,650	618,282,650	37,460,250	149,595,321	42,478,

28 Data for this Table comes from the Department of Ecotourism & Marketing, from data entry of park entrance fees collected at park gates. Data for DEAP distribution comes from the Department of Finance.

29 Data are correct through end of November, 1996.

30 Bemaraha tourist statistics and fees are not part of regular DEAP. Yet the park collects fees, and 50% are given to local communities, balance used to support park program.

Table 7 below provides a number of tourism related indicators being tracked which impact on protected area management of the parks and reserves which are currently receiving tourist visitors. All ICDP program ICDPs are provided here.

Table 7: Tourism Development within the Peripheral Zones of Parks and Reserves (1995)

	Andasibe	Ranomafana	Amber Mt.	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankara fantsika
Tourism												
Number of Hotels in PZ	0	0	na	0	0	na	na	0	na	na	0	0
4 Star	0	0	na	0	0	na	na	0	na	na	0	0
3 Star	0	0	na	0	0	na	na	0	na	na	0	0
2 Star	0	0	na	0	0	na	na	0	na	na	0	0
1 Star	0	1	na	0	0	na	na	0	na	na	0	0
Ravinala (local)(private)	3	4	na	0	0	na	na	1	na	na	3	2
# of these hotels operated by PZ people	0	4	na	0	0	na	na	1	na	na	3	na
# of Kilometers of Tourist Circuits in park	10 km.	20 km.	75 km.	0	0	na	na	4	na	na	0	6
# of Camping Sites in PA	1	0	5	0	0	na	na	0	na	na	0	1
# of Camping Sites in PZ	1	1	1	0	0	na	na	2	na	na	0	0
# of Known Tour Operators coming to Park	37	na	5	0	0	na	na	10	na	na	0	2
Existence of Money Exchange	yes	no	yes	no	no	na	no	no	no	no	yes	yes
Quality of Access to park	excellent	average	good	difficult	good	poor	excl.	poor	poor	good	poor	good
# of Centres d'info for tourists	2	2	1	0	0	na	na	1	na	na	1	1
# of Interpretation Centers Operational	0	1	0	0	0	0	0	0	0	0	0	0
# of Videocassettes on Park	1	2	1	0	0	na	1	0	na	na	2	na
# of Different Types of Products created by local people to sell to tourists	5	23	2	0	0	na	na	3	na	na	na	na
Average Length of Stay	1	1.3 days	2	0	0	na	na	2	na	na	2	na
# of Tourist Guides	29	23	40	0	0	na	na	3	na	na	0	0

It is important for ANGAP to track tourism centered indicators which reflect activities taking place in the peripheral zones of all its parks and reserves. This will be one way for ANGAP to objectively describe, over time, the impact its programs and protected areas are having on the economic development of the regions in which protected areas are found. The base line data should be annual updated and analyzed for change. For example, in the last year alone there have been several new hotels developed near the Ranomafana National Park, with a total now standing at 7 hotels, one of which could be classed as a 1 or 2 star hotel. We know of plans for a 3 or 4 star hotel for the area as well over the next year. Andasibe-Mantadia has in 1996 received the Vokoama Lodge, a 4 star class hotel, and the first of its kind. Andasibe hotels have also greatly expanded the number of rooms and bungalows this year as well. Such data should probably in as regularly followed indicators. This reflects movement in the tourism sector in these peripheral zones which have very direct impact on the economies of these areas. ANGAP must be on top of what is happening, and this is done through such indicators, annually obtained by program field monitoring units..

ANGAP's sharing of tourism revenue with peripheral zone communities is a very important public image statement. It is important to monitor data related to this in a transparent and understandable manner. This information should be regularly communicated to the press, to donor, to peripheral zone partners. This is an indicator being tracked by both donors and the EP-2 program as well, because of its significance. Table 8 below provides the base line for these data sets. It shows that as of September 1996, ANGAP - and its field partners - had only achieved a "score" of 46%. This means that only 46% of the money accumulated for sharing with peripheral zone communities through the end of 1995 had as yet actually been given out in the form of micro-projects. ANGAP should try to achieve a score in the range of 70% to 80%. It will never be possible to achieve 100% because of delays in micro-project implementation which are frequently outside the power of ANGAP or its field partners to influence.

Table 8[31]: ANGAP Revenue Sharing with Peripheral Zone Communities

Note: Funds shown available below are totals up to the end of December 1995. The "score" for 1996 represents the percent of funds which were actually returned to local communities from the available funding through the end of 1995.

Park[32]	Andasibe	Ranomafana	Amber Mountain Complex Amber Mt.	Ankarana	Isalo	Beza-Mahafaly	Total	YEAR	Score
1. FMG Amount Available (50%)[33]	202,947,150	97,641,641	91,611,200		87,698,275	4,904,250	484,802,516	1993 and before	0%
2. FMG Reinvested/Distributed[34] % Reinvested/Distrubuted # of Micro-Project Financed[35]	83,393,996 41% 7	50,145,100 51% 41	56,466,475 62% 33	0 0 3	21,203,832 24% 1	0 0 0	211,209,403 44% (average) 85	1994	24%
3. PZ Communities Exist for Revenue Sharing of DEAP? A "yes" = 100%	100%	100%	100%	100%	0	0	67% (average)	1995 1996 1997	47% 48%
Score =	141%	151%	162%	100%	24%	0%	48%	1998	

6*200%/2/6 = 100% possible score

[31] Data for this table come from Table 5. Information on micro-projects comes from the Department of Park Operations (DSEP). The M&E unit must coordinate information gathering to complete the table.

[32] Only national parks/reserves with ecotourism revenue generating authority are monitored here. Isalo was added as a new USAID supported park in January 1966.

ANGAP does not program disbursement of a current year's funds received from tourists until the following year - programmed as part of annual planning process. 50% of park entrance fees are given back to designated peripherial zone communities of the park/reserve concerned to support micro-projects of their own choosing. This has become an important strategy in linking community economic development to a park's existence - thereby providing support to sustainabilty of this resource. Income figures (#1) are totals up to the end of December, 1995.

[33] Cf. Table 5, DEAP Total Available for each protected area. The funds generated for DEAP in 1996 have been subtracted from total; they will be included in next year's programming.

[34] Cf. Table 5, DEAP Distributed.

[35] Examples of micro-projects financed in park peripherial zones by park entrance fees to date (1994, 1995):

Andasibe: Construction of a small foot bridge over a river opened up an entire cutoff area with 5 villages and was of great community benefit, construction of a rural school, a "village meeting house", extension of a water source to a new locality, village reforestation.

Ranomafana: Seed grain for green beans, squash; beehives for several farmers, fertilizers for a group of rice farmers, pig raising for a small group, village grainery, a village tourist campground.

Amber Mountain & Ankarana: Many small projects of about 800,000 fmg. each supporting community matching efforts: village pharmacy, repair of drinking water community taps, school benches for classrooms, village graineries, repair of medical clinics, construction of a new rural "school", construction of home for a rural school teacher, construction of several local level (fokontany) offices, repair of various rural schools (roofs, benches, black boards, etc.), repair of a local foot bridge, village reforestation, construction of a "village meeting house".

Isalo: Construction of a building in main town of Ranohira, as part of hospital complex. When sick people from the surrounding villages are placed into the hospital, they must have a family care for them - including preparing meals. There was no place for these people to stay in Ranohira. The building provides shelter for such people and is a very valuable community based effort for the entire area.

Bemaraha: Renovation of a village school serving the entire southern region around the park.

Table 9[36]: Financial Sustainability of National Parks Institution (ANGAP headquarters and regional park and reserve network)

The table below is a new one designed during late 1995. While it has been distributed to many ICDP programs, only a few have actually completed any information for this to date. As ANGAP moves into this transition period, and begins taking over direct management of the park operations component from these programs, it will become critical to know the revenue flows and expenditures association with park and reserve management. The table is presented below, but completion of data for the network as a whole will probably not take place before sometime in 1997. Information already available are provided after this worksheet. Once completed, it will begin to serve as a management tool for the base line information associated with parks management and as a guage of ANGAP's success in moving towards financial sustainability.

TABLE 9: 1995 OPERATING COSTS FOR PARK MANAGEMENT [37]

	Andasibe	Ranomafana	Amber Mountain Complex Amber Mt.	Ankarana	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankaraf antsika
INCOME													
1. Entrance Fees													
2. Shop Sales (posters, etc)													
3. Park Service Fees													
4. Royalties/Lodging Income													
5. Trust Fund Income													
6. Research Fees													
7. Filming Fees													
8. Guide Fees													
9. Campgrounds													
10. Other													
TOTAL INCOME													
EXPENSES													
1. Personnel													
2. Depreciation													
3. DEAP Returned to PZ													
4. Maintenance													
5. Products from Shop													
6. Functionning (fuel, supplies, utilities, etc.)													
7. Travel (in-country)													
8. Other													
TOTAL EXPENSES													
Percent Sustainability:													

[36] Data for this table comes from ANGAP records for the parks it manages, and from estimates made by operators of parks or reserves managed by field operators. The estimation of depreciation has been particularly difficult for operators - as clear decisions have not been made about what equipment/buildings, etc. ANGAP will inherit during the coming transition.

[37] Minimum operating costs of network. Does not include costs of training, new infrastructure, development activities in the peripheral zone, expatriate advisor salaries - usually financed by donors.

During the past couple years, ANGAP has been tracking ICDP information on cost of field operations, and how their field partners have allocated their resources among the different components of the program. Monitoring and evaluation, for instance, among ICDPs who put in such a unit, ranged from 0.6% to 10 % of their field operating cost budgets, with an average of 3.4% (cf. below). From the Table 10 below, we see that SAVEM projects have been totally funded by USAID, with no government of Madagascar (GOM) contribution, while some of the non-SAVEM ICDP programs have achieved greater support from the GOM. Tracking of these figures will help ANGAP as it begins to prepare for its own direct management of this network, and the costs involved. The most important assets of the program are the trained field national staff of the ICDP's, and ANGAP will be incorporating many of these into its own staff over the coming few years. The figures below reflect combined conservation and development ICDP national staff - ANGAP would not be picking up this entire cost.

TABLE 10: 1995 OPERATING COSTS FOR ICDP MANAGEMENT

in US Dollars	Andasibe	Ranomafana	Amber Mt.	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankara fantsika
Total Annual Operating Bud.	1,255,143	1,569,384	na	1,764,218	208,097 ?	1,399,361	na	135,185	463,720	633,700	na	204,285
Total Spent on Site	794,887	220,461	na	884,848	178,336	1,636,132	na	122,812	166,850	305,466	na	200,211
			na									
% of Budget for Conservation/Park Mang	28%	30%	na	10%	16%	4%	na	8%	43%	53%	na	12%
% for Development	18%	27%	na	21%	14%	8%	na	13%	13%	4%	na	8%
% for Training	.02%	3%	na	15%	7%	4%	na	2%	2%	3%	na	3%
% for Education-Communication	7%	6%	na	na	9%	na	na	3%	9%	na	na	2.4%
% for M&E	3%	1.2%	na	4%	10%	4%	na	0%	.6%	3%	na	1.7%
% for Research Activities	6	4.8%	na	0	5%	9%	na	1%	4%	4%	na	0
% for Local Coordination	5	23%	na	23%	17%	65%	na	na	31%	22%	na	30%
% for Tana Coordination	25%	5%	na	23%	0% ?	19%	na	0	0		na	20%
% of Budget from Donors	100%	100%	na	100%	100%	100%	na	100%	73%	89%	na	87%
% of Budget from GOM	0	0	0	0	0	0	0	0	27%	11%	na	13%
Total Cost of National Staff	49,033	74,609	na	117,512	120,133	327,628	na	35,223	25,875	83,335	na	52,072
Total Cost of Expat. Staff	57,809	234,679	na	265,100	na	129,774	na	48,000	na	51,740	na	75,000
Total Cost of Consultancies	na	3,737	na	20,000	888	na	na	0	6,990	4,636	na	0
Total Operating Costs	na	468,119	na	135,915	na	820,316	na	36,485	92,850	25,614	na	25,520

2.0 ICDP Program Development Base Line Data Indicators

Five sets of indicator tables are given below which monitor overall program development both within the protected areas themselves, as well as in the development of partnerships with communities in the peripheral zones. These are:

(1) Percent of qualified protected area management plans implemented (Table 11)
(2) Percent of village households in priority zones of peripheral areas that have adopted program sponsored alternatives to destructive practices (Table 12)
(3) Peripheral zone of protected area development plans (Table 13)
(4) Spatial (GIS) data development within ICDPs (Table 14)
(5) 1995 ICDP socio-economic base line data indicators (Table 15)

The data for the indicator groups in Table 11 below have been obtained for the program ICDPs only. The information should be extended to all parks and reserves over the coming year. The scores given at the bottom of the table provide an indication on how ANGAP is doing in terms of putting into place the management plans essential for professional and sustained protection of these protected areas.

Table 11[38]: Percent of Qualified PA Management Plans Implemented October 1996

	Andasibe	Ranomafana	Amber Mountain Complex		Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojeji	Mananara -nord	Ankaraf ntsika
			Amber Mt.	Ankarana									
(1) Clearly defined and marked boundaries:	1 [39]	1 [40]	1 [41]	1	1 [42]	1 *d	1 *d	0	1	1	0	1	1[43]
(2) Enforcement mechanism in place	1	1	1	1	1	1	1	1	0	1	0	1	1
(3) Clearly defined relationships between PA and surrounding ommunities	1	1	0	0	1	1	1	0	1	1	1	1	0
(4) a management structure for park management in place	1	1	0	1	1	1	0	0	0	1	1	1	0
(5) an ecotourism development plan in place	1	1	1	1	0	0	0	0	0	0	1	1	0
(6) system for investment of park entrance fees into the local communities	1	1	1	1	0	0	0	0	1	0	0	0	0
(7) a biodiversity / ecological monitoring plan in place	1	1	1	1	1	0	1	0	0	1	1	0	0
(8) park management plan document exists, and being used.	0	1	0	0	0	0	0	1	0	0	0	0	0
1996 Score= 59 or 58%	7	8	5	6	5	4	3	2	3	5	4	5	2

1995 Score = 38 or 59%;
13*8= 64 points possible; 100% = 64; In some cases it is not possible to complete a particular requirement, because a park (eg. Andohahela) is not open to tourists. So an ecotourism plan can not be initiated.

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[38] Data for this table comes from the M&E tables completed by each ICDP or park program, to be included as part of annual reports.

[39] Ranomafana 100% of boundaries already defined and marked. permanent markers remain to be placed along 40% of perimeter. Will be completed during first quarter 1996.
[40] Andasibe has 25% of permanent markers remaining to be placed, will be completed during first quarter 1996. Guard posts need reinforcement.
[41] Because Amber Mountain itself is composed of 4 separate protected area units (forest station, foret classee, special reserve), two of which are run by DEF, park management has been very difficult. Development of services are also hindered by DEF. It is essential that the entire complex be reclassified as a single unit, one national park. No other arrangement can be practical for management reasons Andasibe faces a similar potential problem with its forest station. To achieve change, USAID and donors will probably need some form of conditionality in PE-2 funding for DEF. Maybe a donor promise to help DEF develop Montaigne Francaise, near Diego, in "exchange" for these needed changes would resolve the situation?
[42] Limits have been clearly defined, but physical markers have not been completed to show these limits to the park or reserve.
[43] Limits have been clearly defined, but physical markers have not been completed to show these limits to the park or reserve.

Table 12[44]: Percent of Village Households in Priority Zones of Peripherial Areas that have Adopted Program Sponsored Alternatives to Destructive Practices.

Socio-economic impact (behavioral changes), if any, can take years to produce visible change. The table below establishes ANGAP and its field partner's attempt to monitor impact of field development activities on reduction of pressures upon the park. To achieve this, a series of steps were necessary which would lead to the ability, in time, to interview households concerned about impact. This process was broken into six discreet steps, monitored through the table below. Swanson (Report #2, 1996) provides the first results, through case studies of these selected households, of potential impact - and results of the hypothesis testing activities for development activities of the USAID funded SAVEM project. ANGAP has been encouraged to follow this process for its other parks and reserves where it has community outreach development type activities underway. This has been done in several non-SAVEM ICDPs (Andringritra, Marojejy). The aggregate scoring below permits ANGAP mangement to quickly judge progress being made in assessing household impact of its development activities.

	Andasibe	Ranomafana	Amber Mountain Complex Amber Mt.	Ankarana	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara -nord	Ankara antsika
(1) Analysis of Pressures/ Causes & Spatialization	1	1	1	1	1	1	1	1	1	1	1	1	1
(2) Identification of Priority target zones in PZ	1	1	1	1	1	1	1	0	1	1	1	1	1
(3) Identification of activities to reduce pressures (hypotheses)	1	1	1	1	1	1	1	0	1	1	1	1	1
(4) Selection of sample households in priority zones to monitor impact (test hypotheses)	1	1	1	1	1	1	1	0	1	0	0	0	0
(5) Analysis of Activity Impact to reduce pressures	0	1	0	0	0	0	0	0	0	0	0	0	0
(6) At least 50% of sample households have adopted program sponsored activities	0	0	0	0	0	0	0	0	0	0	0	0	0
1996 Score = 47 or 60%	4	5	4	4	4	4	4	1	4	4	3	3	3

1995 Score = 30 or 81%

13*6= 78 points possible; 100% = 78

Note: Several ICDPs above only began operations last year, so should not be expected to have achieved the results of SAVEM projects.

[44] Data are obtained through the M&E tables completed for ANGAP, and submitted as part of each protected area's annual report. Only the six SAVEM ICDP's , underway since 1992, are provided below. Isalo added January 1, 1996.

Table 13[45]: Peripheral Zone of Protected Area Development Plans

The baseline data provided in Table 10 below are considered essential for ANGAP management of each protected area. An enlarged Table needs to be created for the network. The six USAID funded SAVEM ICDP's, underway since 1992, were monitored during EP-1 for progress in assessing the evolution of ANGAP (and by extension its collaborating field partners) in developing long term relationships with local communities around parks and reserves. Isalo was only added in January 1996. Establishment of such working collaboration with such communities is considered a requirement for the long term sustainability of these protected areas. The process to arrive at such a relationship was aggregated into 7 major steps, completion of each would earn the program 1 point.

	Andasibe	Ranomafana	Amber Mountain Complex Amber Mt.	Ankarana	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankarafantsika
(1) Peripheral Zone will Defined Spatially	1	1	1	1	1	1	1	0	1	1	1	1	0
(2) Existence of Development Plan for Peripheral Zone	1	1	0	0	1	1	1	0	1	0	1	1	0
(3) Strategy for Forest or other NR Management Developed	0	1	1	0	1	1	1	0	1	1	1	0	1
(4) Limits/Boundaries of PZ Community NRM Terrirories Defined	0	0	1	0	0	0	1	0	0	0	0	1	0
(5) Support System for Community Defined Activities in Place	1	1	0	0	1	1	1	0	1	1	1	1	1
(6) Support to PZ Communities for Eco-Ethno. Tourism Development	0	1	0	0	0	0	0	0	1	0	0	0	0
(7) System in Place to Evaluate Attitude Change	1	0	0	0	1	0	1	0	0	0	0	1	0
1996 Score = 43 or 47%	4	5	1	1	5	4	4	0	5	3	4	5	2

1995 Score = 41%
13*7= 91 points possible; 100% = 91
Note: Several ICDPs above only began operations last year, so should not be expected to have achieved the results of SAVEM projects.

[45] Data for this table come from ICDP M&E indicator tables, submitted as part of each annual report. ANGAP is encouraged to continue to provide this table for all its protected areas throughout the next five years (EP-2).

Table 14[46]: Spatial (GIS) Data Development within ICDPs

The ability to monitor and analyze data spatially is considered to be essential for ANGAP and for effective field program management. While there are numerous types of spatial data which may be recorded, ANGAP with its partners, through the M&E program, established that there are at least 9 types of spatial data which must be acquired early on for good project management. From these base data sets, ANGAP and its partners would be in a position to increase this spatial data bases for each protected area. Each of the original six USAID funded SAVEM ICDPs, with later inclusion of Isalo (January 1996) have been monitored through EP-1 through a point system for each ICDP and for the network as a whole. ANGAP is strongly encouraged to continue this monitoring by extending it to all the protected areas so that a minimum base line set of spatial information may be assured. This will need to continue throughout EP-2, and will be a responsibility of field operators to provide this information on an annual basis through the ongoing M&E system of Tables in place. These field operators must coordinate these efforts through the ANGAP DIVB - which has the expertise to greatly facilitate this process.

Spatial Data Digitized:	Andasibe	Ranomafana	Amber Mountain Complex Amber Mt.	Ankarana	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankarafantsika
1. Protected Area Limits	1	1	1	1	1	1	1	0	0	0	1	1	0
2. Villages of PZ	1	1	0	0	1	1	1	0	1	0	1	1	0
3. Limits of PZ	1	1	1	1	1	1	1	0	0	0		0	0
4. Limits of Priority Areas within PZ (zones, sub-zones)	1	1	1	1	1	1	1	0	0	0	0	0	0
5. Limits of Buffer Zone (if exists)	1	0	0	0	1	0	1	0	0	0	0	0	0
6. Areas of Pressure upon PA Identified	1	1	0	0	1	0	0	0	0	0	0	1	0
7. Elevation Data of PA and PZ (every 100 m)	0	0	0	0	0	0	1	0	0	0	0	0	0
8. Roads, Trails, Paths within PA and PZ	1	1	0	0	1	1	0	0	0	0	0	0	0
9. Major Rivers, Streams, Lakes within PA and PZ	1	1	0	0	1	1	1	0	0	0	0	0	0
1996 Score: 48 or 41%	8	7	3	3	8	6	7	0	1	0	2	3	0

1995 Score = 54%

13*9= 117 points possible; 100% = 117

Note: Several ICDPs above only began operations last year, so should not be expected to have achieved the results of SAVEM projects.

[46] Data for Table 11 come from field ICDP M&E indicator tables, which are part of each annual work plan submission. ANGAP's DIVB should confirm each year that these data are correct. The M&E unit should coordinate the incorporation of these data from the different annual work plans each year.

Table 15: 1995 ICDP Socio-Economic Base Line Data Indicators

	Andasibe	Ranomafana	Amber Mt.	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara	Ankarafa
Population dans ZP[47]	11,160	25,000	31,759	21,000	17,760	40,000	na	39,486	19,122	56,748	47,200	53,551
Number of villages hamlets in ZP	64	103	46+274	80	116	320	na	36+	70	51	171	119
Population Density in Zone 1[48]	27	55	na	11	10	9	na	na	4	na	na	na
Population Density in Zone 2	52	76	na	13	12	6	na	na	26	na	na	na
Population Density in Zone 3	289	75	na	25	25	11	na	na	10	na	na	na
Population Density in Control	na	20	na	29	10	na	na	na	45	na	na	na
Purchase Price of 1 ha. Of Tavy Land (Fmg)	150,000	891,667	800,000	not exist	na	not exist	na	na	not exist	188,000	na	500,000
Purchase Price of 1 ha. Of Irrigated Rice Land (Fmg)	150,000	666,667	800,000	not exist	375,000	802,500	na	na	not exist	1,427,000	na	1,000,000
Annual Rent of tavy land (ha)	na	275,000	250,000	na	na	na	na	na	na	36,000	32,500	na
Annual Rent of irrig. Rice land	na	93,333	300,000	na	200,000	87,000	na	na	60,000	455,000	400,000	na
Price of Day Labor to prepare an irrig. Rice or tavy field [49]	3000	1,643	10,625	3500	15,000	2,500	na	5,000	3,500	4,600	4,000	5,000
Average Cost of kg of rice during "hunger season"	2,100	2,600	1,750	2,500	2,800	1,500	na	2,800	1,810	1,313	1,750	1,750
Average Cost of kg of rice at time of harvest	1,750	1,500	1,225	1,200	1,925	500	na	1,575	930	875	1,750	1,100
Average length of "hunger season" (in months)	6	4	5	6	4	3	na	5	4.5	4	5	4
Per Capita Daily Consumption of Rice (kapoaka/day)[50]	1.75	1.27	3	2	2	2.5	na	3	3.5	3.17	2	3.5
Average yield of tavy rice-kg/ha	800	560	na	850	1,600	530	na	na	700	1,016	900	900
Average yield of irrig. Rice-kg	2,250	1,289	1,170	1,300	1,400	870	na	1,200	1,700	2,614	2,000	1,400
Av. # of Years new tavy field cultivated before abandoned?	1	3	1	1	2	1	na	na	1.5	1.9	2	3
Av. Years field fallow before tavy cultivation can resume?	3	5	1	4	4	3	na	na	6	3.65	5	6

[47] From the last, national level, census in Madagascar, 1991.

[48] Between three and four zones were identified by program within each PZ for more intensive study and development activity. Number of people per square kilometer calculated.

[49] We had distinguished between tavy and irrigated fields for labor questions but found there was no difference anywhere. Therefore same figure (fmg) is used for both.

[50] A kapoka is about 3.5 kg. Price data are always given in Fmg./hectare. In many areas share-cropping is practiced, giving between 30% to 50% of harvest to owner of land.

Though the statistics of Table 15 above only concern 1995, it should be remembered that most ICDPs have been obtaining these data since 1994. At the ICDP level, comparison of the change in these figures is important for what this may be indication concerning the cost of living in an area. For instance, in Zahamena, in 1994, the cost of rice during the "hunger season" was only 700 fmg/kapoaka. It increased the next year to 1200 fmg. The cost of a day's labor was 2,500 fmg. in 1994, increasing to 3,500 in 1995. As a reflection on hard times, the daily consumption of rice per person, 3 kapoaka/day in 1994, decreased to only 2 in 1995. Such data provide indicators which may explain increasing pressures upon park or reserve natural resources. Why did this happen in Zahamena? One reason may be because of the cyclone which hit the area during the midst of the agricultural season, destroying many productive areas.

3.0 Park and Reserve Ecological Monitoring Indicators

3.1 Evolution of Vegetative Cover Base Line Data Indicators

Baseline data needed for long term monitoring of vegetative cover change and selected other ecological indicators over time are provided in Tables 16, 17A-F, 18, and 19 below.

Table 16: Baseline Data for Monitoring the Evolution of Vegetative Cover with Parks/Reserves and Peripheral Zones.

Table 17: Baseline Data for Monitoring the Evolution of Vegetative Cover in the Target Control Zones of the Peripheral Zones and Protected Areas of:

- Table 17A: Ranomafana National Park
- Table 17B: Andasebe/Mantadia National Park
- Table 17C: Amber Mountain Complex
- Table 17D: Zahamena Strict Reserve
- Table 17E: Andohahela National Park
- Table 17F: Masoala National Park

Table 18: Biodiversity Richness of Madagascar Parks and Reserves: Total Number of Recorded Species Known in 1995

Table 19: Rivers with Sources within Protected Areas

Specific monitoring of flagship species or of select sample plots within parks and reserves, and in peripheral zones has also been established in all SAVEM ICDPs. Information on these park specific indicators are not provided here.

It is important that the information below be updated periodically during the coming EP-2 (1997-2002). At the very minimum Table 16 should be updated - and where on-going development efforts are underway, Table 17 type information should be monitored. ANGAP will need to complete similar tables for at least the other Category A parks for which spatial base line data do not yet exist. Future operators or partners in these and other parks and reserves should initiate work to complete not only creation of the spatial base line, but to also begin a regular program of impact monitoring. Only in this way can ANGAP communicate clearly to decision makers, both public and private, the effectiveness of programs underway as well as need for re-enforcement.

Spatial maps showing the data given in Tables 16 and17 are provided in Annex 1, and were created through the efforts of field GIS units in collaboration with ANGAP's DIVB GIS unit. For each park or reserve, an initial map shows the location of the protected area and its peripheral zone - as well as the location of the target control zones. The area in hectares is also given for the various vegetative classes monitored. For each SAVEM park/reserve, the following is provided:

(1) General map showing location of protected area, peripheral zone, and special control zones. Principal roads and towns and rivers are also shown on this map;
(2) Map showing the historical change in vegetation cover for the protected area itself;
(3) Map showing the historical change in vegetation cover for the peripheral zone of protected area;
(4) Maps showing the historical change in vegetation cover for 3-4 target control zones in/around parks.

Table 16[51]: Base Line Data for Monitoring the Evolution of Vegetative Cover Within Parks/Reserves (PA) and Peripheral Zone (PZ)

Table 12A: Area within Park or Reserve: Andasibe Special Reserve	1957		1991		1994		1999	
Year of Base Line Spatial Data	PA	ZP	PA	ZP	PA	ZP	AP	ZP
Primary Forest or little Degradation	706		651		643			
Secondary Forest, Degraded Forest	32		154		197			
Savanna or Pasture Land	0		0		0			
Cultivated Land (tavy, irrigated rice, other crops)	0		0		0			
Other Types of Vegetation (mangroves...)	126		59		24			
Total Area (Hectares) within Park or Reserve	864		864		864			

Table 12B: Area within Park or Reserve: Mantadia	1957		1991		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	9198		8373		7969			
Secondary Forest, Degraded Forest	756		809		1271			
Savanna or Pasture Land	0		0		0			
Cultivated Land (tavy, irrigated rice, other crops)	0		748		38			
Other Types of Vegetation (mangroves...)	6		30		682			
Total Area (Hectares) within Park or Reserve	9960		9960		9960			

Table 12C: Area within Park or Reserve: Ranomafana	1950		1991		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	33,800	28,700						
Secondary Forest, Degraded Forest	4,800	17,700						
Savanna or Pasture Land	1,900	7,500						
Cultivated Land (tavy, irrigated rice, other crops)								
Other Types of Vegetation (mangroves...)								
Total Area (Hectares) within Park or Reserve	40,500	53,900						

Table 12D: Area within Park or Reserve: Amber Mountain	1950		1991		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	20549	26101						
Secondary Forest, Degraded Forest	849	2686						
Savanna or Pasture Land	2976	68198						
Cultivated Land (tavy, irrigated rice, other crops)								
Other Types of Vegetation (mangroves...)								
Total Area (Hectares) within Park or Reserve	24,374	96,985						

Table 12E: Area within Park or Reserve: Ankarana Special Reserve	1950		1991		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	17451	4840						
Secondary Forest, Degraded Forest	2730	5689						
Savanna or Pasture Land	5136	37772						
Cultivated Land (tavy, irrigated rice, other crops)								
Other Types of Vegetation (mangroves...)								
Total Area (Hectares) within Park or Reserve	25,317	48,301						

Table 12F: Area within Reserve: Zahamena Integral Natural Reserve	1950		1992		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	61,807	36,134	62,731	19,831				
Secondary Forest, Degraded Forest	1701	12,893	223	1,694				
Savanna or Pasture Land	870	9,695	1,371	9,960				
Cultivated Land (tavy, irrigated rice, other crops)	0	355	76	27,254				
Other Types of Vegetation (mangroves...)	0			337				
Total Area (Hectares) within Park or Reserve	64,378	59,077	64,401	59,076				

Table 12G: Area within Park or Reserve: Andohahela National Park	1956		1991		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	55,742	54,916	54,949					
Secondary Forest, Degraded Forest	1,804	4,413	1,174					
Savanna or Pasture Land								
Cultivated Land (tavy, irrigated rice, other crops)								
Other Types of Vegetation (mangroves...)	17,165	49,839	18,566					
Total Area (Hectares) within Park or Reserve ('91 change in park limits)	74,711	109,168	74,689					

Table 12H: Area within Park or Reserve: Masoala National Park	1950		1991		1994		1999	
Year of Base Line Spatial Data	PA	PZ	PA	PZ	PA	PZ	PA	PZ
Primary Forest or little Degradation	211,625		209,833					
Secondary Forest, Degraded Forest			1,100					
Savanna or Pasture Land	251		943					
Cultivated Land (tavy, irrigated rice, other crops)			0					
Other Types of Vegetation (mangroves...) [52]			0					
Total Area (Hectares) within Park or Reserve	211,876		211,879					

[51] In order to monitor the nature of change of these macro variables, we recommend that every 5 years new remote sensing data (Landsat) be purchased and overlaid on the base line data for analysis of change of the key variables followed. This should be done for the entire park and reserve area. This same process should be followed for the adjacent peripheral zone. GIS maps showing these data are given in annex 3.

[52] Litorial forest

Table 17[53]: Base Line Data for Monitoring the Evolution of Vegetative Cover in the Target Control Zones of the Peripheral Zones & Protected Areas

TABLE 17A: RANOMAFANA NATIONAL PARK

Hectares, within Ranomafana Control Zone #:	**#1 Manarinony**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996[54]
Primary Forest or little Degradation		575	428	
Secondary Forest, Degraded Forest		129	219	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)		295[55]	347	
Other Types of Vegetation (mangroves...)				

Hectares, within Ranomafana Control Zone #:	**#2 Ranomafana**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	470	315	228	
Secondary Forest, Degraded Forest	351	378	369	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)	178	305	401	
Other Types of Vegetation (mangroves...)				

Hectares, within Ranomafana Control Zone #:	**#3 Vohiparara**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	404		263	
Secondary Forest, Degraded Forest	342		562	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)	253		173	
Other Types of Vegetation (mangroves...)				

[53] The control areas are areas judged by ANGAP and field partners to be under particular pressure on existing natural resources. A need for more regular monitoring of change is needed. Program development activities have frequently been more concentrated here in an effort to provide human populations with alternatives to activities using protected area natural resources (illegally). At the same time, efforts are needed further away to draw people away from these resources. For the target control areas within the peripheral zone (and in some cases including part of a park or reserve), we recommend that every 2 years videographic aerial data be taken and superimposed on the base line data for these areas. Such activity and analysis will be much less costly than Landsat coverage needed every 5 years and will give a better indication of what is really happening in areas of high environmental pressure.

[54] 1996 data analysis for the control zones should come from videographic data.

[55] A number of the SAVEM programs, in interest of speeding up analysis and/or for lack of detailed enough vegetative cover imagery, only made three distinctions (primary or non-graded forest; secondary or degraded forest, and other. With recently acquired videographic imagery, the greater detail desired may be possible (eg. distinctions between irrigated rice and other cropping systems, savanna and pasture land, and other types of vegetation such as mangroves). When only three categories are given, as in this case, this was the system used.

TABLE 17B: ANDASIBE/MANTADIA NATIONAL PARK

Hectares, within Andasibe/Mantadia Control Zone #:	**#1 Vohibazaha**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	921	336	200	
Secondary Forest, Degraded Forest	1,666	248	228	
Savanna or Pasture Land	171	1,771	2,339	
Irrigated Rice Land		0		
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves,..)		0		

Hectares, within Andasibe/Mantadia Control Zone #:	**#2 Falierana**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	603	70	30	
Secondary Forest, Degraded Forest	304	118	224	
Savanna or Pasture Land	600	1,324	1,238	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Andasibe/Mantadia Control Zone #:	**#3 Antsampanana**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	56	45	35	
Secondary Forest, Degraded Forest	317	188	182	
Savanna or Pasture Land	52	193	211	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

TABLE 17C: AMBER MOUNTAIN COMPLEX

ANKARANA SPECIAL RESERVE

Hectares, within Ankarana Control Zone #:	**#1**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation				
Secondary Forest, Degraded Forest				
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

AMBER MOUNTAIN NATIONAL PARK

Hectares, within Amber Mountain Control Zone #:	**#1 Joffre-Ville**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	7,694	5,319	5,117	
Secondary Forest, Degraded Forest	1209	2,584	1,704	
Savanna or Pasture Land	1096	2,096	3,178	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Amber Mountain Control Zone #:	**#2 Sakaramy**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	832	536	459	
Secondary Forest, Degraded Forest	2,476	2,020	1,945	
Savanna or Pasture Land	3,341	4,092	4,242	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Amber Mountain Control Zone #:	**#3 Andasibe**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	3926	2,672	2,493	
Secondary Forest, Degraded Forest		1,255	1245	
Savanna or Pasture Land	4,915	4,915	5103	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Amber Mountain Control Zone #:	**#4 Bobakilanoly**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	3,494	1,960	1,658	
Secondary Forest, Degraded Forest	2,155	2,674	2,004	
Savanna or Pasture Land	4,577	5,591	6,563	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Amber Mountain Control Zone #:	**#5 Mahamasina**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	2,316	1,396	1,197	
Secondary Forest, Degraded Forest	1,183	2,072	1,929	
Savanna or Pasture Land	3,688	3,718	4,061	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

TABLE 17D: ZAHAMENA INTEGRAL NATURAL RESERVE

Hectares, within Zahamena Control Zone #:	**#1 Moango**			(Videographic)
Year of Base Line Spatial Data	1956	1992	1995	1996
Primary Forest or little Degradation	2,055	779		
Secondary Forest, Degraded Forest	361	56		
Savanna or Pasture Land	54	0		
Irrigated Rice Land	0	0		
Other Types of Cultivated Land (tavy, other crops)	0	1,634		
Other Types of Vegetation (mangroves,...)	0			

Hectares, within Zahamena Control Zone #:	**#2 Enclave4**			(Videographic)
Year of Base Line Spatial Data	1956	1992	1995	1996
Primary Forest or little Degradation	6,760	3,037		
Secondary Forest, Degraded Forest	3,061	151		
Savanna or Pasture Land	88			
Irrigated Rice Land	28			
Other Types of Cultivated Land (tavy, other crops)	0	6,749		
Other Types of Vegetation (mangroves...)	0			

Hectares, within Zahamena Control Zone #:	**#3 Namarafana**			(Videographic)
Year of Base Line Spatial Data	1956	1992	1995	1996
Primary Forest or little Degradation	1,132	178	59	
Secondary Forest, Degraded Forest	1,032	63	141	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)		1,922	1963	
Other Types of Vegetation (mangroves...)	0			

TABLE 17E: ANDOHALA NATIONAL PARK

Hectares, within Andohahela Control Zone #:	**Ebaketra**			(Videographic)
Year of Base Line Spatial Data	1956	1991	1994	1996
Primary Forest or little Degradation	2,368	1,752	1,713	
Secondary Forest, Degraded Forest	1,490	1,100	924	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)	38	1,044	1,283	
Other Types of Vegetation (mangroves...)				

Hectares, within Andohahela Control Zone #:	**Mahamavo**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	2,774	2,490	2,183	
Secondary Forest, Degraded Forest	829	174	114	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)	182	1,121	1,488	
Other Types of Vegetation (mangroves...)				

Hectares, within Andohahela Control Zone #:	**#Antseva**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	1,454	1,142	1,019	
Secondary Forest, Degraded Forest	7	32	127	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)	1,786	2,073	2,101	
Other Types of Vegetation (mangroves...)				

Hectares, within Andohahela Control Zone #:	**#Tsimelahy**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	2,818	1,271	1,203	
Secondary Forest, Degraded Forest	1,967	2,219	2,078	
Savanna or Pasture Land				
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)	425	1,720	1,929	
Other Types of Vegetation (mangroves...)				

TABLE 17F: MASOALA NATIONAL PARK

Hectares, within Masoala Control Zone #:	**#1 Ianabe**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	20,405	16,860		
Secondary Forest, Degraded Forest		560		
Savanna or Pasture Land	1,075	4,117		
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Masoala Control Zone #:	**#2 Ambanizana**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	17,462	15,666	15,148	
Secondary Forest, Degraded Forest		1,492	1,990	
Savanna or Pasture Land	596	900	920	
Irrigated Rice Land				
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

Hectares, within Masoala Control Zone #:	**#3 Anaovandrano**			(Videographic)
Year of Base Line Spatial Data	1950	1991	1994	1996
Primary Forest or little Degradation	23,027	16,043	15,197	
Secondary Forest, Degraded Forest	1,060	843	511	
Savanna or Pasture Land	4,084	11,285	12,453	
Irrigated Rice Land		0		
Other Types of Cultivated Land (tavy, other crops)				
Other Types of Vegetation (mangroves...)				

3.2 Known Biodiversity Richness of Protected Area

While much research has been conducted by numerous organizations over the years within Madagascar's various parks and reserves, there has never been any consistent attempt to record, in an organized fashion, what is known in each. ANGAP has been in the process over the past several years to encourage its protected area partners to standardize the collection of a certain minimum amount of data for all known species found within each park or reserve. A form with such a minimum content was discussed and agreed to during the 1994 M&E workshop in Antsirabe. The table below should serve ANGAP and interested partners as a set of indicators showing what has officially become described and recorded within the protected area information system on biodiversity. It is well known that many more species than recorded below have been identified and have been recorded in various books and possible other data bases elsewhere - but these remain "officially" unknown to ANGAP and the official monitoring program. Much work remains to be done. Each year should see a significant rise in the "known richness" of this network of parks and reserves as already existing information finds its way into the ANGAP DIVB information system, and as new research is conducted.

ANGAP's protected area information system, located in its DIVB department computer center, seeks to record, at a minimum, the number of species known for each group below, with related percentage of endemic species, number of species of each group menaced or at risk of extinction, and the number of species with specific known economic or other uses for the peripheral zone population. The information found in Table 18 below are aggregated from this database. Other species-specific data are recorded in the data base.

In reviewing Table 18 below, it is clear that the SAVEM ICDP's, with the exception of Andohahela, have done fairly well in beginning to keep track of the biodiversity within the parks and reserves concerned. Non-SAVEM ICDP's Bemaraha, Andringritra, and Marojejy have also done well. While Ranomafana has achieved significant progress in the scientific description of the biodiversity there, one is surprised by the richness which has already been identified in Masoala. An explanation for this can be found in the percent of their budget spent for research. Isalo, because of the Landel Mills work in 1995 actually has lists of species in the contractor's report. However, ANGAP itself, did not require the contractor to furnish these data in the format required for other ICDPs, - based on the M&E indicators workshops of Antsirabe. Therefore, to date, these data are non-exploitable. The same can be said for other protected areas where contractors have not been given adequate guidelines to work within an over-all monitoring system. This management system needs to be corrected and become more consistently applied throughout the network of parks and reserves.

Table 19 provides information on the number of rivers which find their beginnings in protected areas. From the ten protected areas for which data were provided, 207 rivers originated from the parks or reserves. Of these, 108 are considered of great importance to crop irrigation needs of downstream communities! Future study should attempt to build up information on the economic value of these rivers to the peripheral and regions down-stream. Such objective information would go a long way in raising social and political consciousness about the importance of protecting not only the biodiversity of these protected areas, but the watershed systems themselves which give rise to these water. Many hydro-electric dams, hundreds of thousands of hectares of irrigated rice fields, not to speak of human and water consumption depend on these rivers. [1]As part of this indicator, we asked ICDPs, in their aerial photographic interpretation work, or in some other manner, to try to estimate how much land within the peripheral zone benefited from irrigation water from one of these rivers. Not one ICDP has yet found the time to do this. This may require a special sub-contract if judged essential in EP-2.

Table 18 Biodiversity Richness of Madagascar Parks and Reserves: Total Number of Recorded Species Known in 1995

	Andasibe	Ranomafana	Amber Mt.	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankara fantsika
1. Pteridophytes	1	19	64	60	0	174	0	16	188	211	0	0
2. Phanerogames	286	138	341	224	0	397	0	397	0	0		
3. Monotyledones	0	0	14	22	0	0	0	0	0	0	0	0
4. Cryptogames (not includ. Pterodophytes)	0	0	0	5	0	176	0	43	0	0	0	0
5. Mammiferes	30	40	26	39	0	26	0	16	15	12	0	0
6. Oiseaux	111	112	77	109	0	87	0	92	99	115	0	0
7. Reptiles	28	36	50	46	0	44	0	0	35	25	0	0
8. Amphibiens	24	47	24	62	0	44	0	0	57	41	0	0
9. Insectes	0	73	0	146	0	223	0	0	63	0	0	0
10. Poissons	0	6	0	3	0	20	0	0	0	0	0	0
11. Crustaces	0	7	0	2	0	2	0	0	5	0	0	0
12. Myriapodes	0	0	2	0	0	0	0	0	0	0	0	0
13. Arachides	0	350	0	0	0	0	0	0	0	0	0	0
14. Mollusques	0	0	0	0	0	0	0	50	0	0	0	0
15. Aigues	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total:	480	716	598	497	0	1193	0	614	462	404	0	0
% of ICDP Budget spent on Research:	6%	4.8%	na	4%	5%	9%	na	1%	4%	4%	na	na

Table 19: Rivers with Sources in Protected Areas

	Andasibe	Ranomafana	Amber Mountain Complex Amber Mt.	Ankarana	Zahamena	Andohahela	Masoala	Isalo	Bemaraha	Andringritra	Marojejy	Mananara-nord	Ankarafantsika
# of Rivers Originating from Park	15	27	29	4	36	36	9	na	24	16	na	11	na
# of Rivers of Great Importance for Irrigation	4	20	20	1	19	16	9	na	4	4	na	11	na

4. 0 Baseline Indicators for 2nd Madagascar Environmental Program for ANGAP (CAPE)[56]

During 1996, as part of the preparation for EP-2 (1997-2002) programming, the GOM and its key donors and supporters reviewed each executing agency's program plans for the future. Part of this effort included proposing and adopting a short list of key indicators which would be monitored at a GOM macro level for each program. ANGAP proposed the ten indicators below, based on the M&E information system already in place. Table 20 below presents,, it its first column the six principal objectives of ANGAP, drawn directly form its mission statement:

"To establish, conserve, and manage in a sustainable manner a network of National Parks and Reserves representative of the biological diversity and the natural environment unique to Madagascar. These Protected Areas, source of national pride for both present and future generations, should be places of preservation, education, recreation, and contribute to the development of peripheral zone communities and to regional and national economies."

The second column presents the principal results expected from the global objectives. The third column gives the specific indicators to be monitored for these principal results. The fourth column indicates whether we believe this indicator is one of impact or simply monitoring the accomplishments of this activity. The fifth column provides the worksheet which shows how this indicator will be attained. These worksheets are provided in Annex 3. The last column refers to the M&E table, in this report, from which ANGAP can extract this information each year, to provide to the National Office of the Environment (ONE), charged with the monitoring of these macro incidators.

ANGAP

TABLE OF EP 2 OBJECTIVES - RESULTS - INDICATORS

MAIN OBJECTIVES	MAIN RESULTS	INDICATORS	TYPE	FORM	Reference Table
Establishment of the Protected Area network	• PA network in accordance with ANGAP mission statement	• Nb of PA for which ANGAP has proposed new status to DEF	A	1	Table 2
Conservation of the national Protected Areas network	• Operational conservation structures in PA s • Biodiversity degradation reduced	• Category A parks management plans designing • reduction rates of primary forest areas in Category A parks	A I	2 3	Table 11 Table 16
Sustainable management of PA s	• Network managed in a sustainable and rational way • Program funding needs are partially self-funded	• Nb of PA s directly managed by ANGAP • Category A parks self-sufficiency rate	A I	4 5	Table 2 Table 9
Protected areas are places of education	• Contribution to the implementation of the environmental education policy	• Nb of schoolchildren visiting PA s • Nb of operational Interpretation Centers	I A	6 7	Table 5 Table 7
Protected areas are places of recreation	Protected areas are known and visited • Ecotourism considerably contributes to ANGAP's sustainability	• Annual increase of tourists number • Percentage of total costs covered by ecotourism activities	I A	8 9	Table 4 Table 9
Economic development of neighboring communities	• The lives of the population neighboring PA s are improved	• Total amount of entry fees available for micro-projects in the PZ	A/I	10	Table 6

Note : A = Activity; I = Impact;

56 This section was developed with the assistance of Jean-Michel Dufils, TR&D GIS advisor. ANGAP and TR&D held several meetings with the ONE, various donors, concerning what would be the most appropriate indicators to monitor. The indicators chosen are a sub-set of those discussed earlier in this document.

5.0 Problems Experienced and Lessons Learned from M&E Experience in SAVEM ICDPs

5.1 Start Early

It is important to establish an M&E system early in the life of a program and not mid-way through, as was the case with the SAVEM project in EP-1. This monitoring system, and the department charged for its implementation must also be given both the financial and personnel resources needed to implement such a system. While such a system must be created in partnership with various groups specialized in different domains, there comes a point when a decision has to be made about the indicators to be monitored. After this time, only small changes can be made to the existing indicators, if they are not eliminated altogether, and only a few new indicators should be added. Without such discipline, it is impossible to initiate and put into place a system with any hope of results two, three, or more years later. Incidators mean something is being monitored OVER TIME. A base line is created which will be monitored. If this baseline were to change from year to year, monitoring could not be achieved. One implication of this is that, once a M&E system is established, for better or for worse, one must be whole-heartedly implement it. In a program as complex as the ICDPs in Madagascar, and within the SAVEM project in particular, this can mean having the authority to require compliance. ICDPs should be evaluated on the basis of their respecting the engagements made. One of the roles of "coordinating" a program such as this is in fact monitoring that this engagement is respected. And taking action when it it not. One of the problems during EP-1 was that, in spite of its coordinating role of NGO ICPD programs, ANGAP had little recourse to taking action when programs were slow in implementation of the monitoring and protected area information system. This again, is linked to its development during the mid-point of the program.

5.2 Hypothesis Testing

Many SAVEM ICDPs field teams seemed to think that ANGAP, perhaps through its Department of Planning, Evaluation, and Monitoring (DSEP) and M&E program, was trying to 'force' ICDPs into a hypothesis testing mode of operation - rather than letting them develop their own independent mode of operation and monitoring. Yet the SAVEM project and the TR&D and GMU contracts with USAID were very clear about the central role of hypothesis testing and the need to monitor this aspect of the program as well. The cooperative agreements established between PACT and GMU were not documents reviewed by either ANGAP or TR&D directly, and may not have carried language sufficiently clear to operators about the need, and USAID's expectations, for the development of a system wide M&E system, ANGAP's coordination role and what this implied. ANGAP was the national institution responsible to the government of Madagascar for their field operations. ANGAP was the principal client for international NGOs of these ICDP program - providing services to local communities and regional partners. The lack of clarity about relationships between ANGAP and field operators certainly was responsible for a great deal of the tension which the EP-1 SAVEM ICDPs encountered and which persists until this day. It has also led to what seems to be ANGAP's lack of enthusiasm for NGO capacity for field management and partnerships.

5.3 Selection of Indicators for Behavioral Impact Monitoring

The M&E system sought to cooperatively seek, with field ICDP partners, what kind of activities to select for monitoring of impact on local populations as a result of program activities. Field programs during early years, seemed to have difficulty in developing well thought out hypothesis for the activities for which they expected to monitor impact. In many cases, there was uncertainty on what kind of measurable "effects" the activities selected for specific impact monitoring could be expected to have in "reducing pressures". For example, what kind of behavioral impact (whether short *or* long term) could one reasonably expect intensified rice farming (new varieties, water management) to have on "reducing *tavy* slash and burn farming"? How does one realistically measure this? This entire issue is delt with in a document dedicated to this important theme (Swanson, 1996b).

5.4 Time

Another issue is the life expectancy of projects. We all know that behavioral change takes a great deal of time, and that the full impact of many of our ICDP activities may take years, even decades, to realize

- if given the support needed, long enough, to succeed. But this is rarely the case. Activities start and are dropped the next year. Field personnel change frequently, and newcomers start new activities in line with their own interests or experience - and then are changed again. A departing employee rarely passes on what he or she has been doing to the person replacing them. The period between leaving and a new person can be months. Yet all this does not diminish the need to identify and monitor indicators (steps in the process of change) for the kind of positive change we hope to see as a result of program activities. Change can also be negitive, and the potential impact of this needs to be known as soon as possible. This makes it even more important that the linkage between development activities and the conservation of the protected area be as direct and clear as possible. It also underlines the importance of institutional committment to the indicators developed and for which baselines have already been established.

5.5 The BaseLine Data

In spite of the difficulties encountered in the creation of a protected area baseline information system for the future, it is also true that ANGAP and its field NGO partners have in fact accomplished a great deal. This document is the fruit of this committment. Very significant sets of information, organized into many separate data bases found both within ANGAP's DIVB and the individual ICDP program exist and are increasingly being used to improve program management.

Annex 1: Historical Spatial Base Line Maps of Vegetative Cover Change for 8 Parks and Reserves

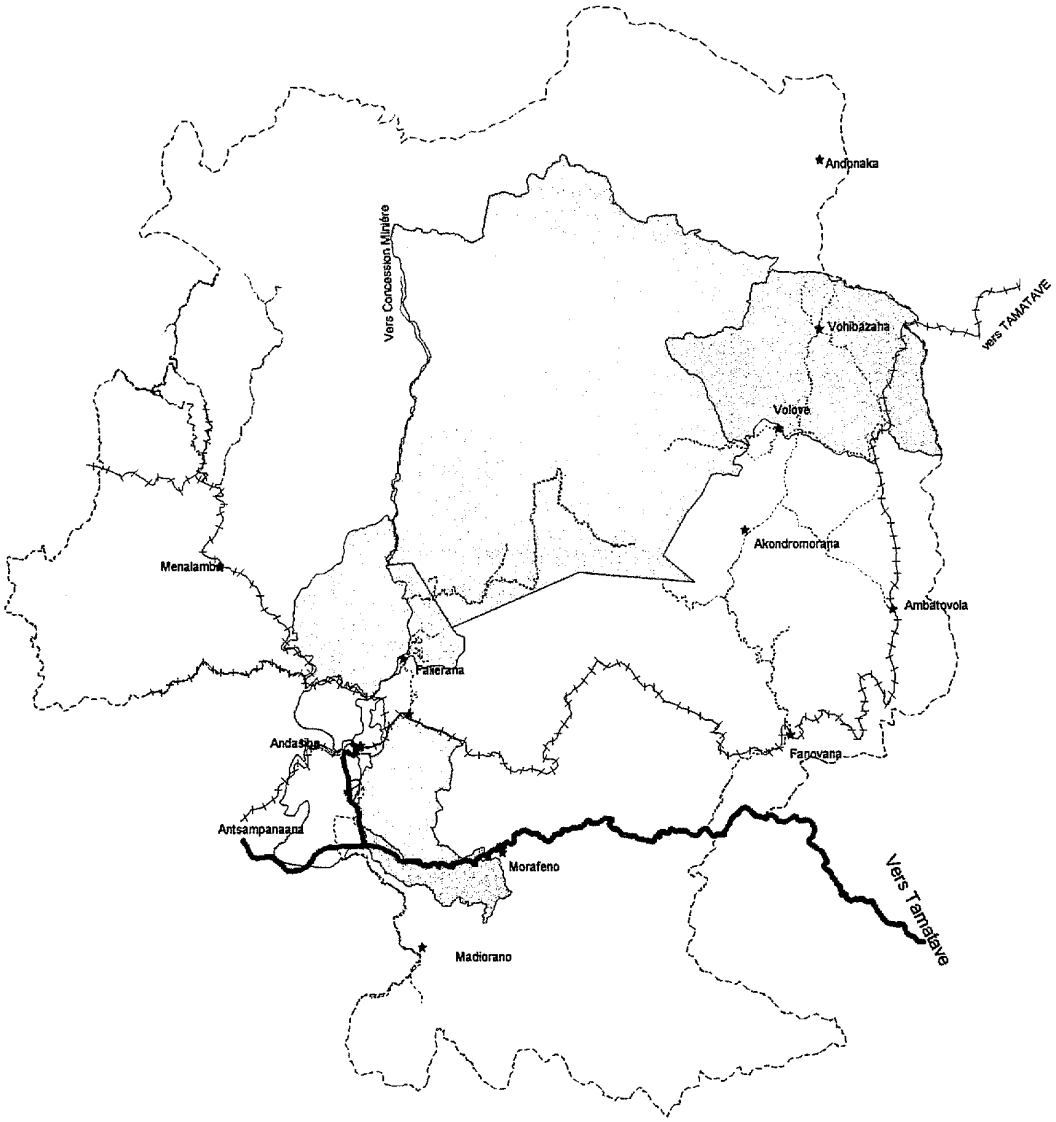
(1) General map showing location of protected area, peripheral zone, and special control zones. Principal roads and towns and rivers are also shown on this map.

(2) Map showing the historical change in vegetation cover for the protected area

(3) Map showing the historical change in vegetation cover for the peripheral zone of protected area.

(4) Maps showing the historical change in vegetation cover for 3-4 target control zones in/around parks.

PARC NATIONAL D' ANDASIBE - MANTADIA
RESERVE SPECIALE ANALAMAZAOTRA
CARTE DE SITUATION

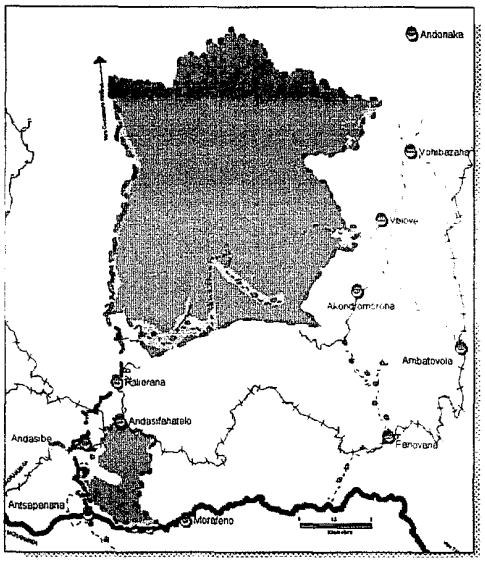


LEGENDE

- Aires Protégées: 9960 + 865 Ha
- ZC Andasibe: 1074 Ha
- ZC Antsampanana: 427.7 Ha
- ZC Falierana: 1512 Ha
- ZC Vohibazaha: 2761 Ha
- ------ Zone Périphérique : 43.115 Ha

PNAM/SIG/
Edité en collaboration avec SIG/DIVB/ANGAP

VEGETATIVE COVER EVOLUTION PROTECTED AREAS



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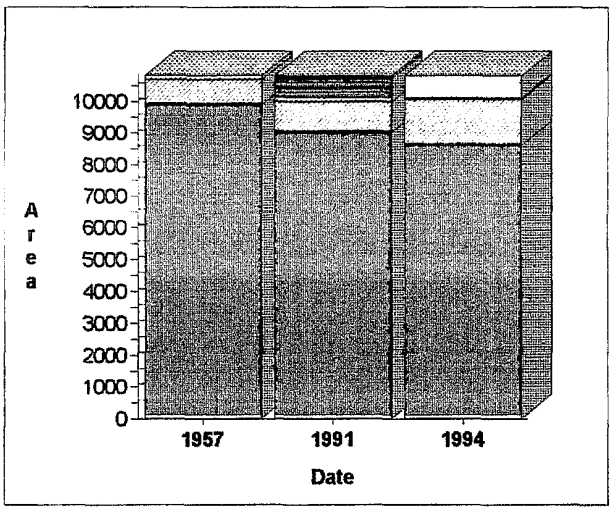
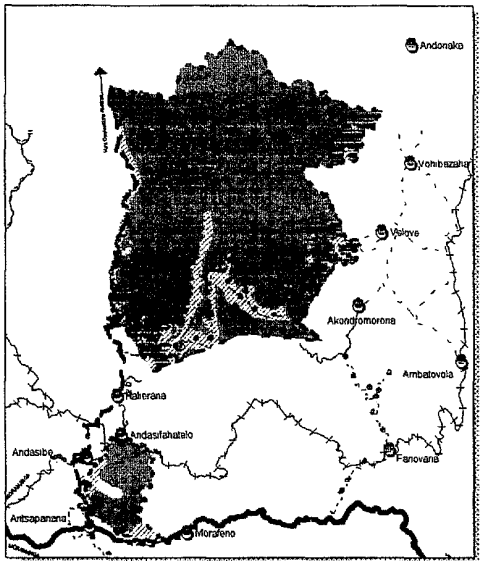
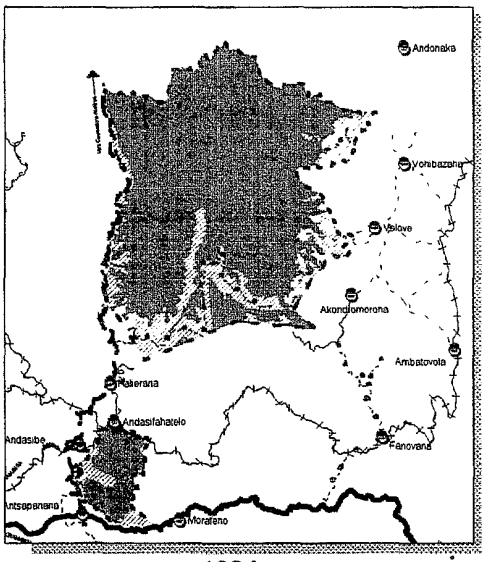




1991

LEGEND

- Primary Forest (PF)
- Secondary Forest (SF)
- Tavy
- All Others (AO)
- Protected Area : (9960+865)Ha
- Village
- Trail
- Roads suitable for vehicules
- Railways
- Logging road
- Path
- Hydrography
- National road



1994

AREA (Hectare)

Date	PF	FS	D	AO
1957	9904	788	0	132
1991	9024	963	748	89
1994	8612	1468	38	706

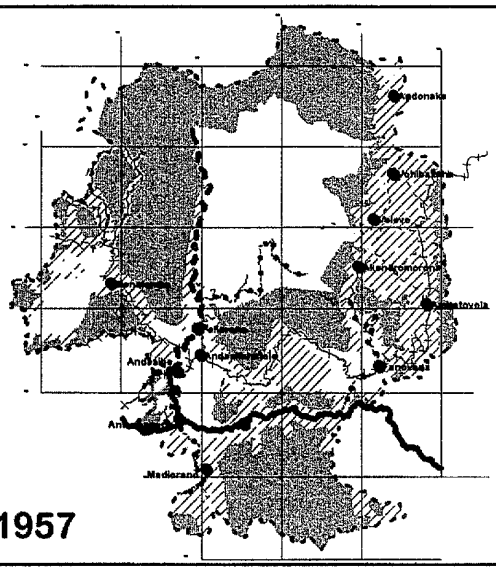
GIS/PNAM ANGAP/DIVB DEF

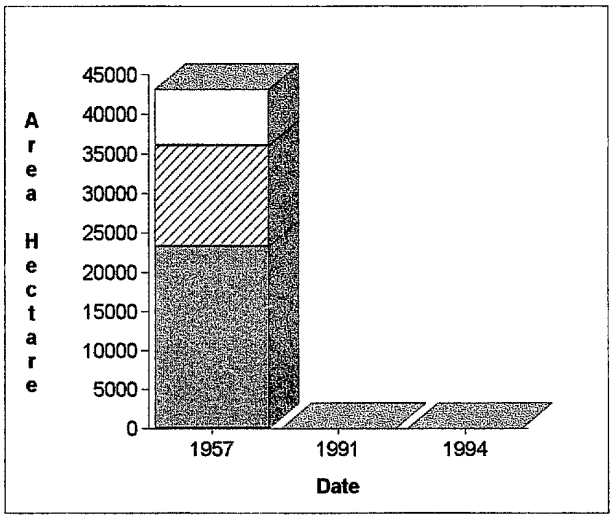
NORD

Scale : 1/300.000

Realisation : July 1996

VEGETATIVE COVER EVOLUTION
PERIPHERAL ZONE





No Window

1991

No Window

1994

LEGEND

- Primary Forest
- Secondary Forest
- All Others
- Peripheral Zone : 43.115 Ha
- Protected Area
- Village
- Trail
- Roads suitable for vehicules
- Railways
- Logging road
- Path
- Hydrography
- National road

AREA (Hectare)

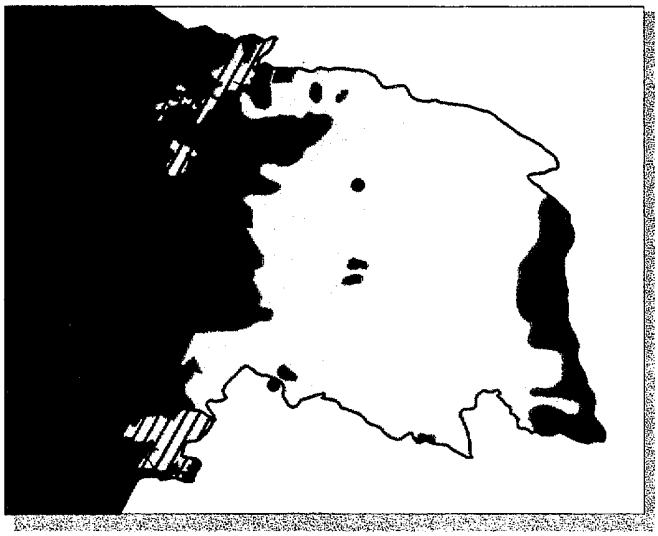
DATE	P.F	S.F	A.O
1957	23292	12720	7103
1991	0	0	0
1994	0	0	0

SIG/PNAM ANGAP/DIVB DEF

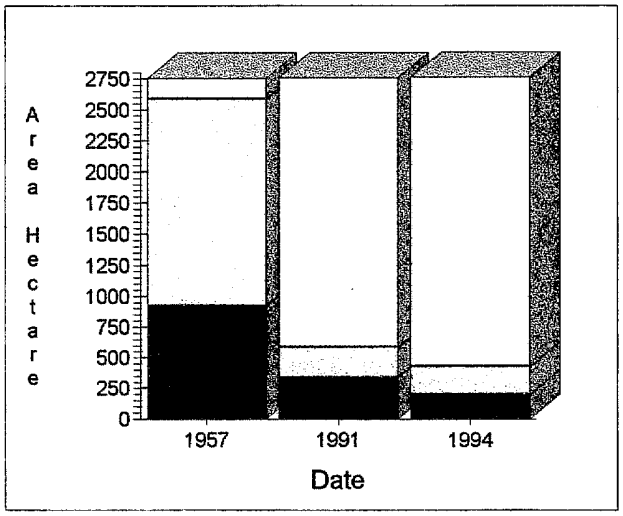
Scale : 1 :450.000

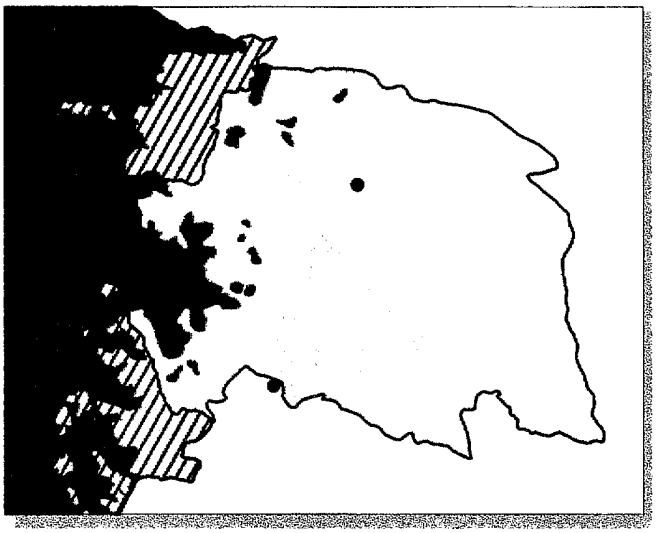
Realisation : August 1996

VEGETATIVE COVER EVOLUTION
TARGET ZONE VOHIBAZAHA



1957

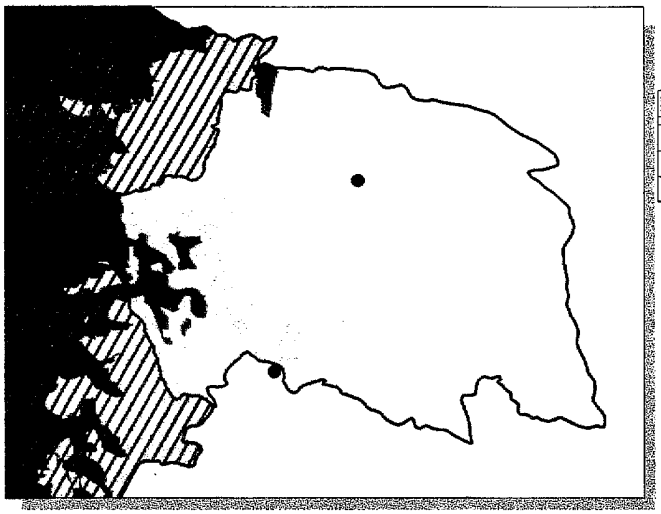




1991

LEGEND

- Primary Forest
- Secondary Forest
- All Others
- Target Zone : 2761 Ha
- Protected Area
- Village
- Trail
- Roads suitable for vehicules
- Railways
- Logging road
- Path
- Hydrography
- National road



1994

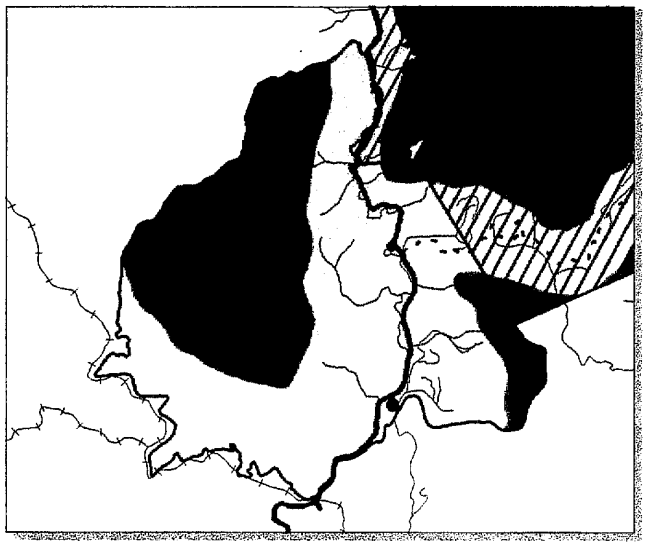
AREA (Hectare)

Date	Forêt peu dégradée	Forêt dégradée	Autres
1957	921.28	1666	171
1991	336.43	249	2176
1994	200	228	2339

SIG/PNAM ANGAP/DIVB DEF

Scale : 1 : 105.000

VEGETATIVE COVER EVOLUTION
TARGET ZONE FALIERANA



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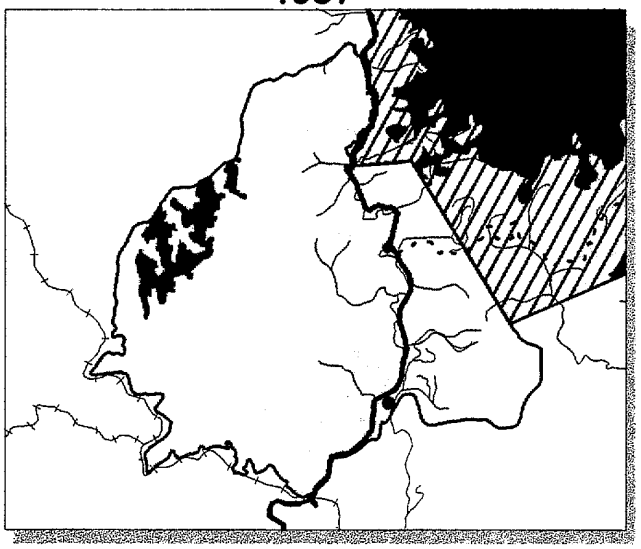
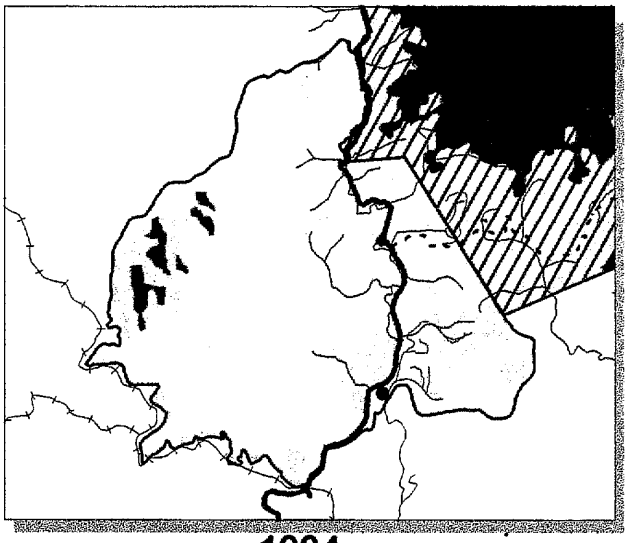


1991



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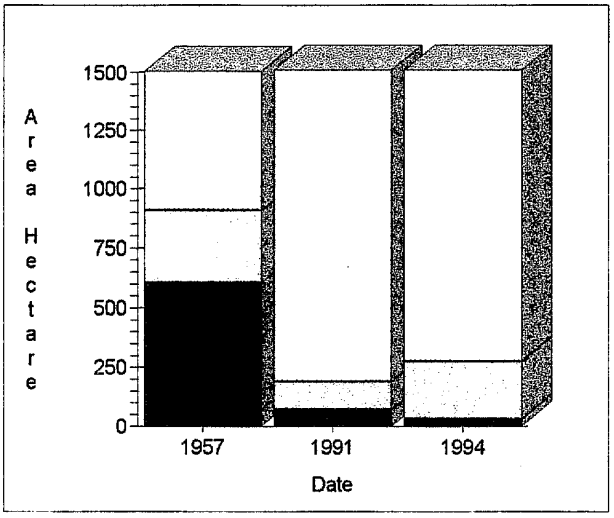


LEGEND

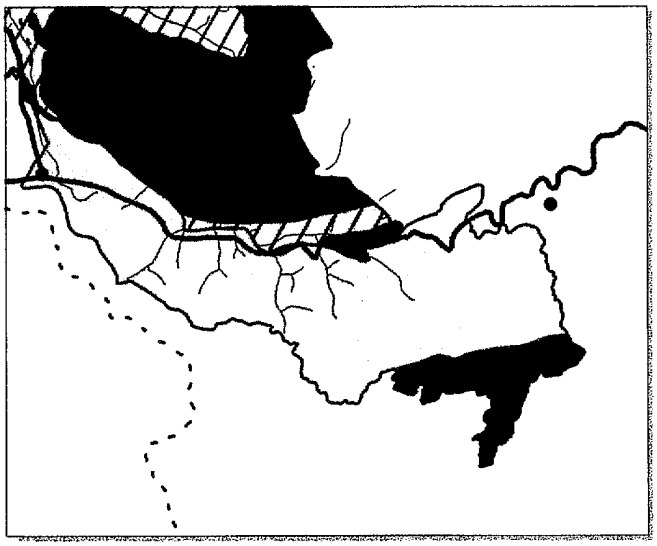
- Primary Forest
- Secondary Forest
- All Others
- Target Zone : 1512 Ha
- Protected Area
- Village
- Trail
- Roads suitable for vehicles
- Railways
- Logging road
- Path
- Hydrography
- National road

AREA (Hectare)

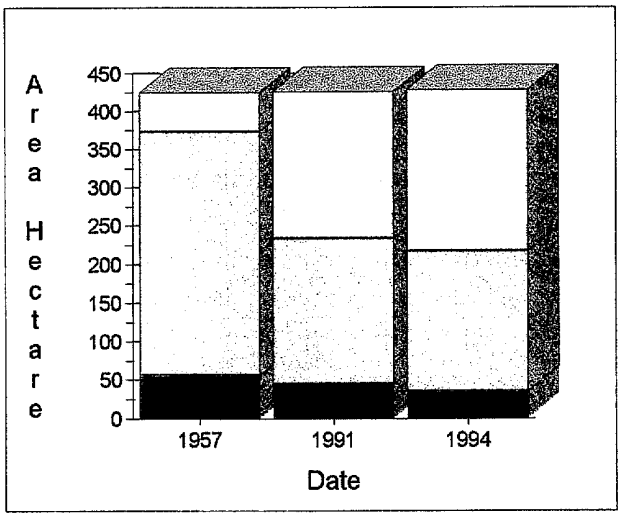
Date	Forêt peu dégradée	Forêt dégradée	Autres
1957	603	304	600
1991	70	118	1324
1994	30	244	1238

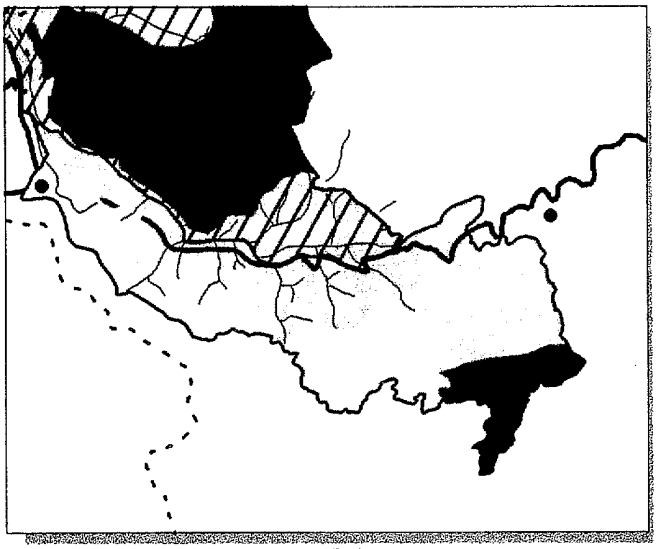
SIG/PNAM ANGAP/DIVB DEF

VEGETATIVE COVER EVOLUTION
TARGET ZONE ANTSAPANANA



1957

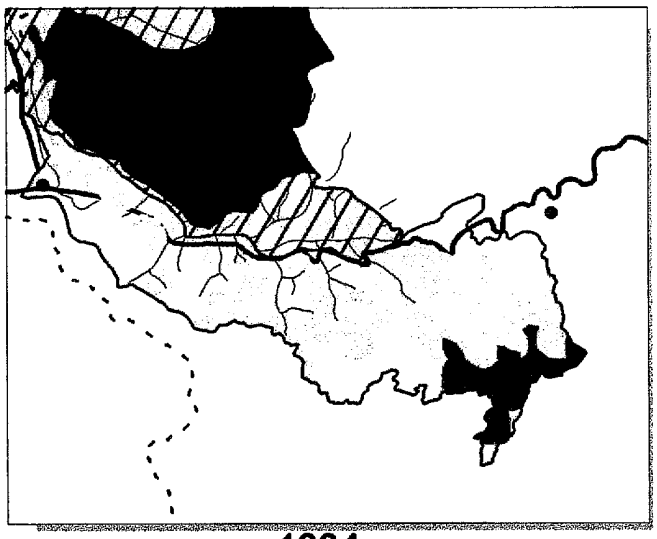




1991

LEGEND

- Primary Forest
- Secondary Forest
- All Others
- Target Zone : 1512 Ha
- Protected Area
- Village
- Trail
- Roads suitable for vehicules
- Railways
- Logging road
- Path
- Hydrography
- National road



1994

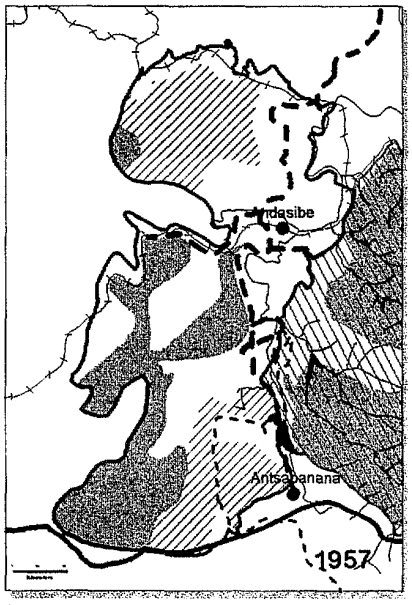
AREA (Hectare)

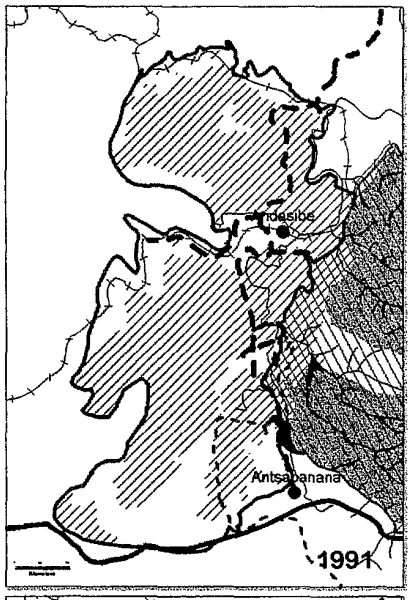
Date	Forêt peu dégradée	Forêt dégradée	Autres
1957	56	317	52
1991	45	188	193
1994	35	182	211

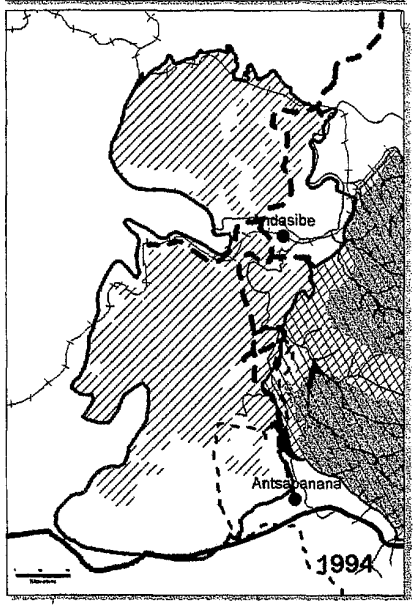
SIG/PNAM ANGAP/DIVB DEF

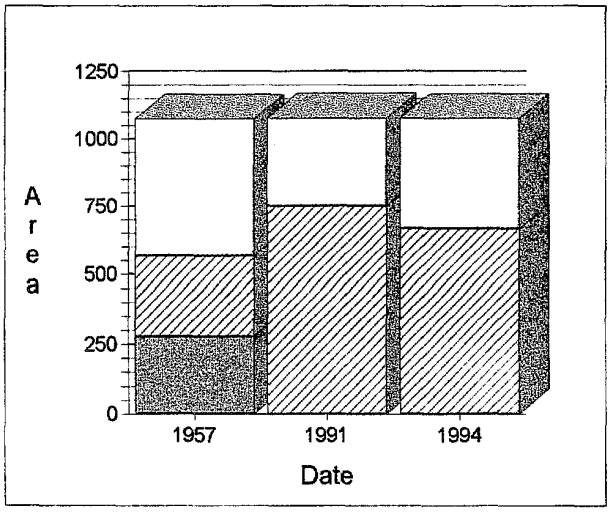
Scale : 1 : 58.000

VEGETATIVE COVER EVOLUTION
TARGET ZONE ANDASIBE









LEGEND

- Primary Forest (PF)
- Secondary Forest (SF)
- All Others (AO)
- Target Zone : 1074 Ha
- Protected Area
- Village
- Trail
- Roads suitable for vehicules
- Railways
- Logging road
- Path
- Hydrography
- National road

AREA (Hectare)

Date	PF	SF	AO
1957	278	289	507
1991	0	751	326
1994	0	667	409

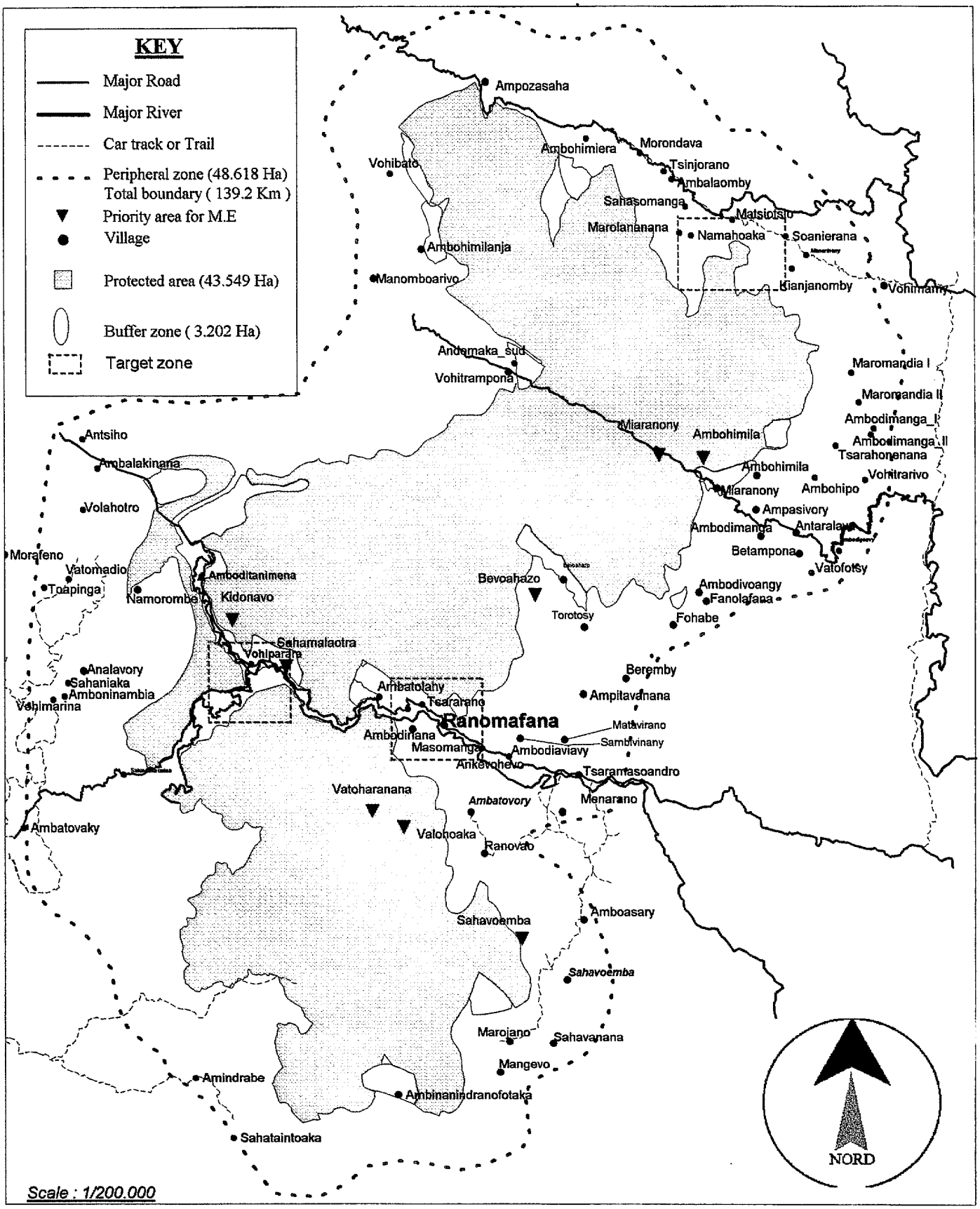
SIG/PNAM ANGAP/DIVB DEF

Scale : 1 : 80.000

Realisation : Juillet 1996

RANOMAFANA NATIONAL PARK

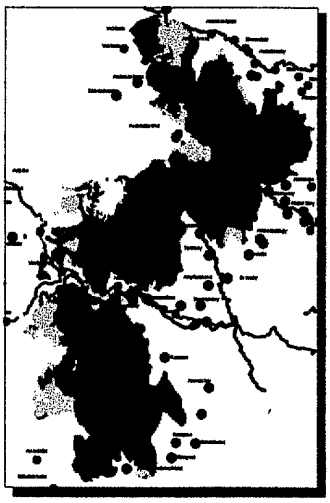
Protected areas, Peripheral zone, Villages, Major roads, Car tracks, M.E priority areas



PARC NATIONAL DE RANOMAFANA

EVOLUTION DE LA COUVERTURE VEGETALE

A l'INTERIEUR DE L'AIRE PROTEGEE



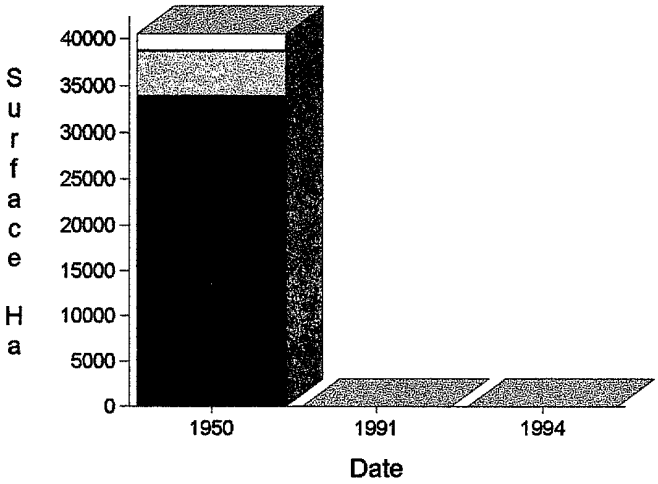
1950

No Window

1991

No Window

1994



Date	F_prim	F_sec	Autres
1950	33830	4796	1937
1991	0	0	0
1994	0	0	0

LEGENDE

- Forêt primaire
- Forêt secondaire
- Autres
- Aire protégée
- Village
- Piste
- Route nationale
- Grande rivière

PARC NATIONAL RANOMAFANA

S.I.G / RNPP

SIG - ANGAP/DIVB

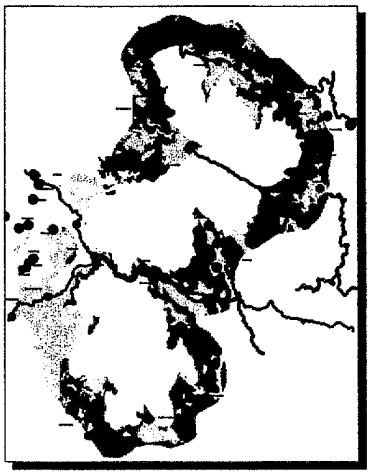
NORD

Echelle :1-635.000

PARC NATIONAL DE RANOMAFANA

EVOLUTION DE LA COUVERTURE VEGETALE

DANS LA ZONE PERIPHERIQUE



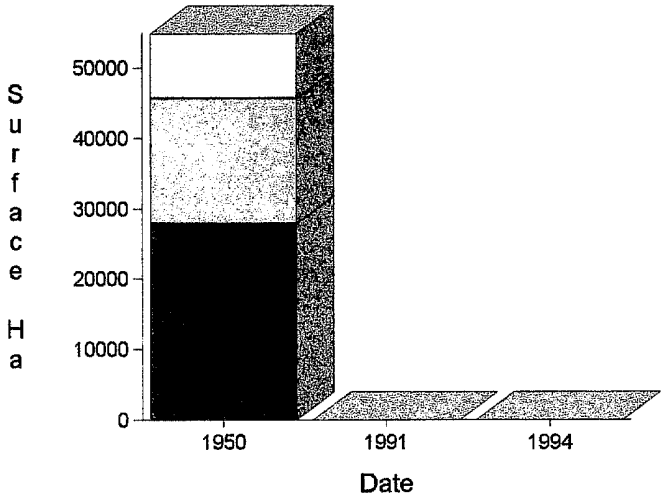
1950

No Window

1991

No Window

1994



Date	F_prim	F_sec	Autres
1950	27842	17806	9166
1991	0	0	0
1994	0	0	0

LEGENDE

- Forêt primaire
- Forêt secondaire
- Autres
- Aire protégée
- Village
- Piste
- Route nationale
- Grande rivière

PARC NATIONAL RANOMAFANA

S.I.G / RNPP

SIG - ANGAP/DIVB

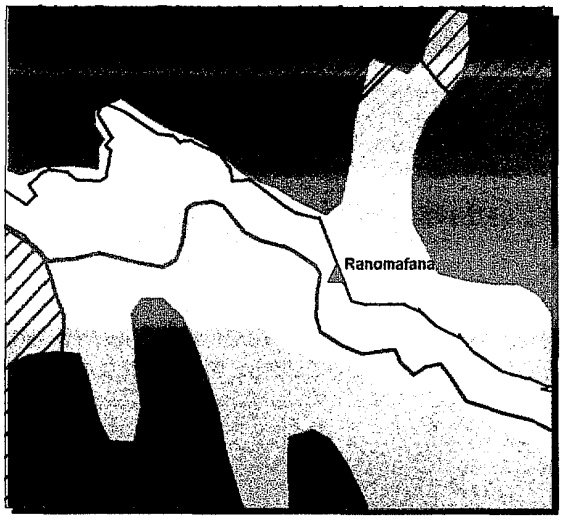
NORD

Echelle :1-772.000

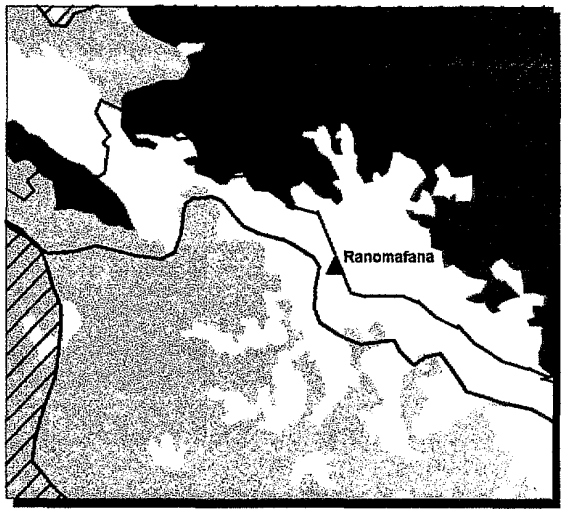
PARC NATIONAL DE RANOMAFANA

EVOLUTION DE LA COUVERTURE VEGETALE

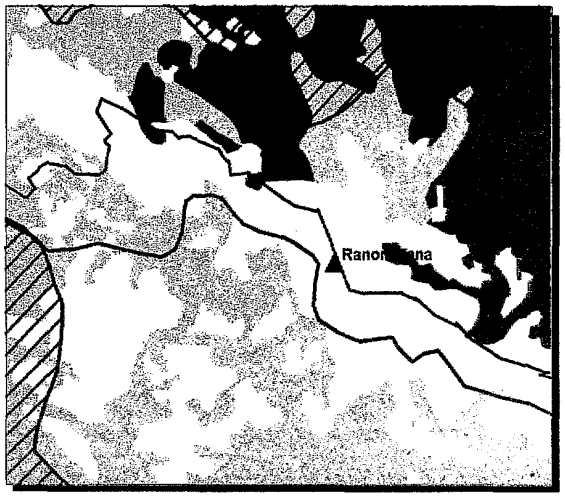
ZONE DE CONTROLE 2 - RANOMAFANA



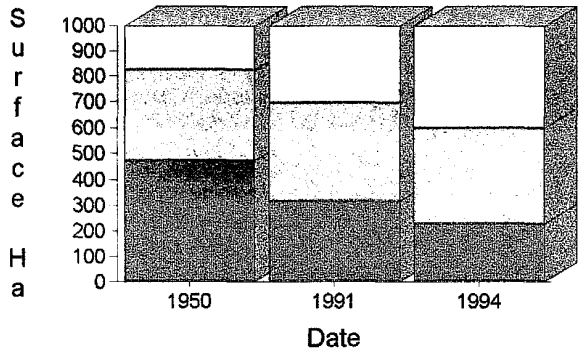
1950

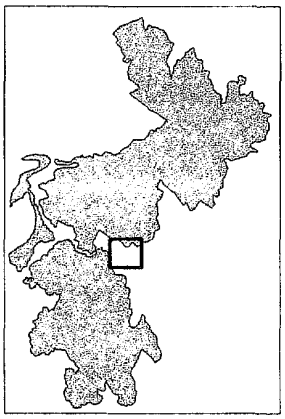


1991



1994





Localisation géographique de la zone de controle 2

LEGENDE

- Forêt primaire
- Forêt secondaire
- Autres
- Aire protégée
- Village
- Piste
- Route nationale
- Grande rivière

Date	F_prim	F_sec	Autres
1950	470	351	178
1991	315	378	305
1994	228	369	401

PARC NATIONAL RANOMAFANA

S.I.G / RNPP

SIG - ANGAP/DIVB

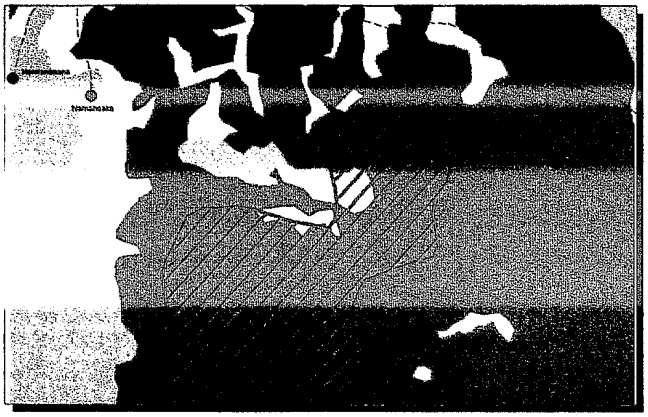
NORD

Echelle : 1 - 45.000

PARC NATIONAL DE RANOMAFANA

EVOLUTION DE LA COUVERTURE VEGETALE

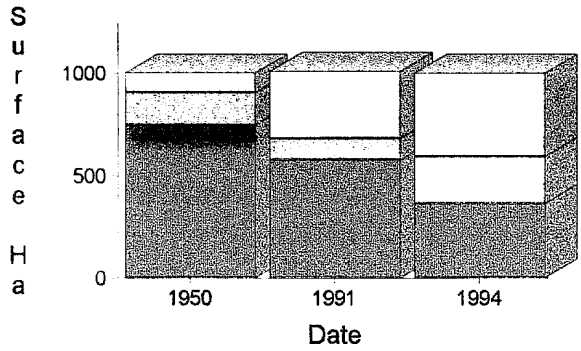
ZONE DE CONTROLE 1 - MANARINONY

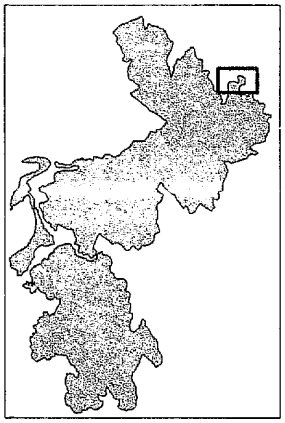


1950

1991

1994





Localisation géographique de la zone de controle 1

LEGENDE

- Forêt primaire
- Forêt secondaire
- Autres
- Aire protégée
- Village
- Piste
- Route nationale
- Grande rivière

Date	F_prim	F_sec	Autres
1950	743	159	99
1991	577	103	329
1994	364	229	407

PARC NATIONAL RANOMAFANA

S.I.G / RNPP

SIG - ANGAP/DIVB

NORD

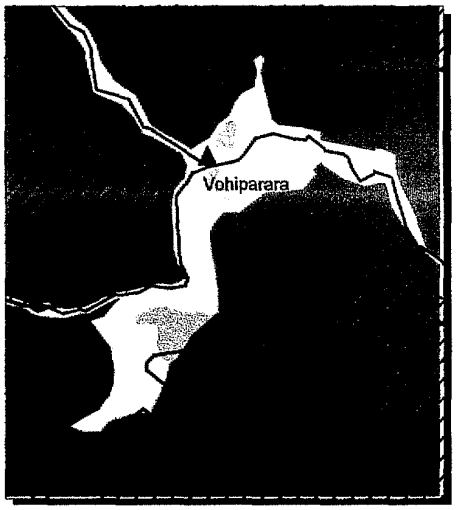
Echelle : 1- 46.000

58

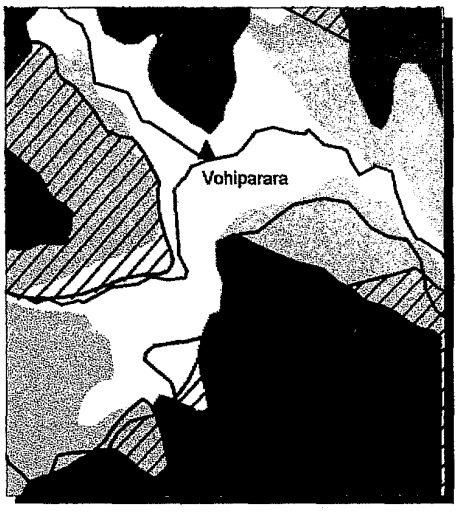
PARC NATIONAL DE RANOMAFANA

EVOLUTION DE LA COUVERTURE VEGETALE

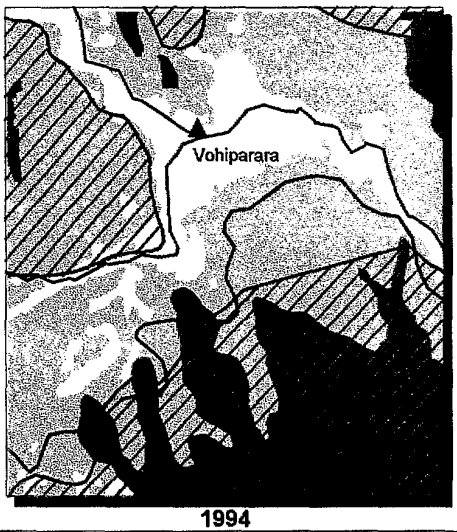
ZONE DE CONTROLE 3 - VOHIPARARA



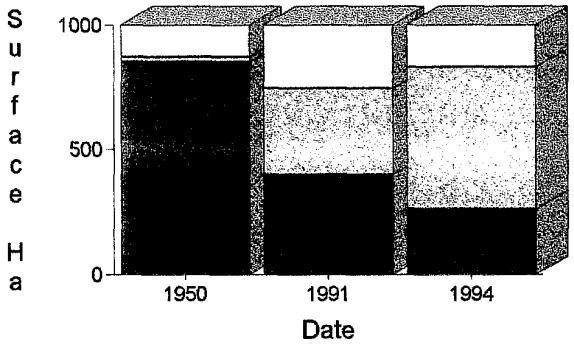
1950

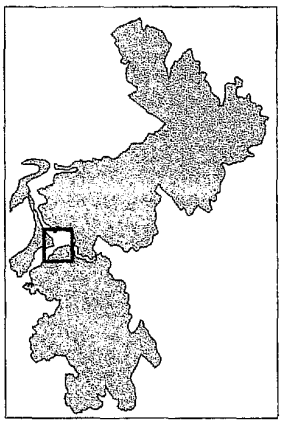


1991



1994





Localisation géographique de la zone de controle 3

LEGENDE

- Forêt primaire
- Forêt secondaire
- Autres
- Aire protégée
- Village
- Piste
- Route nationale
- Grande rivière

Date	F_prim	F_sec	Autres
1950	849	20	131
1991	399	343	258
1994	263	564	173

PARC NATIONAL RANOMAFANA

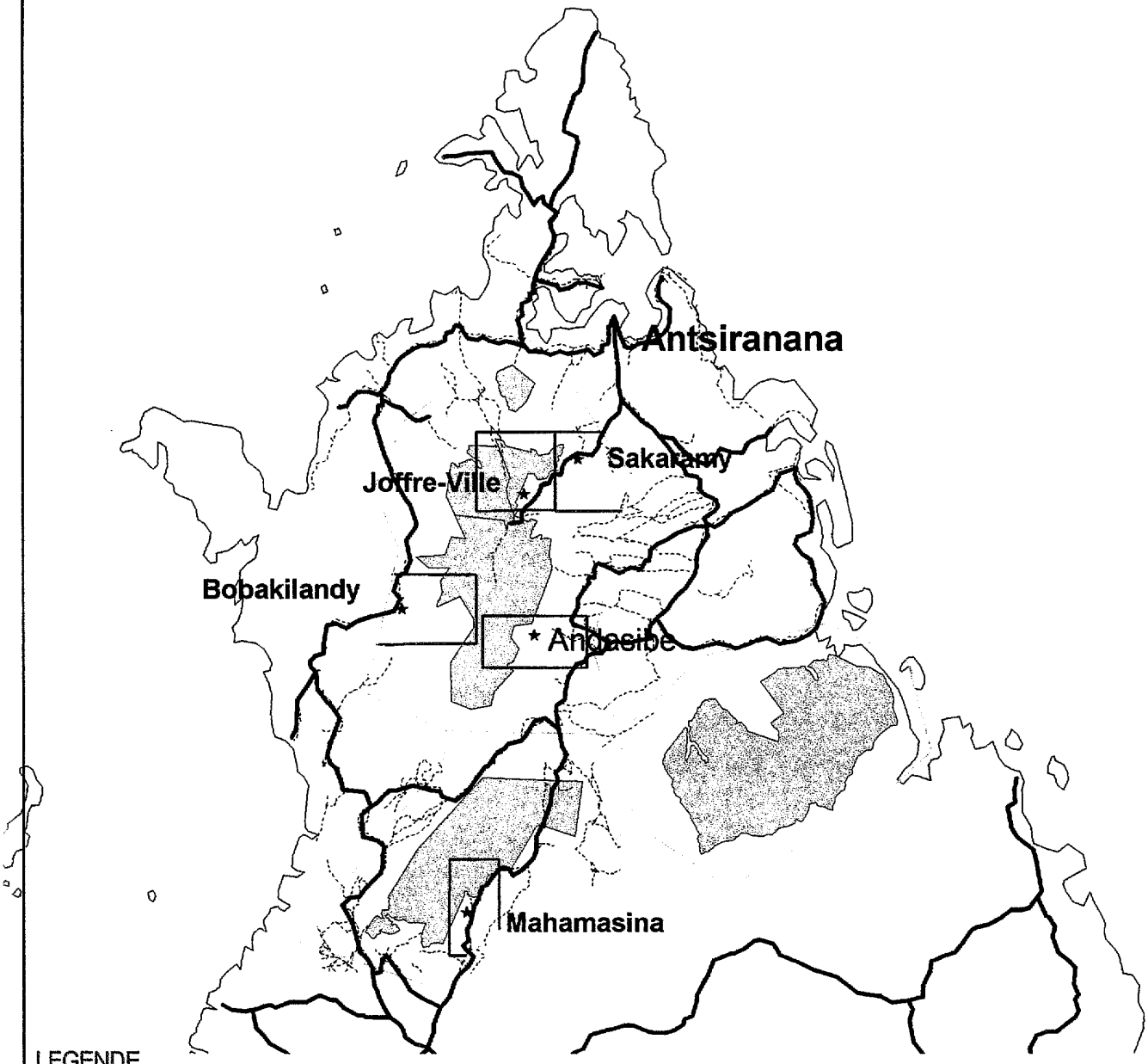
S.I.G / RNPP

SIG - ANGAP/DIVB

NORD

Echelle :1-50.000

PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
COMPLEXE MONTAGNE D'AMBRE
CARTE DE SITUATION

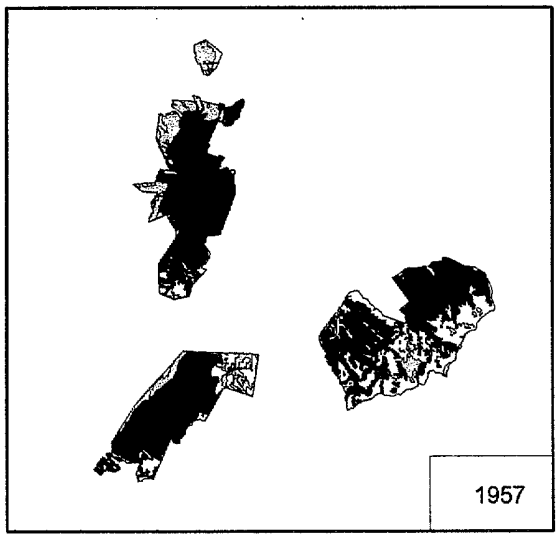


LEGENDE

- Limite du côte
- Limite de la Zone périphérique
- Limite des zones cibles
- Routes et Pistes
- Route nationale
- Aires Protégées

Document réalisé SIG\DIVB\ANGAP

PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Complexe Montagne d' Ambre

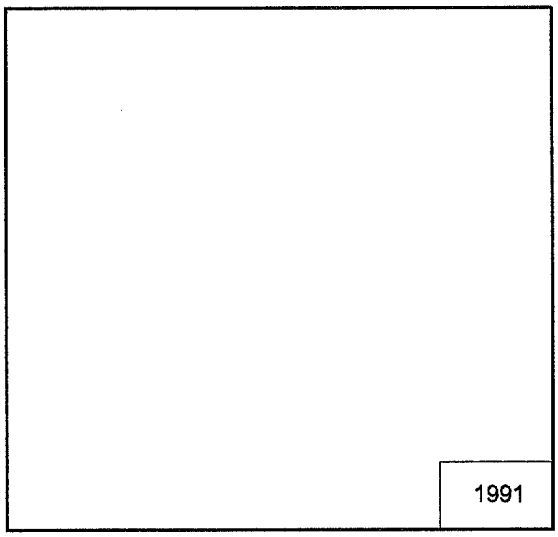


Source : Carte Forestière DEF

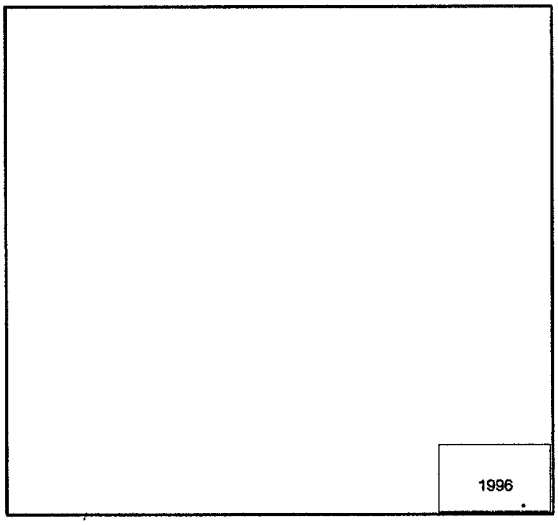
Forêt peu dégradée (65424,6 Ha)

Forêt dégradée (9714,58 Ha)

Autres (26230, 8 Ha)



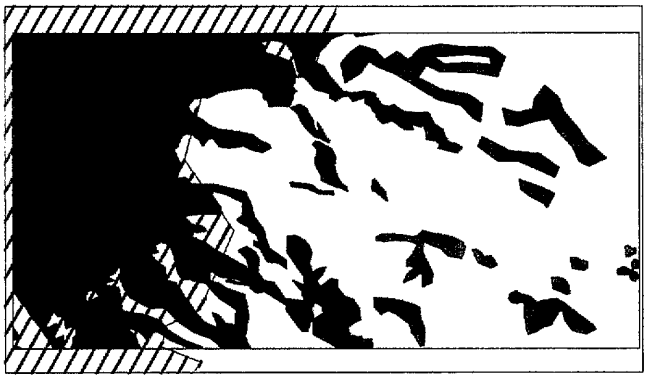
Source : Photo - interprétation 1992



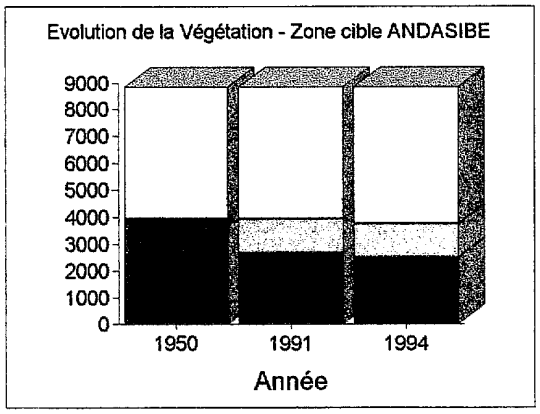
Source: Images Vidéographiques

Document réalisé SIG \ DIVB \ ANGAP

PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible ANDASIBE



1950



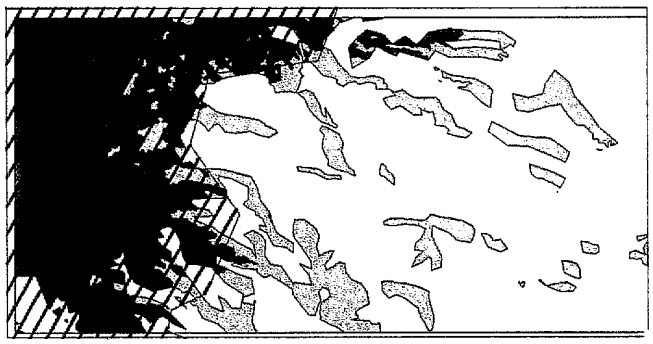
1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP



1994

SUPERFICIE EN Ha

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	3927	0	4916
1991	2672	1255	4916
1994	2493	1246	5104

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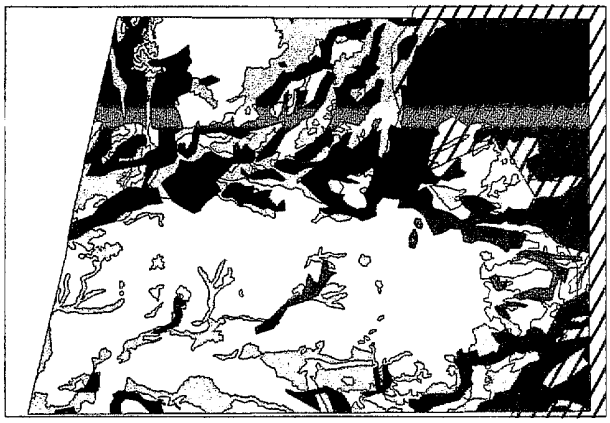
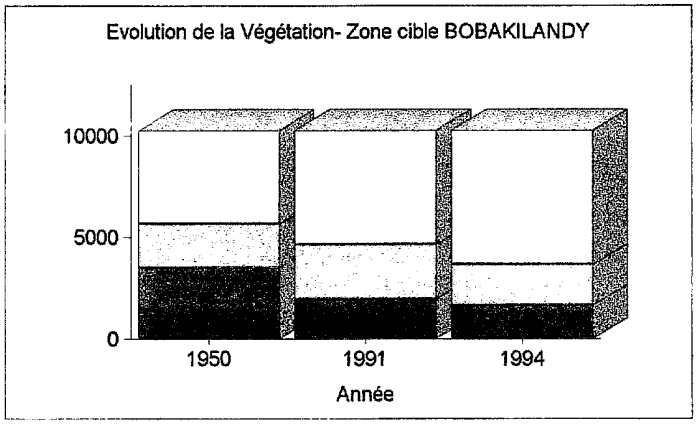
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible BOBAKILANDY



1950



1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP

1994

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	3494	2155	4577
1991	1960	2674	5592
1994	1659	2005	6563

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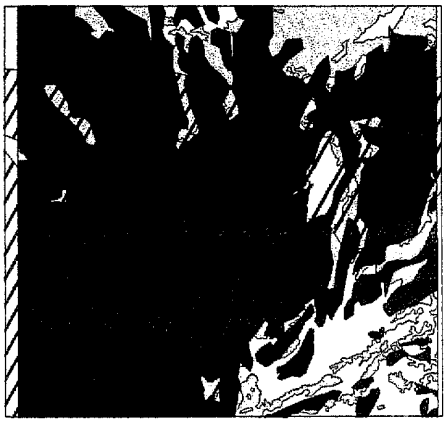
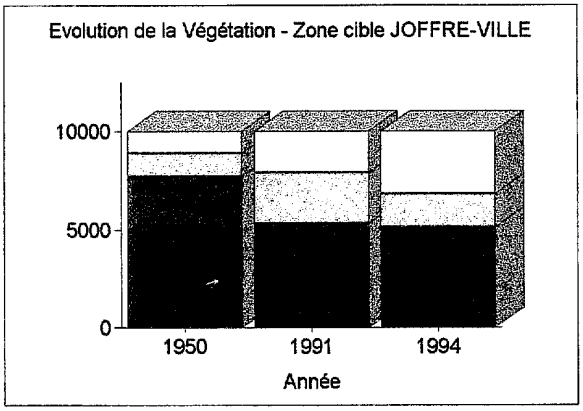
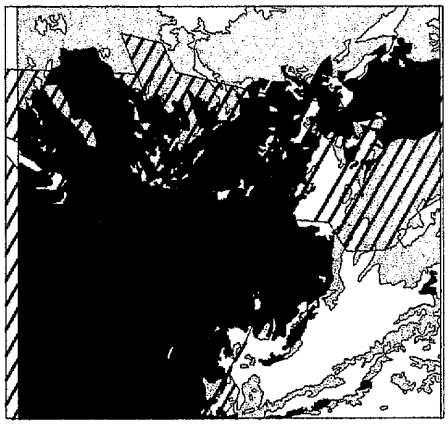
Edité en collaboration avec SIG/DIVB/ANGAP

PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible JOFFRE - Ville



1950





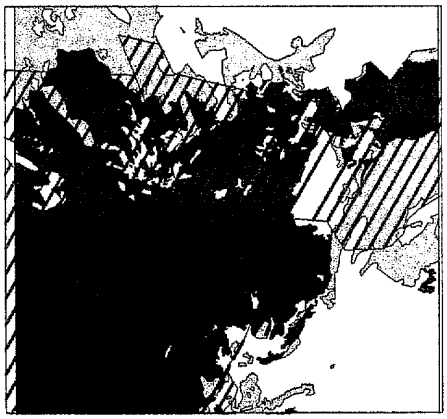
1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP



1994

SUPERFICIE EN Ha

Date	Forêt peu dégrad	Forêt dégradée	Autres
1950	7694	1210	1096
1991	5320	2585	2096
1994	5118	1704	3179

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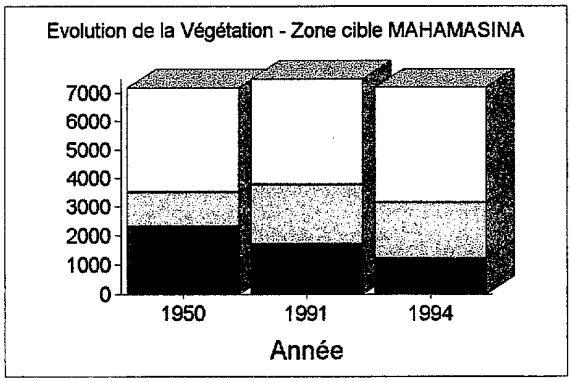
Edité en collaboration avec DIVB/ANGAP

PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible MAHAMASINA

1950



1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP

1994

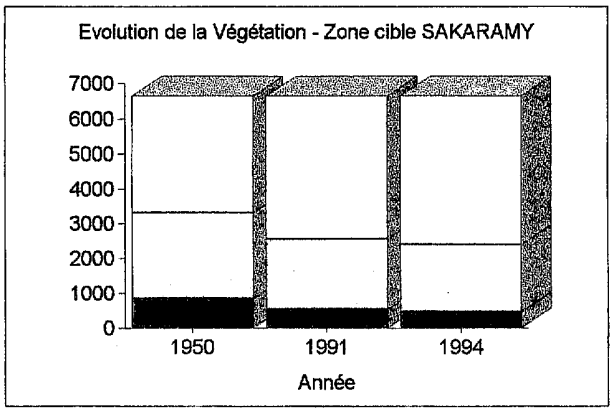
SUPERFICIE EN Ha

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	2316	1183	3688
1991	1697	2072	3719
1994	1198	1930	4061

PCDI- MONTAGNE D' AMBRE
Edité en collaboration avec SIG / DIVB / ANGAP

PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible SAKARAMY

1950



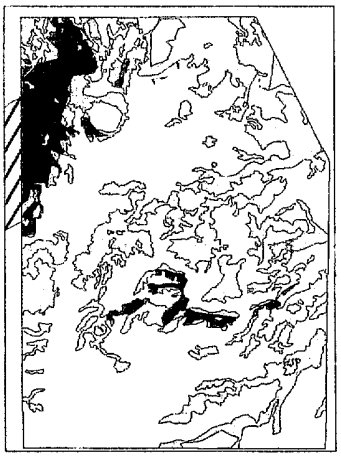
1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP



1994

SUPERFICIE EN Ha

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	832	2477	3341
1991	537	2020	4093
1994	460	1946	4242

PCDI - MONTAGNE D' AMBRE
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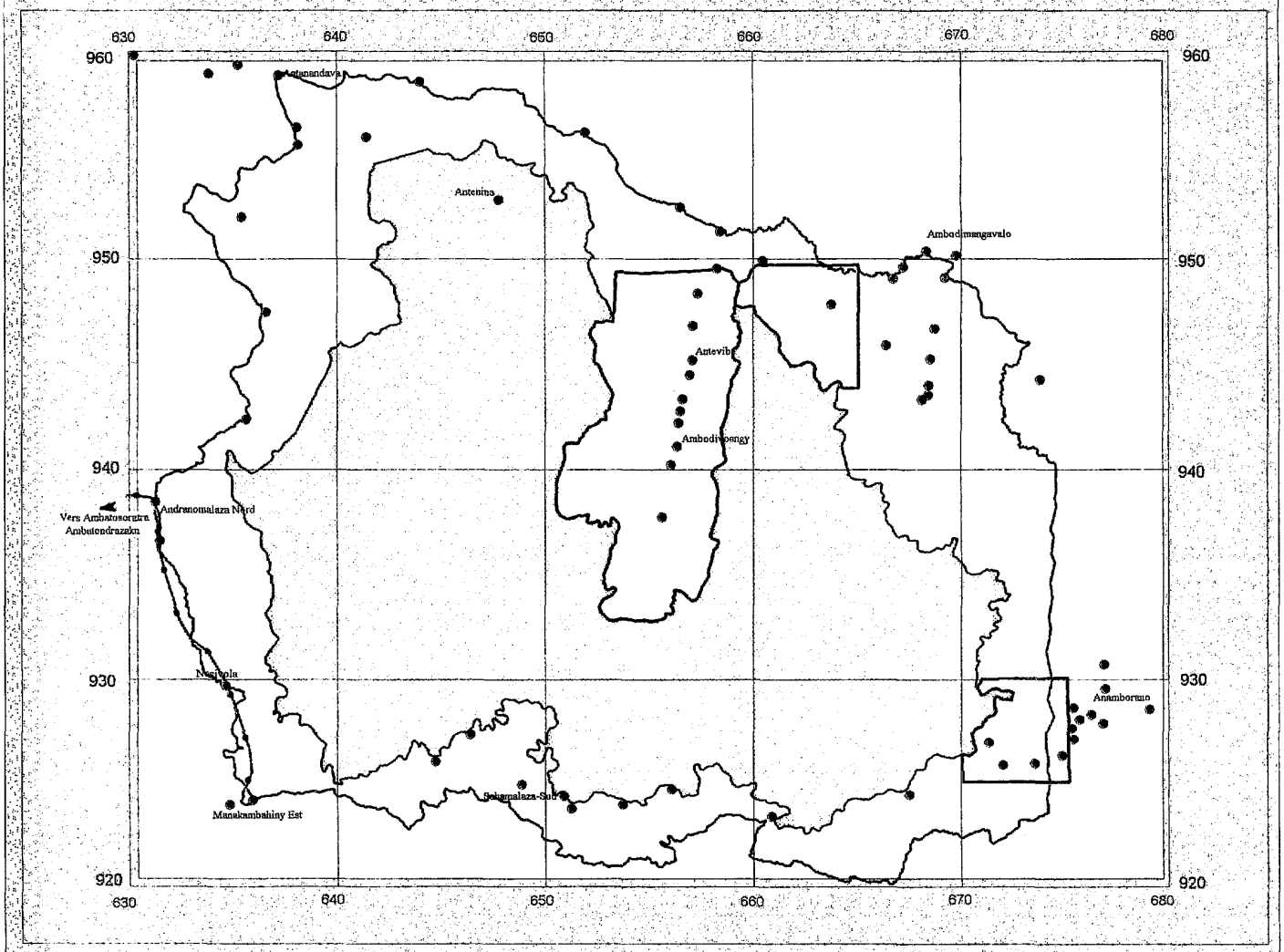
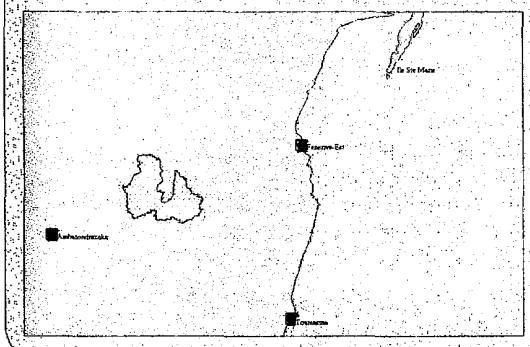
ZAHAMENA - RNI N°III : LOCALISATION

Echelle : 1/320000 è



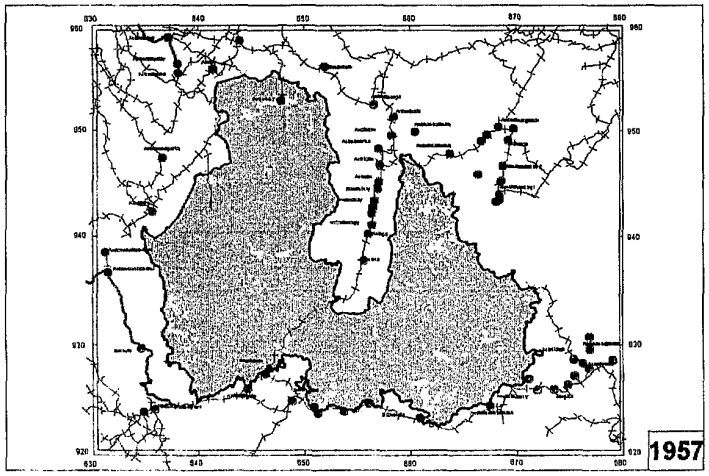


LEGENDE

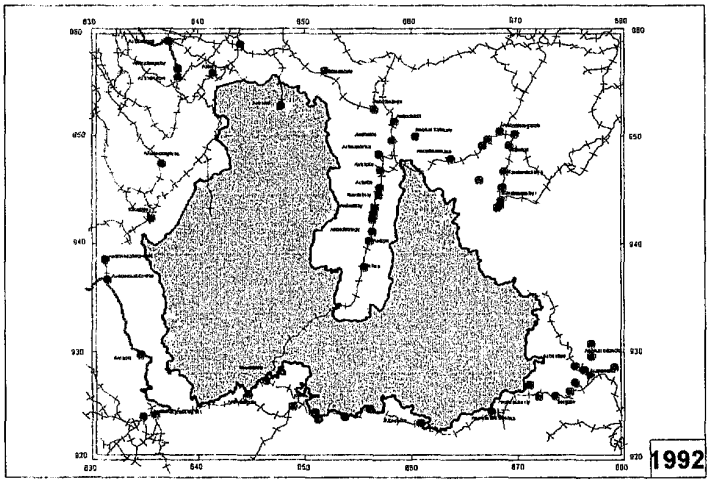
- Aire protégée
- Zone périphérique
- Zone de contrôle
- Route carrossable
- Village

Document préparé par
SIG/PCDI Zahamena - Conservation International
Edité en collaboration avec ANGAP DIVB
Septembre 1996
Système de projection : Laborde (Madagascar)

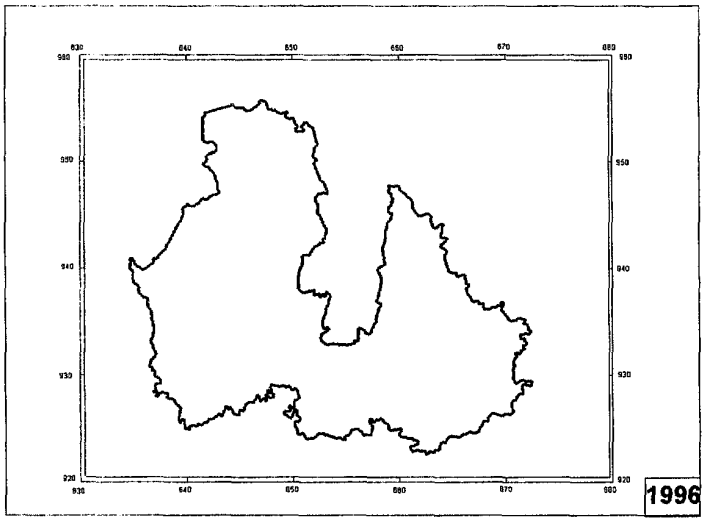
CARTE D'EVOLUTION DE LA VEGETATION
AIRE PROTEGEE - RNI N°III ZAHAMENA



Source : Carte FTM - 1957

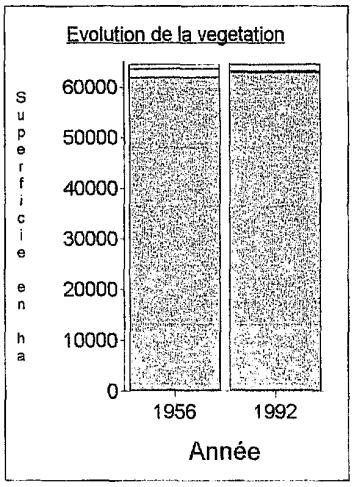


Source : Interprétation des photo-aériennes IGN/FTM 1992

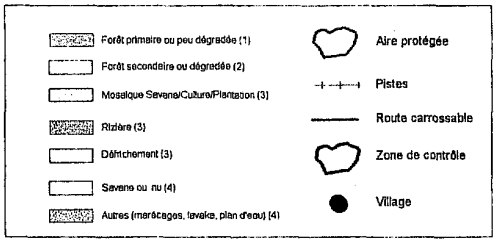


Source probable : Images vidéographiques Octobre 1996

Superficie totale : 64.378 ha



Légende



Echelle : 1 : 675000

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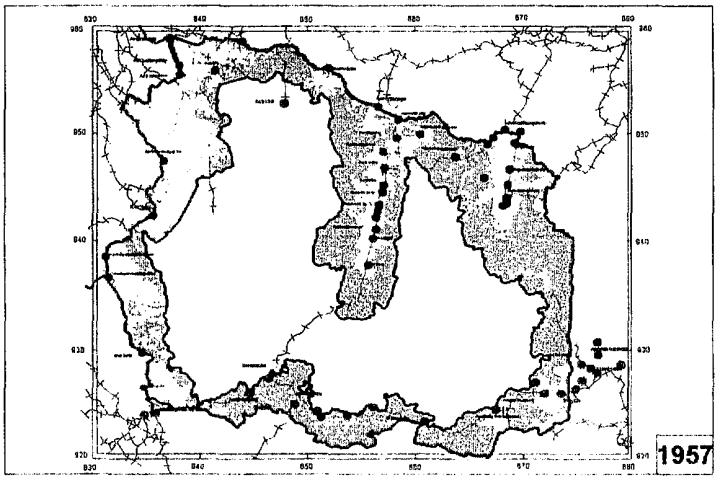
Septembre 1996
Système de projection : Laborde (Madagascar)

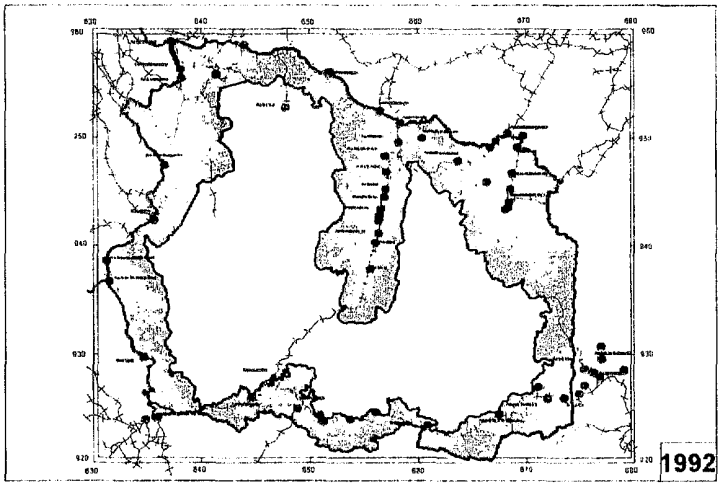
Année	Forêt_Primaire	Forêt_Secondaire	Culture_Plantation	Savane_Autres
1956	61807.31	1700.39	0.00	870.00
1992	62731.14	200.06	1370.99	76.00

Superficie en ha

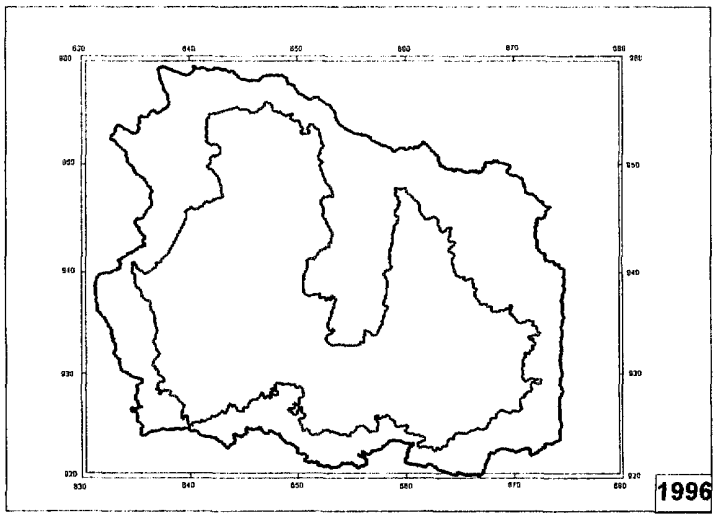
CARTE D'EVOLUTION DE LA VEGETATION
ZONE PERIPHERIQUE - RNI N°III ZAHAMENA



Source : Carte FTM - 1957

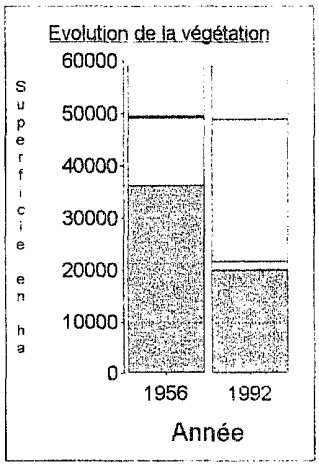


Source : Interprétation des photo-aériennes IGN/FTM 1992

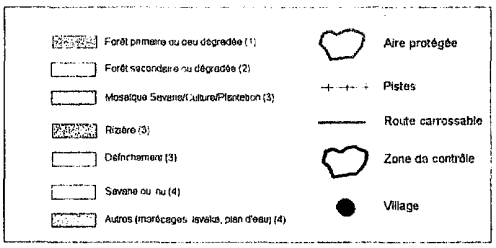


Source probable : Images vidéographiques Octobre 1996

Superficie totale : 59.076 ha



Légende



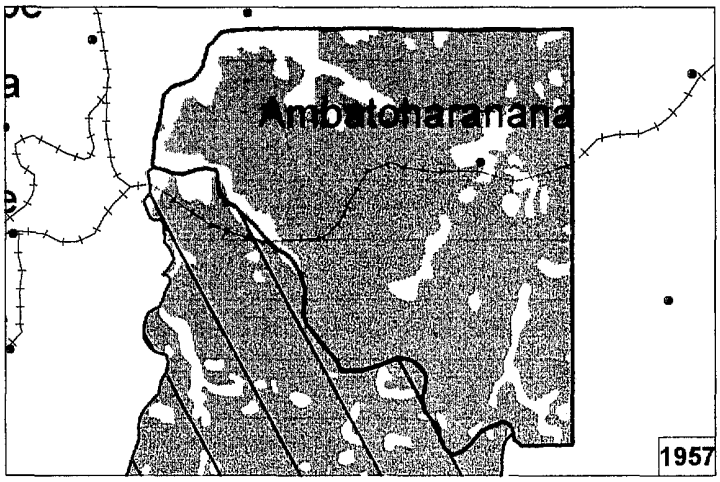
Echelle : 1 : 675000

Document préparé par
SIG/PCDI Zahamena - Conservation International
Edité en collaboration avec ANGAP DIVB
Septembre 1996
Système de projection : Laborde (Madagascar)

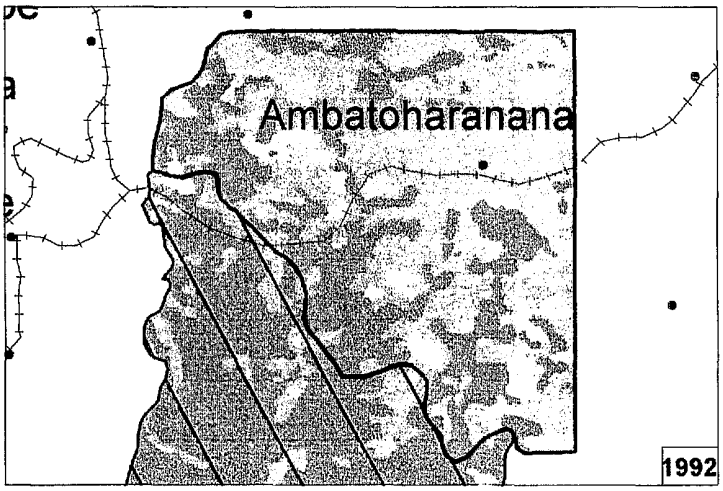
Année	Forêt_Primaire	Forêt_Secondaire	Culture_Tavy	Savane_Autres
1956	36133.55	12892.68	355.00	9695.34
1992	19831.06	1693.52	27254.00	10297.25

Superficie en ha

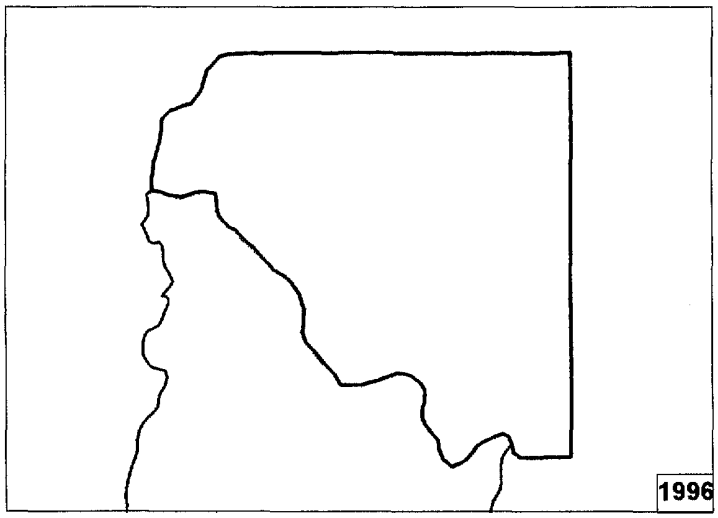
CARTE D'EVOLUTION DE LA VEGETATION
ZONE CIBLE 1 "MOANGO" - RNI N°III ZAHAMENA (2469 ha)



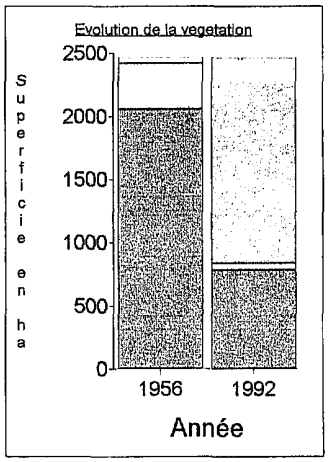
Source : Carte FTM - 1957



Source : Interprétation des photo-aériennes IGN/FTM 1992



Source probable : Images vidéographiques Octobre 1996



Légende

- Forêt primaire ou peu dégradée (1)
- Forêt secondaire ou dégradée (2)
- Mosaïque Savane/Culture/Plantation (3)
- Rizière (3)
- Défrichement (3)
- Savane ou nu (4)
- Autres (marécages, lavaka, plan d'eau) (4)
- Aire protégée
- Pistes
- Route carrossable
- Zone de contrôle
- Village

Echelle : 1 : 100000

CONSERVATION INTERNATIONAL

N

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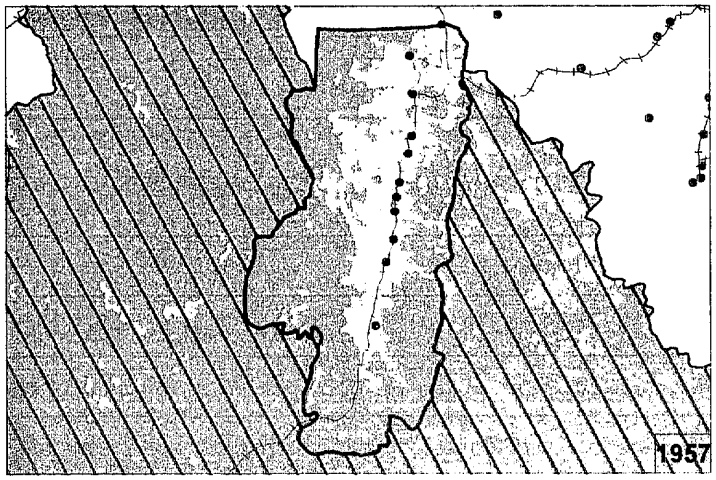
Septembre 1996
Système de projection : Laborde (Madagascar)

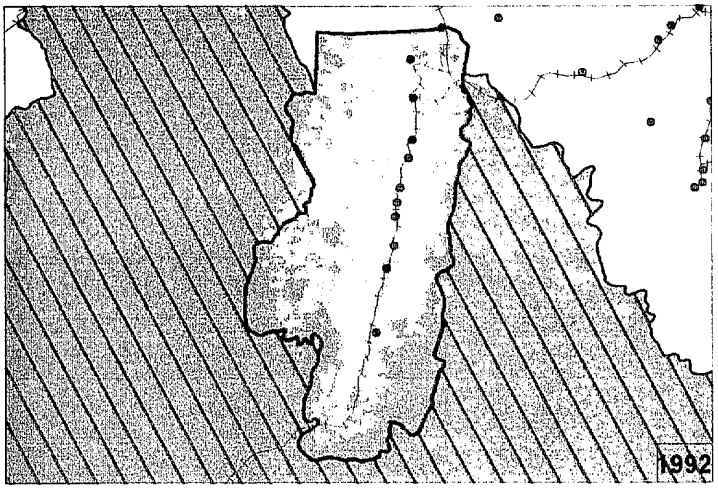
Année	Forêt_Primaire	Forêt_Secondaire	Culture_Tavy	Savane_Autres
1956	2054.61	360.93	0.00	53.63
1992	778.86	55.98	1634.33	0.00

Superficie en ha

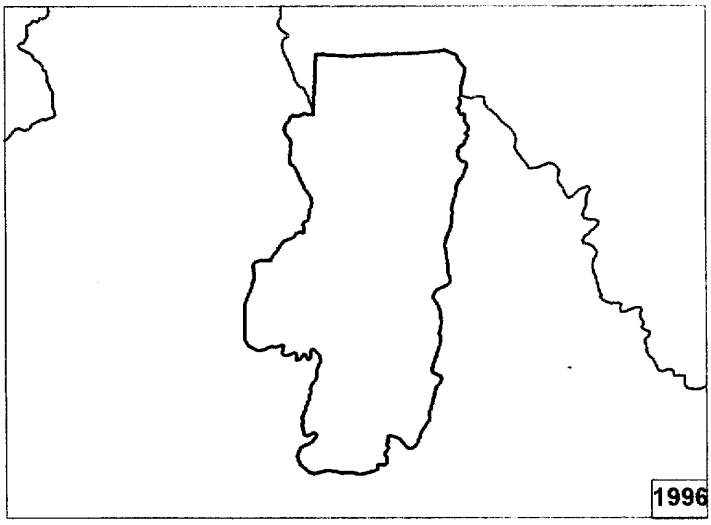
CARTE D'EVOLUTION DE LA VEGETATION
ZONE CIBLE 2 "ENCLAVE" - RNI N°III ZAHAMENA (9.936 ha)



Source : Carte FTM - 1957



Source : Interprétation des photo-aériennes IGN/FTM 1992



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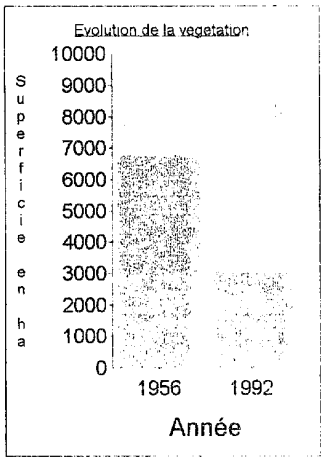
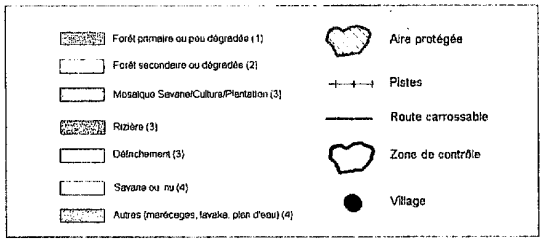


Légende



Echelle : 1 : 285000

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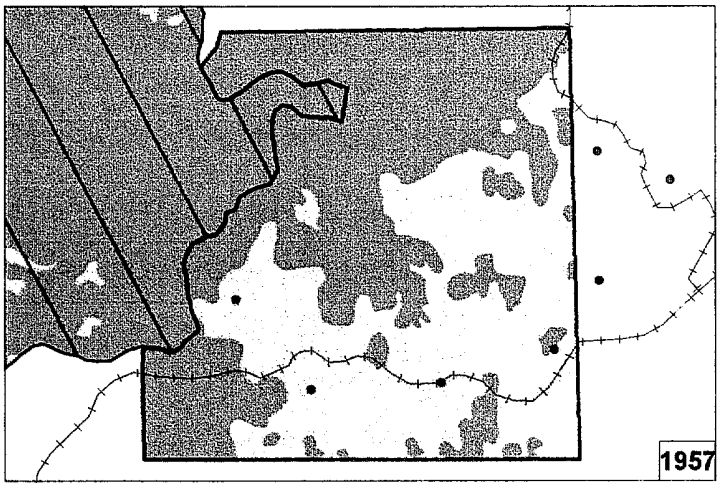
Edité en collaboration avec ANGAP DIVB
Septembre 1996
Système de projection : Laborde (Madagascar)

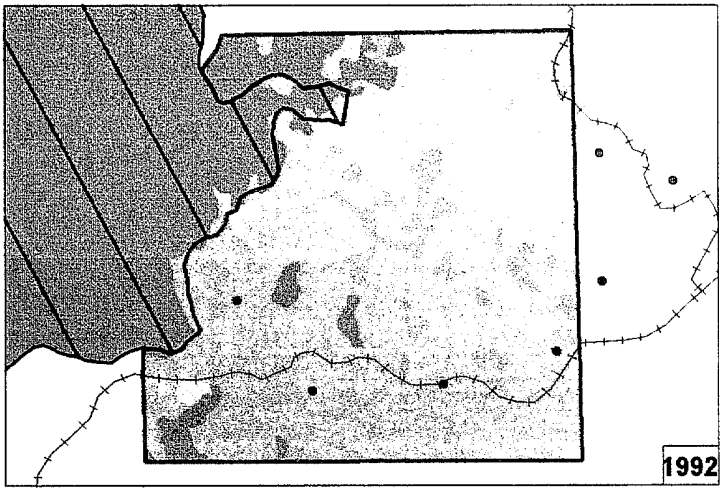
Année	Forêt_Primaire	Forêt_Secondaire	Culture_Tavy	Savane_Autres
1956	6759.60	3060.83	28.42	87.77
1992	3037.06	150.87	6748.70	0.00

Superficie en ha

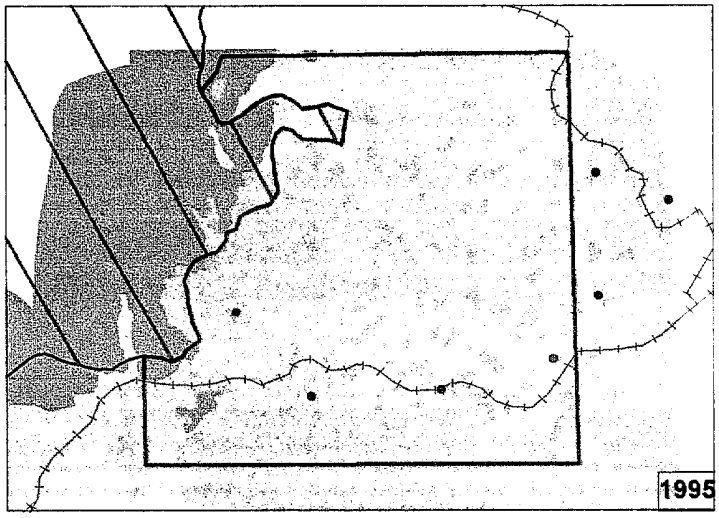
CARTE D'EVOLUTION DE LA VEGETATION
ZONE CIBLE 3 "NAMARAFANA" - RNI N°III ZAHAMENA (2.164 ha)



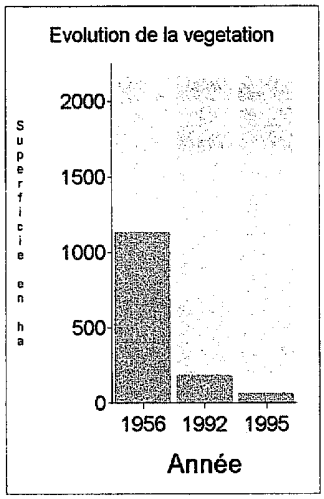
Source : Carte FTM - 1957



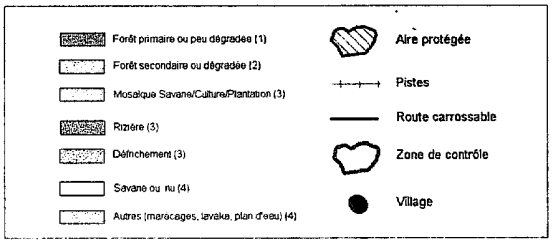
Source : Interprétation des photo-aériennes IGN/FTM 1992



Source : Images vidéographiques Octobre 1995



Légende



Echelle : 1 : 85000

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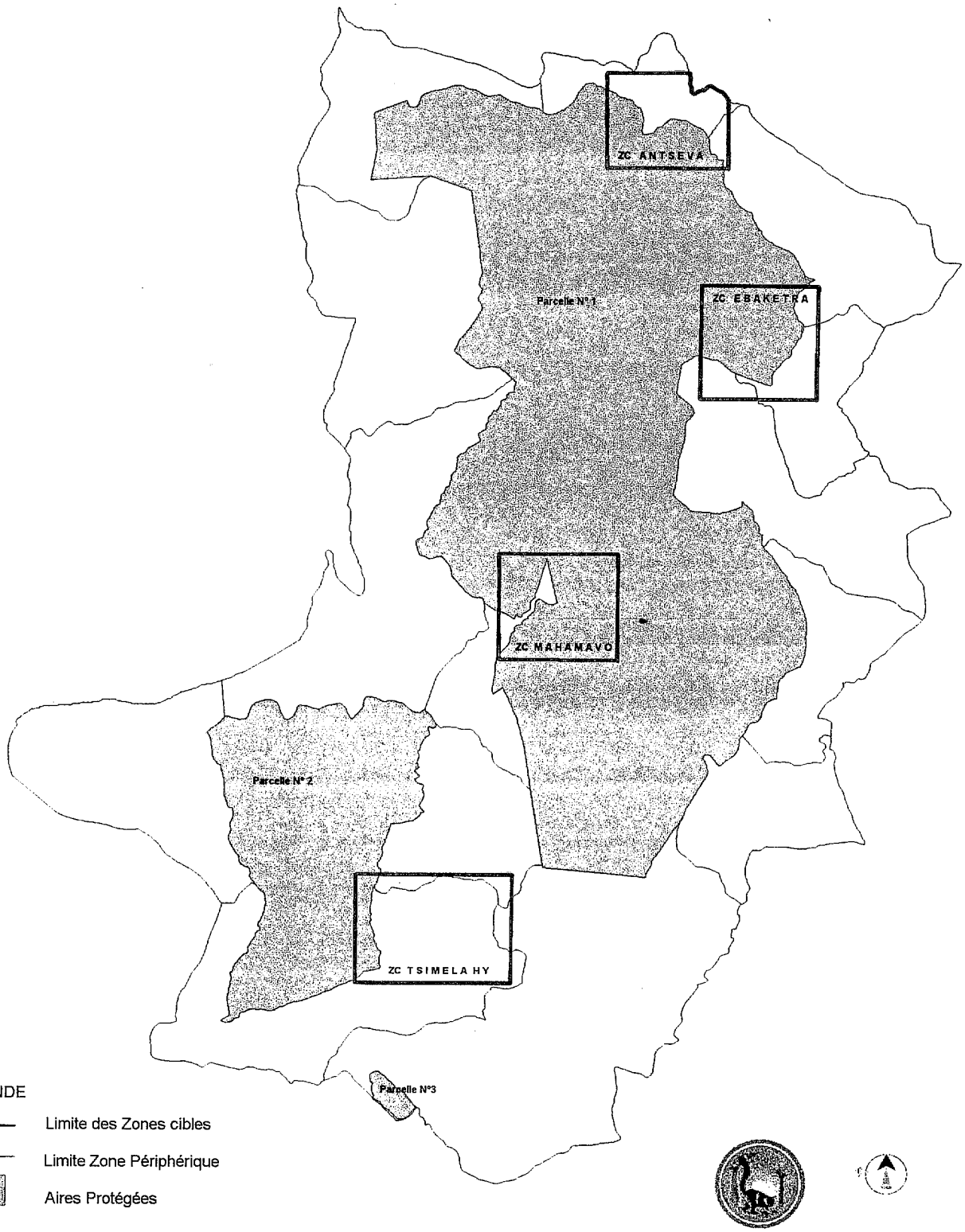
Edité en collaboration avec ANGAP DIVB
Septembre 1996
Système de projection : Laborde (Madagascar)

Année	Forêt_Primaire	Forêt_Secondaire	Culture_Tavy	Savane_Autres
1956	1132.05	1031.94	0.00	0.00
1992	178.43	63.39	1922.16	0.00
1995	58.91	141.81	1962.92	0.00

Superficie en ha

RESERVE NATURELLE INTEGRALE D' ANDOHAHELA
CARTE DE SITUATION



LEGENDE

Limite des Zones cibles

Limite Zone Périphérique

Aires Protégées

PCDI - ANDOHAHELA
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RESERVE NATURELLE INTEGRALE D' ANDOHAHELA
CARTE DES AIRES PROTEGEES

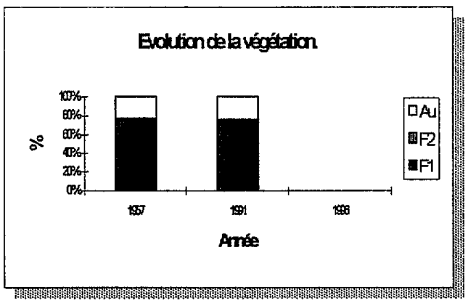
1957

Forêt primaire (55742 ha)

Forêt secondaire (1804 ha)

Autres (17165 ha)

1991



Forêt primaire (54949 ha)
Forêt dégradée (1174 ha)
Autres (18566 ha)

1996

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RESERVE NATURELLE INTEGRALE D' ANDOHAHELA
CARTE DE VEGETATION DES ZONES PERIPHERIQUES

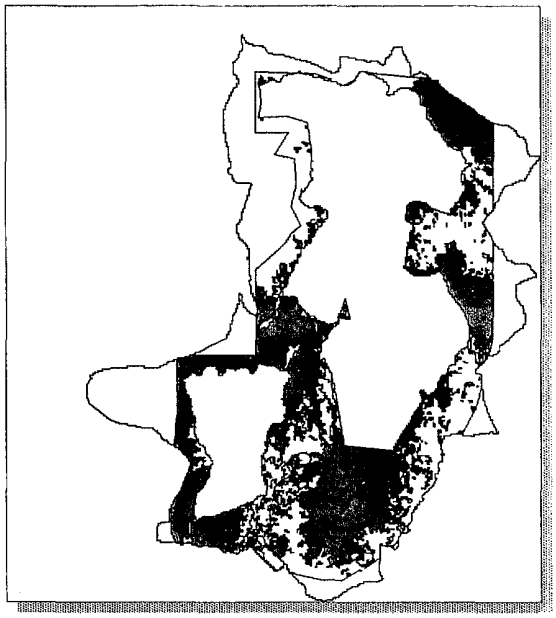
1957

Forêt peu dégradée (74380 ha)

Forêt dégradée (4413 ha)

Autres (49839 ha)

1991



1996

PCDI - ANDOHAHELA
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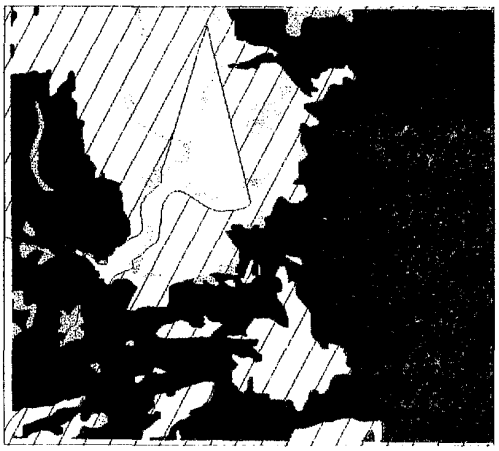
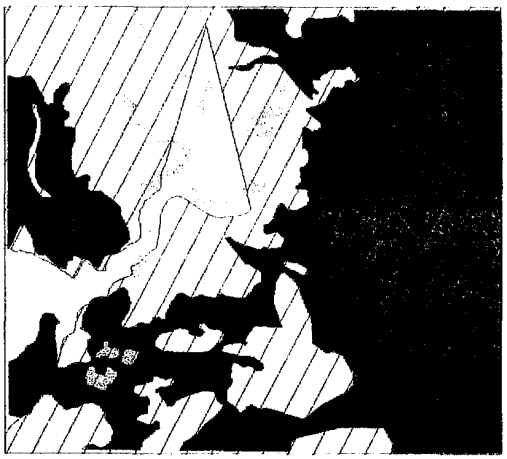
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible MAHAMAVO

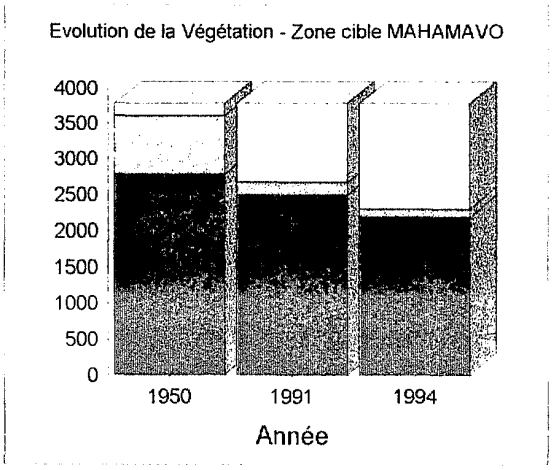
1950



1991



1994



Forêt peu dégradée

Forêt dégradée

Autres

Limite AP

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	2774	829	182
1991	2490	174	1121
1994	2183	114	1488

PCDI / ANDOHAHELA
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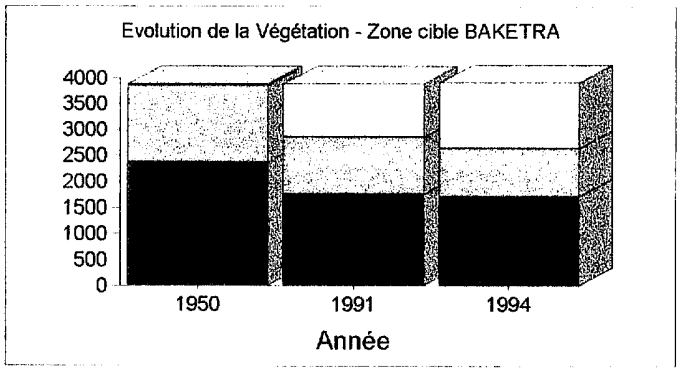
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible BAKETRA

1950



1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP

1994

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	2368	1490	38
1991	1752	1100	1044
1994	1713	924	1283

PCDI ANDOHAHELA
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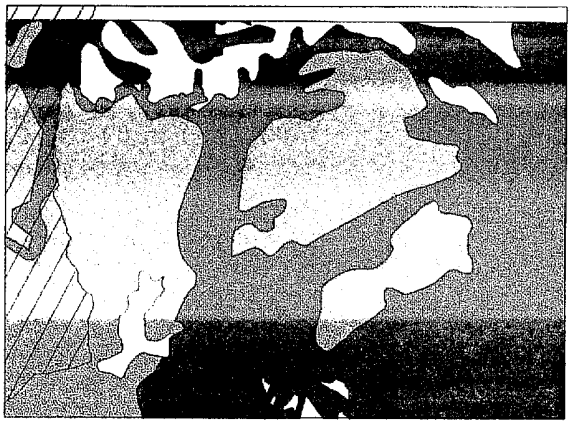
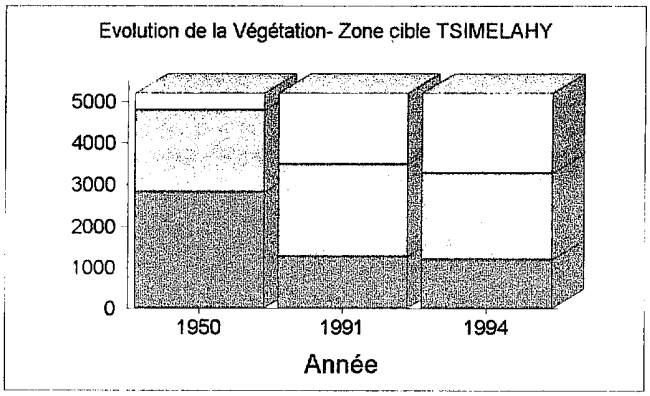
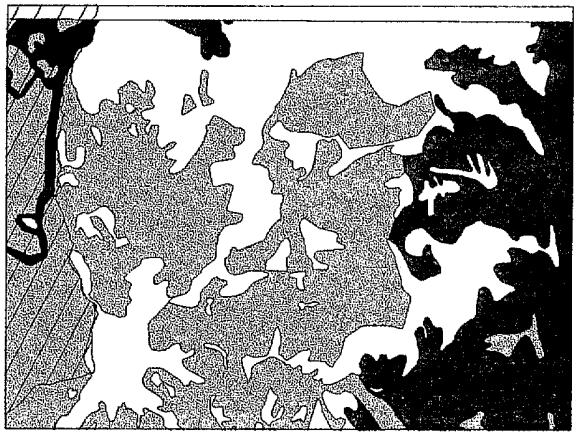
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible TSIMELAHY



1950





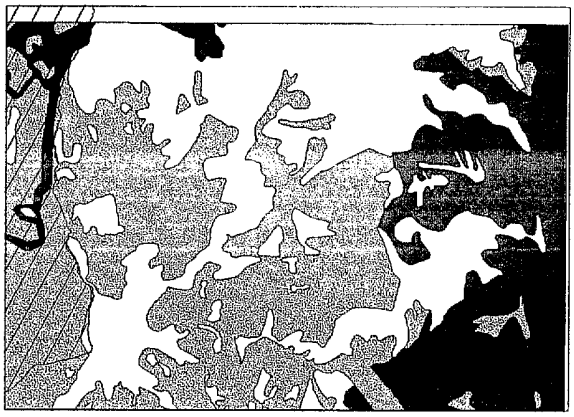
1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP



1994

SUPERFICIE EN Ha

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	2818	1967	425
1991	1271	2219	1720
1994	1203	2078	1929

PCDI / ANDOHAHELA
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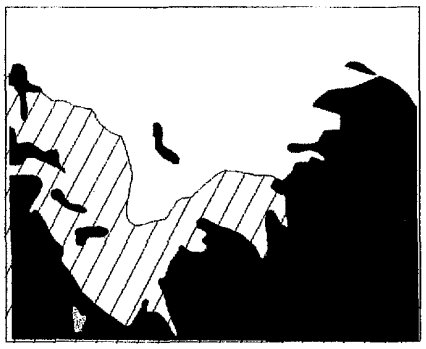
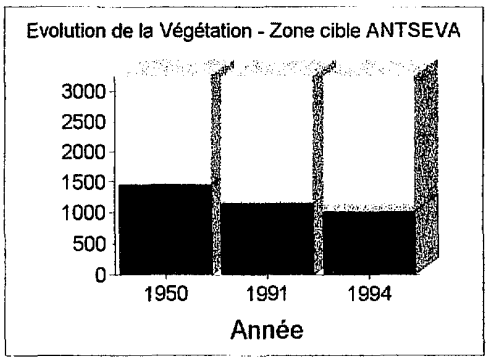
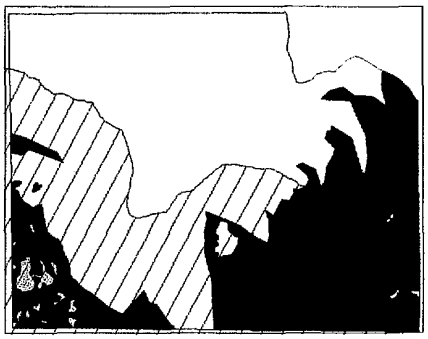
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible ANTSEVA



1950





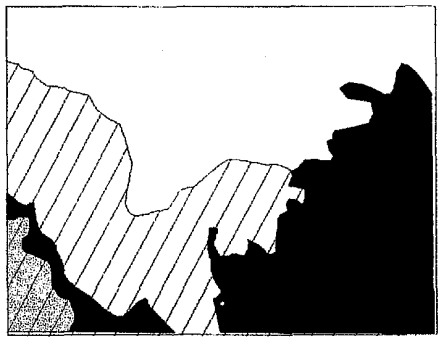
1991

Forêt peu dégradée

Forêt dégradée

Autres

Limite AP



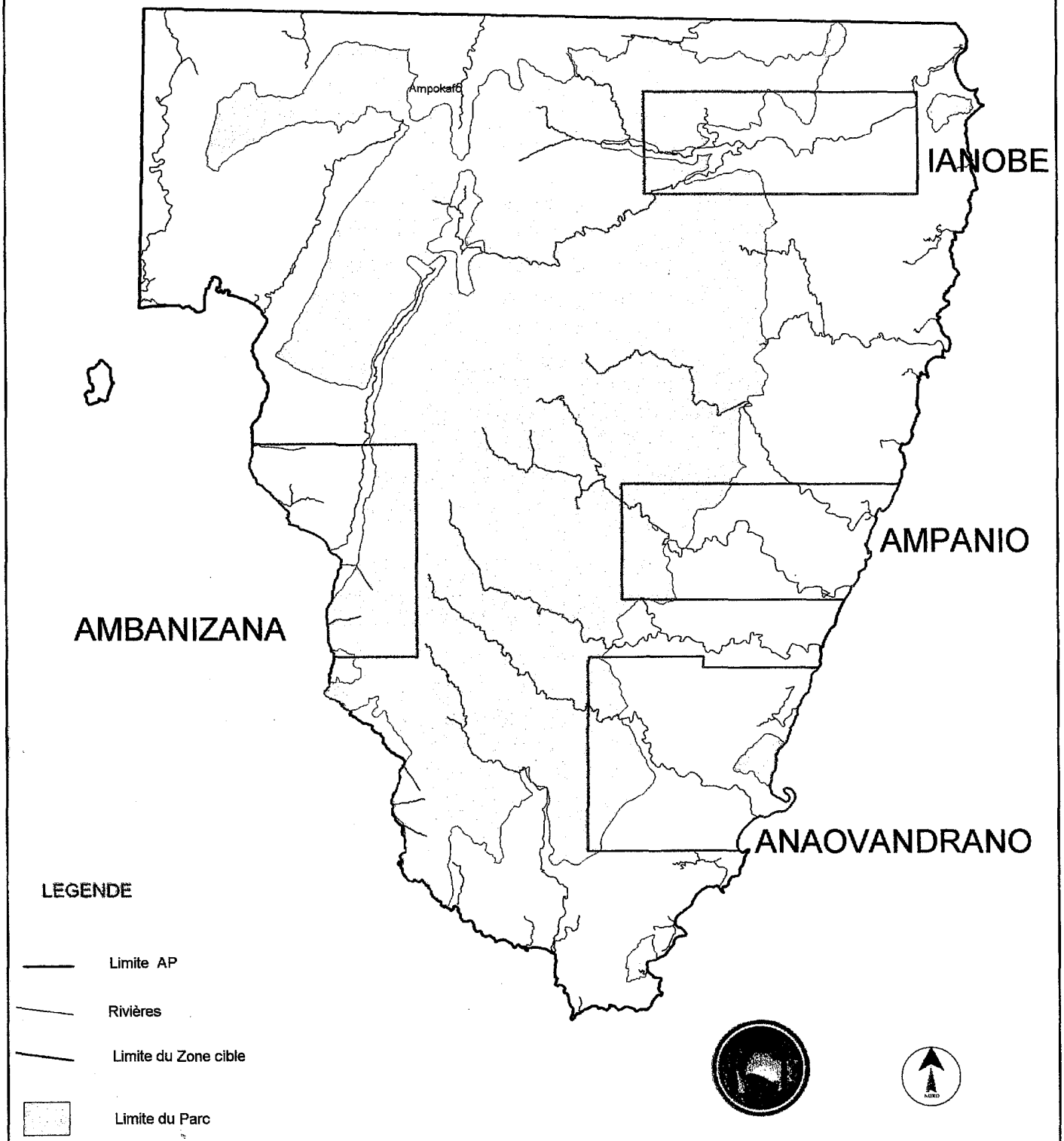
1994

SUPERFICIE EN Ha

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	1454	7	1786
1991	1142	32	2073
1994	1019	127	2101

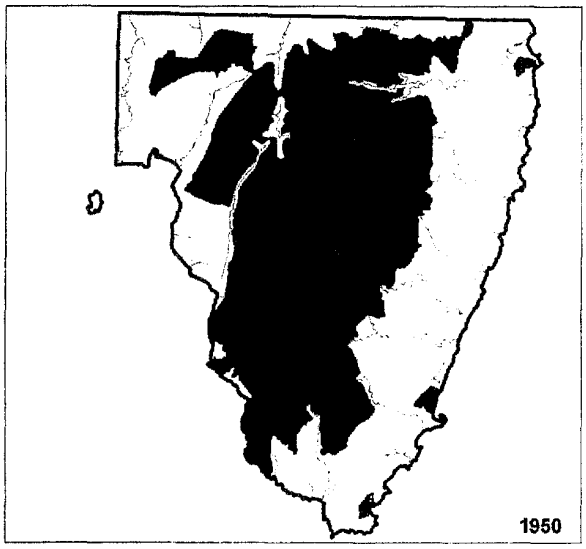
PCDI - ANDOHAHELA
Edité en collaboration avec SIG/DIVB/ANGAP

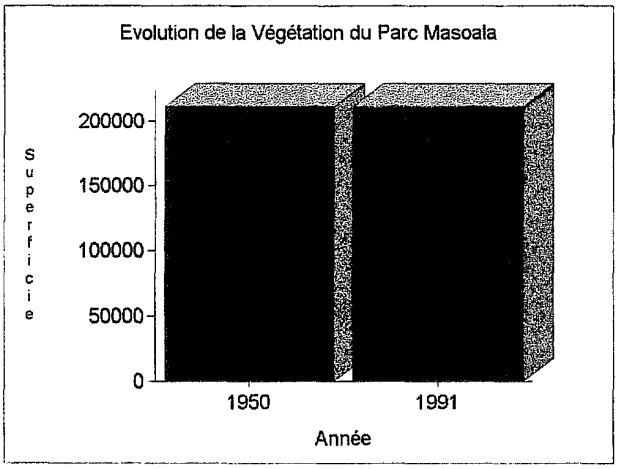
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
CARTE DE SITUATION - MASOALA

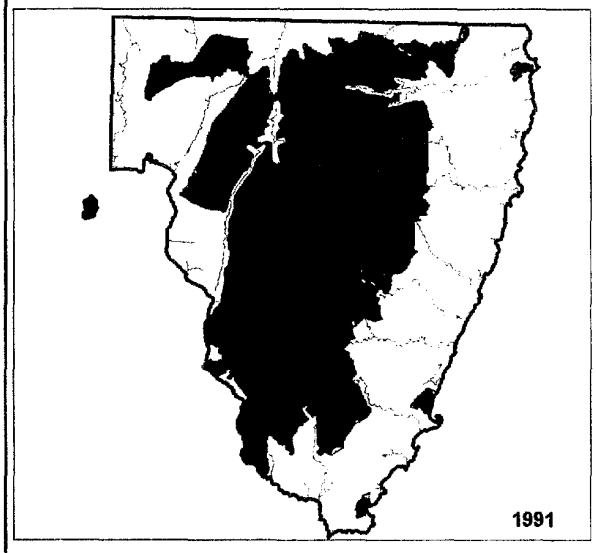


PCDI - MASOALA (MADR/DEF/ANGAP/CARE/WCS/TPF)
Edité en collaboration avec SIG/DIVB/ANGAP

CARTE DE VEGETATION DU PARC MASOALA
EVOLUTION DE LA VEGETATION



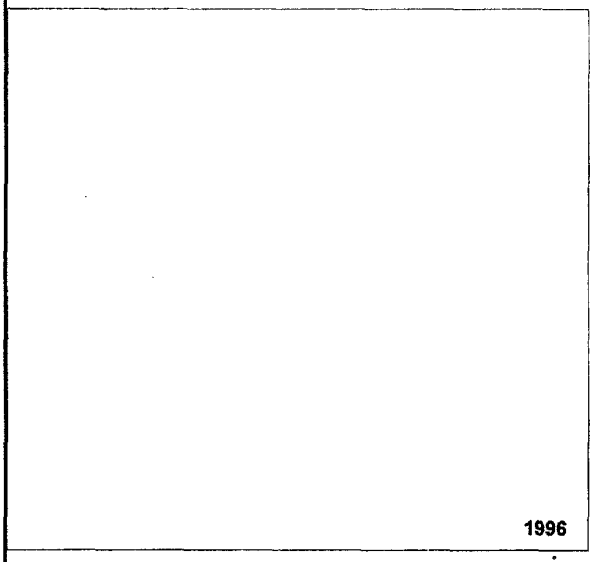




Forêt peu dégradée

Forêt dégradée

Autres



Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	211625	0	251
1991	209833	1103	943

PCDI - MASOALA
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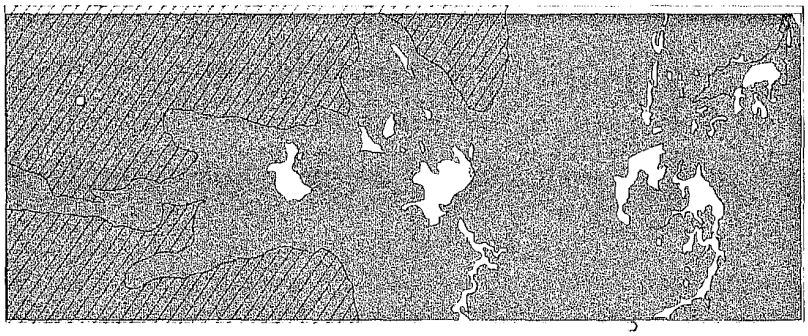
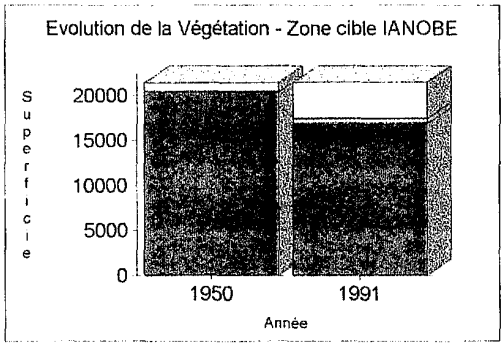
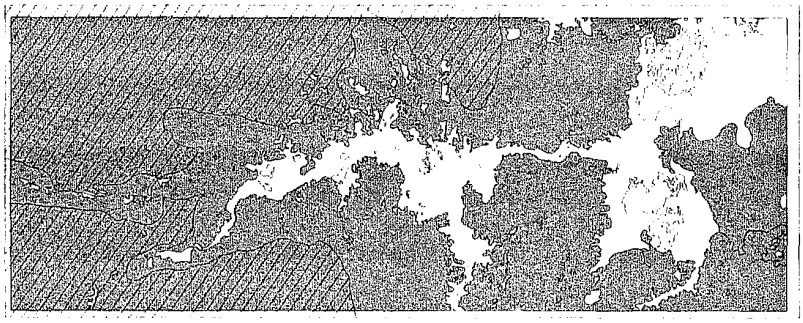
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible IANOBE



1950





1991

LEGENDE

- Forêt peu dégradée
- Forêt dégradée
- Autres
- Limite AP

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	20405	0	1075
1991	16860	560	4117

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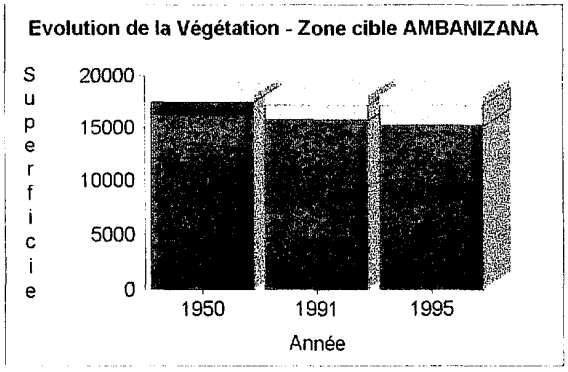
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
Evolution de la Végétation - Zone cible AMBANIZANA
MASOALA

1950



1991

Forêt peu dégradée

Forêt dégradée

Autres

Aire Protégée

1995

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	17462	0	596
1991	15666	1492	900
1995	15148	1990	920

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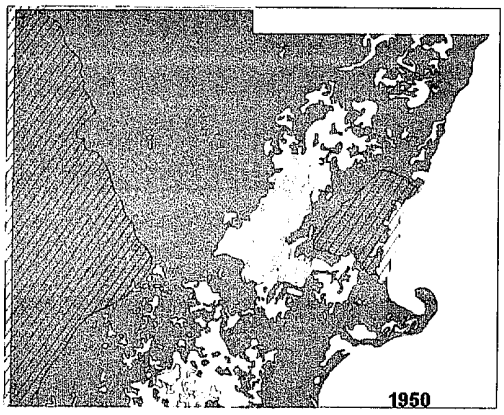
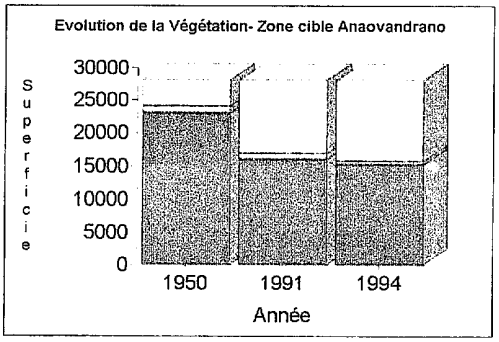
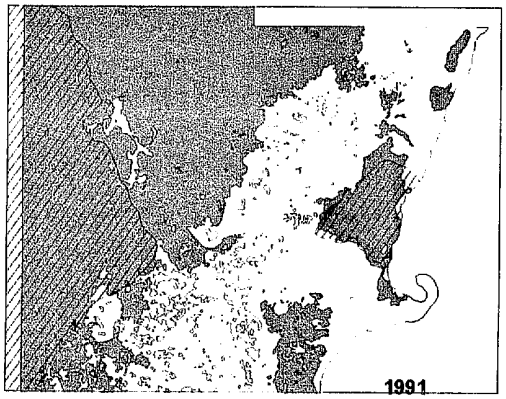
PROJET DE CONSERVATION ET DE DEVELOPPEMENT INTEGRES
EVOLUTION DE LA VEGETATION - Zone cible - ANAOVANDRANO
MASOALA

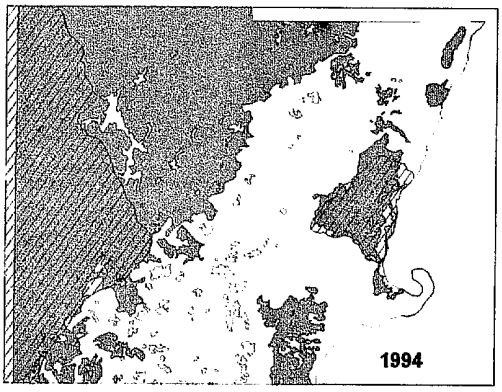






LEGENDE

- Forêt peu dégradée
- Forêt dégradée
- Autres
- Parc



Superficie (Hectares)

Date	Forêt peu dégradée	Forêt dégradée	Autres
1950	23027	1060	4084
1991	16043	843	11285
1994	15197	511	12463

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Edité en collaboration avec SIG/DIVB/ANGAP

Annex 2: LES INDICATEURS DE SUIVI DU PROGRAMME AIRES PROTEGEES

La deuxième colonne du tableau des indicateurs est réservée aux données y afférentes collectées au niveau des différentes instances (ANGAP, PCDI) lors de la phase opérationnelle du système. Dans le cadre de ce document, les lettres "M" figurant dans cette deuxième colonne désignent les indicateurs minima du système de suivi, c'est-à-dire, les indicateurs à compléter à la fin de chaque année au niveau des entités concernées (ANGAP, PCDI) , quel que soit le niveau de ressources disponibles; alors que les lettres "F" désignent les indicateurs facultatifs ou optionnels du système.

Certains indicateurs se refèrent aux quatre (4) sous-zones définies dans la zone périphérique. Il s'agit en réalité d'un nombre minimum de trois (3) sous-zones prioritaires sur le plan des pressions sur l'AP considérée plus une (1) sous-zone optionnelle de référence où le PCDI intervient peu ou pas du tout.

3.1- VUE D'ENSEMBLE DES PROGRES DU PROGRAMME AIRES PROTEGEES :

Sont regroupés dans cette partie, les indicateurs relatifs à l'état d'avancement de l'ensemble du Programme Aires Protégées, lesquels sont repartis en deux groupes :

* le premier groupe (Tableau 3.1) concerne le développement institutionnel de l'ANGAP;

* le second groupe (Tableau 3.2) traduit les différentes phases et étapes de développement des PCDI; pour ce tableau, chaque PCDI aura, en fin d'année, à répondre par Oui (O) ou par Non (N) à chacun de ces indicateurs.

TABLEAU 3.1 : DEVELOPPEMENT INSTITUTIONNEL DE L'ANGAP

Capacité Administrative et Financière :	
1. Recettes (en FMG) de droits d'entrée dans les AP (DEAP) collectées :	M
. 1992	
. 1993	
. 1994	
. 1995	
. 1996	
2. Ristournes sur DEAP (en FMG) versées aux communautés des ZP :	M
. 1994	
. 1995	
. 1996	
3. Nombre de PCDI sous la coordination de l'ANGAP	M
4. Pourcentage de ces PCDI ayant fourni à temps (dans le mois suivant la fin de période) leur rapport financier trimestriel	M
5. Montant (en $US) du budget des PCDI sous la coordination de l'ANGAP	M
6. Quantité de fonds (en $US) mobilisés dans l'année sous la gestion directe de l'ANGAP	M
7. Nombre de cadres professionnels de l'ANGAP (en fin d'année)	M
8. Ratio de l'enveloppe financière (cf. 5) / cadres professionnels de l'ANGAP	M

Suivi-Evaluation	
1. Nb de visites sur terrain faites par l'ANGAP	M
2. Nb de PCDI ayant suivi, dans leur PAT, le modèle adopté (priorisation,...)	M
3. Nb de PCDI ayant fourni à temps les tableaux sur les indicateurs de suivi	M
4. Existence d'un système de gestion des données sur les PCDI	M
5. Existence de rapport annuel publiant ces données sur les PCDI	M

Formation	
1. Nb de requêtes de soutien et/ou de formation faites par le PCDI auprès de l'ANGAP	M
2. Nb de sessions de formation organisées dans l'année par l'ANGAP pour les PCDI	M
3. Nb d'agents des PCDI formés dans l'annee par l'ANGAP	M

Relations Publiques et Communications	
2. Nb de vidéos/films sur les AP malgaches disponibles à l'ANGAP	M
3. Nb de nouveaux vidéos/films crées par l'ANGAP ou les PCDI dans l'année	M
4. Fonds (en FMG) obtenus dans l'année par la vente de produits d'intérêt touristiques par l'ANGAP	M
5. Fonds (en $US) obtenus dans l'année sous le parrainage de l'ANGAP (écotourisme, trust fund,...)	M
6. Nb d'émissions télévisées dans l'année sur les vidéos/films de l'ANGAP ou des PCDI	M

TABLEAU 3.2 : DEVELOPPEMENT DES PCDI

Développement du Projet	
1. Existence de l'analyse des pressions et de la liste des pressions priorisées	M
2. Existence de la liste des causes des pressions et de leur priorisation	M
3. Existence de l'analyse spatiale des pressions et de la priorisation des sous-zones	M
4. Existence de stratégies permettant le choix/regroupement des activités à mener	M
5. Existence de la liste des activités priorisées avec leur répartition par volet	M
6. Existence de la liste et de l'analyse des groupes cibles et des bénéficiaires	M
7. Existence de liaison conservation-développement par des hypothèses de travail pour toutes les activités principales	M
8. Existence de PAT avec des activités justifiées par l'échelle correspondante pour avoir un impact	M
9. Existence de plan de transfert de responsabilités	M
10. Existence d'un plan de pérennisation et de structure participative pendant le projet	M

Plan de gestion de l'Aire Protégée	
1. Limites de l'AP (le cas échéant, ZT + AP) clairement définies	M
2. Limites de l'AP matérialisées (a)	M
3. Existence de structure de contrôle et de suivi des limites	M
4. Relations clairement définies entre les communautés des ZP et le PCDI	M
5. Existence de structure opérationnelle de gestion de l'AP	M
6. Existence de plan d'aménagement écotouristique de l'AP	M
7. Système de répartition et de gestion des ristournes sur DEAP en place	M
8. Existence de plan de suivi de la biodiversité	M
9. Existence de plan de gestion (avec manuel) mis en oeuvre au niveau de l'AP	M

Plan de développement de la zone périphérique	
1. Existence de ZP bien définie avec proposition de limites (b)	M
2. Existence de plan de développement de la ZP	M
4. Stratégie d'aménagement et de gestion des forêts et autres SIBE de la ZP	M
5. Détermination des limites des terroirs traditionnels (régime foncier)	F
6. Système d'appui aux autres activités définies par les communautés en place	M
7. Appui aux communautés de la ZP pour les opportunités éco/ethnotouristiques	M
8. Existence d'un système de suivi d'attitude et de comportement de la population de la ZP vis-à-vis de l'AP	M

Développement d'une base de données spatiales pour chaque PCDI	
1. Existence de base de données spatiales conformes aux normes cartographiques nationales	M
2. Existence d'une cartographie de base (AP, ZP, zones, sous-zones) (c)	M
3. Existence d'une cartographie de la couverture végétale actualisée	M
4. Zones de pressions localisées et cartographiées	M
5. Existence d'une cartographie de l'évolution de la couverture végétale	F

Développement d'une base de données spatiales numérisées pour chaque PCDI	
1. Numérisation des limites de l'AP achevée (d)	F
2. Villages de la ZP identifiés, codifiés de manière unique, localisés au GPS (d)	F
3. Limites de la ZP numérisées (d)	F
4. Limites des zones et sous-zones numérisées (d)	F
5. Limites de la zone tampon numérisée (si il y en a) (d)	F
6. Zones de pressions clés localisées et numérisées	F
7. Données altimétriques des 4 zones cibles numérisées (courbes de niveau tous les 25 m) (e)	F
8. Données altimétriques de l'AP et ZP numérisées (courb. niv. tous les 100m) (f)	F
9. Pistes/routes/sentiers AP et ZP localisés au GPS et numérisés	F
10. Réseau hydrographique digitalisé	F
11. Cartographie digitalisée du tavy de l'année 1991 (g)	F
12. Cartographie digitalisée de la riziculture irriguée de l'année 1991 (g)	F
13. Cartographie digitalisée des autres types de couverts végétaux dans l'AP et la ZP de l'année 1991 (g)	F

Note :

(a) la matérialisation des limites de la zone tampon (s'il y en a) est laissée à la discrétion du PCDI concerné.

(b) la zone périphérique (ZP) correspond à une proximité physique de l'AP et est liée à l'idée de responsabilisation des communautés locales, de répartition des ristournes sur DEAP, et de la localisation des pressions directes sur l'AP; alors que la zone d'influence (ZI) est liée à la localisation des pressions indirectes ou lointaines sur l'AP.

(c) la cartographie de base comprend les villages, les pistes, les routes, les sentiers, le reseau hydrographique et les donnees altimétriques (courbes de niveau tous les 100 m)

(d) ces indicateurs sont minima pour les PCDI sous financement SAVEM

(e) les courbes de niveau tous les 25 m, s'il existe, et le cas échéant, les courbes de niveau se rapprochant le plus de cette valeur.

(f) les courbes de niveau tous les 100 m, s'il existe, et le cas échéant, les courbes de niveau se rapprochant le plus de cette valeur.

(g) cette cartographie sera réalisée sur la base des ortho-photos disponibles de la zone concernée pour la période couvrant de 1989 à 1993.

3.2- INDICATEURS GENERAUX DE SUIVI DES PCDI

Les indicateurs généraux de suivi des PCDI, dont les données sont à remplir et envoyer à l'ANGAP au début de chaque année, permettent d'une part d'avoir une vue d'ensemble de la situation de chaque PCDI du Programme Aires Protégées, et d'autre part d'effectuer une comparaison rapide entre les PCDI, au-delà de leurs différences et spécificités inhérentes à la localisation de chaque AP, au niveau de financement disponible et aux méthodologies propres à chaque opérateur sur terrain.

TABLEAU 3.3 : INDICATEURS GENERAUX DE SUIVI DES PCDI

Mobilisation des ressources financières	
1. Budget annuel total (en $US)	M
2. Dépenses totales annuelles (en $US)	M
3. Pourcentage des dépenses totales consacrées à la gestion/conservation de l'AP	M
4. Pourcentage des dépenses totales consacrées aux activités de développement de la ZP	M
5. Pourcentage des dépenses totales consacrées à la formation	M
6. Pourcentage des dépenses totales consacrées à l'éducation-sensibilisation-communication	M
7. Pourcentage des dépenses totales consacrées au suivi-evaluation	M
8. Pourcentage des dépenses totales consacrées aux activités de recherche	M
9. Pourcentage des dépenses totales consacrées à la coordination locale	M
10. Pourcentage des dépenses totales consacrées à la coordination centrale	M
11. Pourcentage des dépenses totales supportées par les bailleurs étrangers	M
12. Pourcentage des dépenses totales supportées par le Gouvernement Malagasy	M
13. Coût total annuel (en FMG) pour le fonctionnement du PCDI	M
14. Coût total annuel (en FMG) du personnel national du PCDI	M
15. Coût total annuel (en $US) du personnel expatrié du PCDI	M
16. Coût total annuel (en $US) des consultances au niveau du PCDI	M

Mobilisation des ressources humaines	
1. Nb de km2 de l'AP par APN/ACD (AP = km2)	M
2. Nb de km de périmètre de l'AP par APN/ACD (Pér. AP = km)	M
3. Nb de km2 de la ZP par techniciens/cadres professionnels (ZP = km2)	M
4 Nb de km2 de la ZP par animateurs/vulgarisateurs	M
5 Nb d'habitants de la ZP par animateurs/vulgarisateurs (Hab. ZP en 93 =)	M
6 Nb de personnel du PCDI, du service public, d'ONG ou autre partenaire sponsorisé en formation LT >3 mois	M
7 Nb de personnel du PCDI, du service public, d'ONG ou autre partenaire sponsorisé en formation CT > 3 mois	M
8 Pourcentage d'APN/ACD, animateurs et vulgarisateurs du projet venant de la ZP (Nb total =)	M
9 Pourcentage de techniciens/cadres professionnels du projet résidant dans la ZP	M
10 Pourcentage du personnel national (cadre et agents de terrain) du projet venant de la région (a)	M
11 Pourcentage de femmes par rapport à l'ensemble du personnel national du projet	M
12 Nb d'ONG et autres institutions travaillant effectivement avec le PCDI dans la ZP	M
13 Nb d'hommes-mois d'interventions extérieures (consultants...) au niveau du PCDI	M

Mobilisation des ressources matérielles (b)	
1 Nb annuel de véhicules (4X4, légers) opérationnels	M
2 Nb annuel de motocyclettes opérationnelles	M
3 Nb annuel de bicyclettes opérationnelles	M
4 Coût moyen annuel (en FMG) investi par agent de terrain dans les équipements de terrain	M
5 Coût annuel investi (en FMG) dans la maintenance du materiel de transport	M
6 Coût annuel dépensé (en FMG) dans les mobiliers de bureau	M
7. Nb annuel de bateaux et zodiacs opérationnels	M

Gestion de l'Aire Protégée	
1. Personnes-jour de patrouille des agents du projet (APN/ACD) dans l'AP	M
2. Personnes-jour de travail des agents du projet (APN/ACD) dans la sensibilisation des communautés	M
3. Nb de km de limites de l'AP (ré)définies	M
4. Nb de km de limites de l'AP (ré)définies avec l'appui de la communauté de la ZP sur la base d'une convention formelle avec cette communauté	M
5. Nb de km de sentiers établis dans l'AP	M
6. Nb de km de pistes établies dans l'AP	M
7. Nb de km de pistes entretenues dans l'AP	M
8. Nb total de délits observés par les APN/ACD	M
9. Pourcentage de ces délits sanctionnés par le "dina" des villageois	M
10. Pourcentage de ces délits communiqués au Service Forestier (CIREF,...)	M
11. Pourcentage de ces délits verbalisés par le Service Forestier (CIREF,...)	M
12. Nb de personnes-jour des agents de la DEF dans l'AP/ZP (c)	M

Activités de développement dans la zone périphérique	
1. Personnes-jour de travail sur le terrain des animateurs/vulgarisateurs	M
2. Nb de groupements villageois, d'ONG ou d'associations de la ZP formes par (ou travaillant avec) le projet	M
4. Nb de micro-projets hors DEAP définis par les communautés, financés et mis en oeuvre dans la ZP	M
5. Coût (en $US) de ces micro-projets définis par les communautés, financés hors DEAP et mis en oeuvre dans la ZP	M
6 Ratio femmes/hommes participant aux activités du projet	M

Note :

(a) les limites de la région sont celles du faritany de localisation du PCDI concerné.

(b) chaque PCDI est libre d'ajouter des indicateurs mieux adaptés à ses spécificités tels que coût moyen annuel investi dans le matériel informatique, le matériel roulant, le matériel de navigation, la construction, la réhabilitation et l'entretien des bâtiments du projet...

(c) les agents de la DEF concernés par cet indicateur sont ceux du service forestier en général, y compris ceux du Projet Dette Nature.

3.3- INDICATEURS SOCIO-ECONOMIQUES DES PCDI

Cet ensemble d'indicateurs permettent d'apprécier à moyen terme, les effets des actions du projet dans sa zone d'intervention.

Les indicateurs concernant les données générales sur la riziculture, en tant qu'activité de base de la population rurale malgache, figurent à titre indicatif, bien que la rubrique soit obligatoire. Il alors est recommandé et laissé à la discrétion des PCDI d'en définir les indicateurs appropriés, pour pouvoir apprécier l'évolution du niveau de vie des populations riveraines; dans les régions où la riziculture constituent une activité secondaire, les données relatives à l'activité prédominante (élévage ou pêche) devront être fournies et d'en trouver les indicateurs appropriés pour le suivi définis.

Ces indicateurs concernent au minimum trois (3) sous-zones prioritaires et une (1) sous-zone témoin optionnelle.

TABLEAU 3.4 : INDICATEURS SOCIO-ECONOMIQUES DES PCDI

Données démographiques de base	
1. Estimation récente (< 5 ans) de la population dans la ZP	M
2. Nb de villages et hameaux dans la ZP	M
3. Population dans les 4 sous-zones (recensement du projet) en 1994 :	
- sous-zone 1	M
- Sous-zone 2	M
- sous-zone 3	M
- sous-zone 4 (témoin)	F
4. Densité de la population dans ces 4 sous-zones en 1994 :	
- sous-zone 1	M
- sous-zone 2	M
- sous-zone 3	M
- sous-zone 4 (témoin)	F
5. Population dans les 4 sous-zones (recensement du projet) en 1996 :	
- sous-zone 1 (Pourcentage de migrants =)	M
- sous-zone 2 (Pourcentage de migrants =)	M
- sous-zone 3 (Pourcentage de migrants =)	M
- sous-zone 4 (témoin) (Pourcentage de migrants =)	F
6. Densité de la population dans ces 4 sous-zones en 1996 :	
- sous-zone 1	M
- sous-zone 2	M
- sous-zone 3	M
- sous-zone 4 (témoin)	F

Données générales sur la riziculture (a) M	
1. Vente de terrain de tavy (en FMG/ha)	
2. Location de terrain de tavy (en FMG/ha)	
3. Métayage de tavy (en pourcentage de la récolte par ha)	
4. Vente de rizières (en FMG/ha)	
5. Location de rizières (en FMG/ha)	
6. Métayage de rizières (en pourcentage de la récolte par ha)	
7. Coût moyen (en FMG) de la main-d'oeuvre journalière pour la préparation des rizières	
8. Coût moyen (en FMG) de la main-d'oeuvre journalière pour la préparation du terrain de tavy	
9. Prix moyen (en FMG) d'achat au marché de 1 kg de riz : (b)	
- pendant la période de soudure	
- pendant la période de récolte	
10. Consommation moyenne de riz per capita (en kapoaka/j)	
11. Durée moyenne (en mois) de la période soudure	
12. Rendement moyen en paddy sur tavy (en kg/ha)	
13. Rendement moyen en paddy sur rizières (en kg/ha)	
14. Nb moyen d'années de culture dans un terrain de tavy ou jinja avant qu'il ne soit laissé en friche ou en jachère	
15. Nb moyen d'années de friche ou jachère dans un terrain de tavy ou jinja avant qu'il ne soit remis en culture	

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Ecotourisme et ethnotourisme (c)	
1. Montant (en FMG) des ristournes sur DEAP de l'année précédente destinés à la population de la ZP	M
2. Pourcentage de ce montant des ristournes sur DEAP réellement utilisés dans l'année pour la population de la ZP	M
4. Nb de micro-projets financés sur DEAP dans la ZP	M
5. Montant annuel (en FMG) des retombées pour les associations de guides	M
6. Nombre de visites dans l'AP faites par :	M
- les enfants	
- les élèves/étudiants	
- les nationaux	
- les touristes étrangers résidents	
- les touristes étrangers non résidents	
- les chercheurs ou cinéastes	
8. Nb d'infrastructures hôtelières disponibles dans la ZP :	M
- 4 étoiles	
- 3 étoiles	
- 2 étoiles	
- 1 étoile	
- 3 ravinala	
- 2 ravinala	
- 1 ravinala et autres	
9. Nb de km de circuits touristiques créés dans l'AP	M
10. Nb de sites de camping existant dans l'AP	M
11. Nb de sites de camping existant dans la ZP	M
12. Nb de tours opérateurs amenant des touristes dans l'AP	M
13. Existence de point de change de devises dans la zone (d)	M
14. Qualité de la voie d'accès vers l'AP (e)	M
15. Nb de centres ou points d'informations créés pour les touristes	M
16. Nb de vidéocassettes produites pour la promotion de l'AP et de la ZP	M
17. Nb d'édition de posters/brochures ou autres disponibles sur le PCDI	M
18. Nb de type de produits créés pour l'écotourisme par la population de la ZP (produits artisanaux...)	M
19. Durée moyenne (en j) de séjour par touristes	M
20. Nb de guides écotouristiques	M
21. Nb d'infrastructures hôtelières dans la ZP gérées par :	
- la population locale	M
- les privés	M
22. Nb de contrats signés entre le projet et les partenaires écotouristiques	M
23. Nb annuel de fréquentations de ces centres ou points d'informations	M

Note :

(a) ces données constituent les valeurs moyennes obtenues à partir de vingt (20) échantillons minima par rubrique dans l'ensemble des quatre sous-zones suivies.

(b) chaque PCDI est libre de définir la méthode permettant d'obtenir le prix moyen du riz au marché.

(c) cette partie constitue des indicateurs minima uniquement pour les parcs nationaux et les réserves spéciales.

(d) il s'agit de répondre par Oui (O) ou par Non (N)

(e) il s'agit d'évaluer sommairement l'état de la voie d'accès vers l'AP (excellent, bon, moyen, mauvais).

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3.4- INDICATEURS ECOLOGIQUES DES PCDI

Ces indicateurs écologiques des PCDI, bien que sommaires eu égard à la richesse de la biodiversité malgache, serviront de point de départ et de base à la collecte des données permettant de donner un bref aperçu et/ou de faire le point de la connaissance de notre biodiversité. Ces indicateurs, bien que non minima en grande partie pour l'ensemble du PAP, sont recommandés pour les PCDI sous financement SAVEM

TABLEAU 3.5 : INDICATEURS ECOLOGIQUES DES PCDI

Biodiversité et richesses taxonomiques dans l'AP	**(a)**	
1. Nb d'especes de ptéridophytes connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'especes utilisées par les populations de la ZP		
2. Nb d'especes de phanérogames connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'especes utilisées par les populations de la ZP		
3. Nb d'especes de cryptogames (non ptéridophytes) connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'especes utilisées par les populations de la ZP		
4. Nombre d'espèces de mammiferes connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'especes utilisées par les populations de la ZP		
5. Nombre d'especes d'oiseaux connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'especes utilisées par les populations de la ZP		
6. Nombre d'espèces de reptiles connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'espèces menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
7. Nombre d'espèces d'amphibiens connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'espèces menacées au avec risque d'extinction	(b)	
- nb d'especes utilisées par les populations de la ZP		
8. Nombre d'espèces d'insectes connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'espèces menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
9. Nombre d'espèces de poissons connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'espèces menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
10. Nombre d'espèces de crustacés connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'espèces menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
11. Nombre d'espèces de myriapodes connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
12. Nombre d'espèces d'arachnides connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'especes menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
13. Nombre d'espèces de mollusques connus scientifiquement :		
- pourcentage d'endémicité		
- nb d'espèces menacées ou avec risque d'extinction	(b)	
- nb d'espèces utilisées par les populations de la ZP		
14. Nombre d'espèces d'algues connues scientifiquement :		

- pourcentage d'endémicité	
- nb d'espèces menacées ou avec risque d'extinction (b)	
- nb d'espèces utilisées par les populations de la ZP	

Ressources forestières (c)	
1. Nb d'espèces d'arbres par ha dans les :	
- parcelles de forêts primaires à l'intérieur de l'AP :	
* 1994	
* 1996	
- parcelles de forêts secondaires à l'intérieur de l'AP :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 1 :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 2 :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 3 :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 4 :	
* 1994	
* 1996	
2. Nb d'arbres par ha de diamètre supérieur à 10 cm à haut. de poitrine dans les :	
- parcelles de forêts primaires à l'intérieur de l'AP :	
* 1994	
* 1996	
- parcelles de forêts secondaires à l'intérieur de l'AP :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 1 :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 2 :	
* 1994	
* 1996	
- parcelles de forêts secondaires dans la sous-zone 3 :	
* 1994	
* 1996	
- parcelles de forets secondaires dans la sous-zone 4 :	
* 1994	
* 1996	

Ressources hydriques	
1. Nb de fleuves et rivières sortant de l'AP	M
2. Nb de fleuves et rivières permanents sortant de l'AP	M
3. Nb de fleuves sortant de l'AP d'importance majeure pour l'irrigation dans la ZP	M
4. Nb d'ha de rizières (ou autres terres agricoles)dans la ZP irriguées par l'eau venant de l'AP	F

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Indicateurs biologiques et physico-chimiques de l'AP définis au niveau du PCDI (d)	
1. Données de référence (suivi de la population) en 1994 :	
-	
-	
-	
-	
2. Taux de variation (fin 1996) :	
-	
-	
-	
-	

Note :

(a) *les PCDI concernés par les espèces marines devront faire la distinction entre espèces marines et non marines.*

(b) *l'ANGAP fournira aux PCDI la liste des espèces connues scientifiquement et figurant sur la liste UICN (Red Data Book) ou la liste CITES.*

(c) *ces indicateurs permettront de constituer au niveau de chaque PCDI une petite banque de données sur les ressources forestières (chaque espèces d'arbre avec le nombre de pieds de diamètre supérieur à 10 cm à hauteur de poitrine par hectares de parcelles considérées); le nom vernaculaire sera également utilisé que le nom scientifique de l'espèce soit connue ou non au niveau du PCDI.*

(d) *ces indicateurs définis au niveau du PCDI permettent de tenir compte des spécificités de chaque PCDI; chaque projet détermine à son niveau les indicateurs jugés caractéristiques de sa zone (qualité d'eau des fleuves, aigle serpentine,...), en collecte les données de référence en 1994 et en suit la variation en 1996.*

3.5- INDICATEURS DE SUIVI DE LA GESTION DES RESSOURCES NATURELLES

Cette partie concerne le suivi de la gestion et de l'utilisation des ressources naturelles (produits forestiers principaux et secondaires) au niveau de la zone périphérique.

Dans le cas des produits forestiers secondaires, une enquête préalable au niveau de la zone périphérique permettra d'élaborer la liste des produits (charbon, bois de chauffe, bilahy,...) les plus utilisés et/ou exploités par les populations riveraines, et en suite de les prioriser en fonction de la quantité utilisée et/ou de l'impact de leur utilisation sur le plan écologique. Le suivi proprement dit concernera les quatre (4) produits forestiers secondaires jugés prioritaires; les indicateurs sont donnés ici à titre indicatif, et il appartient à chaque PCDI d'en définir les indicateurs appropriés et les méthodologies de suivi à utiliser.

TABLEAU 3.6 : SUIVI DE LA GESTION DES RESSOURCES NATURELLES

Utilisation des produits forestiers secondaires	
1. Produit forestier secondaire N° 1 :	M
- distance moyenne (en km) entre l'habitation du ménage et la zone de prélèvement de ce produit	
- quantité moyenne (en unité ou en kg/an/personne) de ce produit prelevé par an et par personne	
- indice de difficulté pour trouver ce produit dans la ZP (a)	
- pourcentage du besoin de la population satisfait par le nouveau mode de gestion de ce produit	
- densité moyenne de ce produit au milieu de l'AP	
- densité moyenne de ce produit à 1 km à l'intérieur de l'AP	
- densité moyenne de ce produit dans la ZP	
2. Produit forestier secondaire N° 2 :	M
- distance moyenne (en km) entre l'habitation du ménage et la zone de prélèvement de ce produit	
- quantité moyenne (en unité ou en kg/an/personne) de ce produit prelevé par an et par personne	
- indice de difficulté pour trouver ce produit dans la ZP (a)	
- pourcentage du besoin de la population satisfait par le nouveau mode de gestion de ce produit	
- densité moyenne de ce produit au milieu de l'AP	
- densité moyenne de ce produit à 1 km à l'intérieur de l'AP	
- densité moyenne de ce produit dans la ZP	
3. Produit forestier secondaire N° 3 :	M
- distance moyenne (en km) entre l'habitation du ménage et la zone de prélèvement de ce produit	
- quantité moyenne (en unité ou en kg/an/personne) de ce produit prelevé par an et par personne	
- indice de difficulté pour trouver ce produit dans la ZP (a)	
- pourcentage du besoin de la population satisfait par le nouveau mode de gestion de ce produit	
- densité moyenne de ce produit au milieu de l'AP	
- densité moyenne de ce produit à 1 km à l'intérieur de l'AP	

- densité moyenne de ce produit dans la ZP	
4. Produit forestier secondaire N° 4 :	M
- distance moyenne (en km) entre l'habitation du ménage et la zone de prélèvement de ce produit	
- quantité moyenne (en unité ou en kg/an/personne) de ce produit prelevé par an et par personne	
- indice de difficulté pour trouver ce produit dans la ZP (a)	
- pourcentage du besoin de la population satisfait par le nouveau mode de gestion de ce produit	
- densité moyenne de ce produit au milieu de l'AP	
- densité moyenne de ce produit à 1 km à l'intérieur de l'AP	
- densité moyenne de ce produit dans la ZP	

Gestion des forêts de la zone périphérique (b)	
1. Surface concernée et nb de permis accordés pour l'exploitation forestière :	M
- 1990 (S = ha ; Nb =)	
- 1991 (S = ha ; Nb =)	
- 1992 (S = ha ; Nb =)	
- 1993 (S = ha ; Nb =)	
- 1994 (S = ha ; Nb =)	
- 1995 (S = ha ; Nb =)	
- 1996 (S = ha ; Nb =)	
2. Surface concernée et nb de permis de coupe accordés :	M
- 1990 (S = ha ; Nb =)	
- 1991 (S = ha ; Nb =)	
- 1992 (S = ha ; Nb =)	
- 1993 (S = ha ; Nb =)	
- 1994 (S = ha ; Nb =)	
- 1995 (S = ha ; Nb =)	
- 1996 (S = ha ; Nb =)	
3. Nb de permis de défrichement accordés :	M
- 1990	
- 1991	
- 1992	
- 1993	
- 1994	
- 1995	
- 1996	
4. Nb de permis de droit d'usage accordés :	M
- 1990	
- 1991	
- 1992	
- 1993	
- 1994	
- 1995	
- 1996	
5. Nb d'hectares de terrains reboisés : (c)	M
- 1990	
- 1991	
- 1992	
- 1993	
- 1994	
- 1995	
- 1996	
6. Nb de plans de gestion forestière villageoise définis ou mis en oeuvre : (d)	M
- 1994	
- 1995	
- 1996	

Note :

(a) *il s'agit de repondre par "bas", "moyen" ou "haut" selon la difficulté croissante ressentie dans la recherche du produit considéré.*

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(b) *une note y afférente de la DEF Centrale à tous les services forestiers décentralisés faciliterait la collecte de ces données au niveau des PCDI.*

(c) *cet indicateur est donné à titre indicatif; il appartient à chaque PCDI de définir les indicateurs appropriés permettant le suivi du reboisement au niveau de sa zone d'action.*

(d) *ces plans de gestion forestière villageoise seront conjointement définis par le PCDI concerné et les services forestiers décentralisés.*

3.6- INDICATEURS DE L'EVOLUTION DE LA COUVERTURE VEGETALE

L'évolution de la couverture végétale traduit dans un certain sens le comportement de la population riveraine vis-à-vis des ressources naturelles, et permet de "mesurer" les effets et/ou impacts des actions du PCDI dans le modélage de ce comportement.

Le suivi de cette évolution devra être faite, avec une périodicité moyenne de cinq ans, sur l'ensemble de l'aire protégée et un minimum de trois (3) sous-zones prioritaires au niveau de la zone périphérique. Les documents de base du suivi peuvent être des orthophotos au 1/20000è établis à partir des prises de vue aériennes (PVA) au 1/40000è de la zone, des images satellites SPOT ou Landsat TM. Le choix du type de document de suivi dépend avant tout de la taille de la sous-zone cible, de la disponibilité et du coût du document; l'essentiel etant de réaliser le suivi interannuel de la couverture végétale sur un même type de document.

En plus de ces types de documents de suivi, l'utilisation de la vidéographie est conseillée pour assurer le suivi annuel de la couverture vegetale

TABLEAU 3.7 : EVOLUTION DE LA COUVERTURE VEGETALE (a)

Sous-zone (prioritaire) N° 1 de la ZP :	
1. Nb d'hectares de forêts primaires ou peu dégradées (b)	M
- 1991	
- 1996	
2. Nb d'hectares de forêts secondaires ou dégradées (b)	M
- 1991	
- 1996	
3. Nb d'hectares de savanes/pâturages	M
- 1991	
- 1996	
4. Nb d'hectares de terrains de riziculture irriguée	F
- 1991	
- 1996	
5. Nb d'hectares de terrains de culture (tavy ou autres)	M
- 1991	
- 1996	
6. Nb d'hectares d'autres types de végétation (mangroves...)	M
- 1991	
- 1996	

Sous-zone (prioritaire) N° 2 de la ZP :	
1. Nb d'hectares de forêts primaires ou peu dégradées (b)	M
- 1991	
- 1996	
2. Nb d'hectares de forêts secondaires ou dégradées (b)	M
- 1991	
- 1996	
3. Nb d'hectares de savanes/pâturages	M
- 1991	
- 1996	
4. Nb d'hectares de terrains de riziculture irriguée	F
- 1991	
- 1996	
5. Nb d'hectares de terrains de culture (tavy ou autres)	M
- 1991	
- 1996	
6. Nb d'hectares d'autres types de végétation (mangroves...)	M
- 1994	
- 1996	

Sous-zone (prioritaire) N° 3 de la ZP :	
1. Nb d'hectares de forêts primaires ou peu dégradées (b)	M
- 1991	
- 1996	
2. Nb d'hectares de forêts secondaires ou dégradées (b)	M
- 1991	
- 1996	
3. Nb d'hectares de savanes/pâturages	M
- 1991	
- 1996	
4. Nb d'hectares de terrains de riziculture irriguée	F
- 1991	
- 1996	
5. Nb d'hectares de terrains de culture (tavy ou autres)	M
- 1991	
- 1996	
6. Nb d'hectares d'autres types de végétation (mangroves...)	M
- 1991	
- 1996	

Sous-zone (témoin) N° 4 de la ZP : F	
1. Nb d'hectares de forêts primaires ou peu dégradées (b)	
- 1991	
- 1996	
2. Nb d'hectares de forêts secondaires ou dégradées (b)	
- 1991	
- 1996	
3. Nb d'hectares de savanes/pâturages	
- 1991	
- 1996	
4. Nb d'hectares de terrains de riziculture irriguée	
- 1991	
- 1996	
5. Nb d'hectares de terrains de culture (tavy ou autres)	
- 1991	
- 1996	
6. Nb d'hectares d'autres types de végétation (mangroves...)	
- 1991	
- 1996	

Totalité de l'aire protégée :	
1. Nb d'hectares de forêts primaires ou peu dégradées (b)	M
- 1991	
- 1996	
2. Nb d'hectares de forêts secondaires ou dégradées (b)	M
- 1991	
- 1996	
3. Nb d'hectares de savanes	M
- 1991	
- 1996	
4. Nb d'hectares de terrains de culture (tavy, riziculture irriguée,...)	M
- 1991	
- 1996	
5. Nb d'hectares d'autres types de végétation	M
- 1991	
- 1996	

Note :

(a) en plus de ces indicateurs, il est recommandé au PCDI disposant de SIG, de procéder au suivi des îlots forestiers (nombre, périmètre et surface) au niveau des sous-zones cibles.

(b) on entend par forêt secondaire toute forêt dégradée ou de moins de vingt (20) années d'âge.

ANNEX 3: WORK SHEETS ON HOW INDICATOR IS CALCULATED

Fiche : 1

Composante : CAPE

Libellé court de l'Indicateur : Nb de dossiers de changement de statut d'AP

Code: CAPE1

Résultat à atteindre ou objectif recherche : Réseau d'AP conforme à la mission de l'ANGAP

Description de l'indicateur : Dossier technique de changement de statut complet et déposé à la DEF

Formule : somme des dossiers déposés (valeurs cumulées)

Source de la mesure : ANGAP/ DOGR

Methode de mesure : Comptage récépissés DEF

Responsable de la mesure : ANGAP

Valeurs a la fin de chaque annee:

PA0: 6	PA1: 7	PA2: 8	PA3: 9	PA4: 10	PA5: 11
Post: 12	Annee: 2007				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures : Annuelle

Cout de chaque mesure et cout total: 0

Autres remarques

- Chaque dossier doit être conforme au manuel de procédures DEF/ANGAP
- Les dossiers actuellement déposés à la DEF sont :
  - Zahamena
  - Ankarafantsika
  - Bemaraha
  - Ranomafana
  - Masoala

- Indicateur interne de l'ANGAP

Fiche : 2

Composante : CAPE

Libelle court de l'Indicateur : Niveau d'élaboration de structures opérationnelles de gestion des AP niveau A

Code: CAPE2

Resultat a atteindre ou objectif recherche : Conserver le réseau national des AP à travers des structures opérationnelles.

Description de l'indicateur : Une structure opérationnelle représente l'aboutissement d'un processus de mise en oeuvre. Le niveau d'avancement de ce processus est déterminé pour chaque AP de niveau A et consolidé pour l'ensemble des AP de niveau A.

Formule :

	AP1	AP2	APn
Limites définies et matérialisées	1		
Système de controle opérationnel	1		
Relations entre AP et communautés riveraines clairement établies	1		
Structure de gestion de parc en place	1		
Plan de développement écotouristique en place	1		
Système de redistribution des droits d'entrées auprès des communautés riveraines en place.	1		
Système de suivi-évaluation socio-économique et écologique en place.	1		
Plan de gestion existe et mis en application.	1		
TOTAL	T1	T2	Tn

1 Point par étape, 8 points possibles par AP, score maximum 8 x nb AP
Résultat exprimé en %: $(\sum Tn) / (8 \times n)$

Source de la mesure : ANGAP

Methode de mesure : Rapports Annuels de chaque AP

Responsable de la mesure : ANGAP/DOGR

Valeurs a la fin de chaque annee:
PA0: 50 % PA1: 60% PA2: 70% PA3: 80% PA4: 90% PA5: 100%
Post Annee:

Verification de la qualite

Objectivite : X
non ambiguite : X
mesurabilite : X
specificite au projet : X
Sensibilite :

Frequence des mesures : annuel

Cout de chaque mesure et cout total: 0

Autres remarques : Indicateur interne ANGAP

Fiche : 3

Composante : CAPE

Libelle court de l'Indicateur : Taux de degradation de la superficie de foret primaire des AP de categorie A

Code: CAPE3

Resultat a atteindre ou objectif recherche : Diminution de la dégradation des habitats naturels dans les AP

Description de l'indicateur : Taux de degradation moyen annuel de la superficie de foret primaire des AP de categorie A

Formule : (Superficie année A - Superficie année A+n) / n

Source de la mesure : Image satellite / Photo aérienne

Methode de mesure : Télédétection (Classification supervisée / Photo interprétation)

Responsable de la mesure : ANGAP/DIVB

Valeurs a la fin de chaque annee:

PA0:	PA1:	PA2	PA3	PA4	PA5
Post	Annee:				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	:

Frequence des mesures : 4 ans

Cout de chaque mesure et cout total : 10x 4000 $=40.000 $

Autres remarques

- 1 mesure durant PE2 (PA5) à partir d'images/photos datant de A4. Les données peuvent être utilisées par d'autres composantes du PE2 et les couts ainsi partagés.
- Les valeurs initiales et prévisionnelles sont en cours de détermination (disponibilité Juin 1996)
- Indicateur interne ANGAP

Fiche : 4

Composante: CAPE

Libelle court de l'Indicateur : Nombre d'AP sous gestion directe de l'ANGAP

Code: CAPE4

Resultat a atteindre ou objectif recherche : Gestion durable et rationnelle du reseau d'Aires Protegees

Description de l'indicateur :

Formule : sans

Source de la mesure : ANGAP

Methode de mesure

Responsable de la mesure : ANGAP/DOGR

Valeurs a la fin de chaque annee:

PA0: 2	PA1: 9	PA2: 10	PA3: 10	PA4: 10	PA5: 11
Post	Annee:				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures: annuelle

Cout de chaque mesure et cout total : 0

Autres remarques

Fiche : 5

Composante : CAPE

Libelle court de l'Indicateur : Pourcentage d'autonomie financiere de l'ANGAP

Code: CAPE5

Resultat a atteindre ou objectif recherche : Autonomie financiere de l'ANGAP.

Description de l'indicateur : Pourcentage d'autonomie financiere

Formule :

$$\frac{\text{Fonds Propres (c.f Tableau)}}{\text{Depenses de fonctionnement (non compris les amortissements)}}$$

Source de la mesure: ANGAP/DRH

Methode de mesure : Analyse de la comptabilite annuelle

Responsable de la mesure : ANGAP/DRH

Valeurs a la fin de chaque annee:

	1995	1996	1997	1998	1999	2000	2001
%	19	-	6,08	6,14	9,30	11,84	14,48

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des m esures : annuelle

Cout de chaque mesure et cout total : Gratuit

Autres remarques

Fiche : 6

Composante : CAPE

Code: CAPE1

Libelle court de l'Indicateur : Nombre d'eleves visitant les AP de categorie A

Resultat a atteindre ou objectif recherche : Les AP sont des lieux d'education et contribuent a la mise en oeuvre de la politique sectorielle d'education environnementale.

Description de l'indicateur : Eleves visitant les parcs "A"

Formule: sans

Source de la mesure : ANGAP

Methode de mesure : Verification des talons de tickets d'entree

Responsable de la mesure : ANGAP/DRHC

Valeurs a la fin de chaque annee:

PA0: 6000	PA1: 7000	PA2: 8000	PA3: 9000	PA4: 10000	PA5: 11000
Post: 20000	Annee: 2010				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures : annuelle

Cout de chaque mesure et cout total : 0

Autres remarques :

Indicateur interne ANGAP

Fiche : 7

Composante: CAPE

Libelle court de l'Indicateur : Nombre de centres d'interpretation operationnels

Resultat a atteindre ou objectif recherche : Les AP sont des lieux d'education et contribuent a la mise en oeuvre de la politique sectorielle d'education environnementale.

Description de l'indicateur :

Formule :

Source de la mesure : ANGAP

Methode de mesure : Comptage des CI en activité

Responsable de la mesure : ANGAP/DRHC

Valeurs a la fin de chaque annee:

PA0: 2	PA1: 5	PA2: 7	PA3: 8	PA4: 9	PA5: 10
Post: 11	Annee: 2005				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures : annuelle

Cout de chaque mesure et cout total :0

Autres remarques

Fiche : 8

Composante: CAPE

Libelle court de l'Indicateur : Taux d'augmentation annuel des touristes des Parcs de Niveau A

Resultat a atteindre ou objectif recherche : Les aires protegees sont des lieux de recreation connus et visités.

Description de l'indicateur : Pourcentage d'augmentation des touristes des Parcs Niveau A

Formule : $\frac{TPA_{(n+1)} - TPA_{(n)}}{TPA_{(n)}} \times 100$

$TPA_{(n)}$: nombre de touriste durant l'annee PA_n

Source de la mesure : ANGAP

Methode de mesure : Analyse des situations tickets d'entrée

Responsable de la mesure : ANGAP/DRHC

Taux d'augmentation par rapport a l'annee precedente (pour Parc de Niveau A):

PA0: 0 PA1: 30% PA2: 30% PA3: 20% PA4: 20% PA5: 20% PA6: 20%
Post Annee:

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures : annuelle

Cout de chaque mesure et cout total : 0

Autres remarques: Il est possible d'utiliser egalement les valeurs suivantes pour le nombre total des touristes:

PA0: 32.358 - PA1: 42.000 - PA2: 55.000 - PA3: 66.000 - PA4: 79.000 - PA5: 95.000 PA6: 114.000

Fiche : 9

Composante: CAPE

Libelle court de l'Indicateur : Degré de recouvrement des dépenses totales par les recettes écotouristiques

Résultat à atteindre ou objectif recherché : Les aires protégées sont des lieux de récréation connus et visités.

Description de l'indicateur : Pourcentage des dépenses couvertes par les recettes ecotouristiques

Formule : ½ DEAP + Recettes Service Vente des Parcs + Recettes Ventes diverses

Source de la mesure : ANGAP

Methode de mesure :

Responsable de la mesure : ANGAP/DAF

Valeurs a la fin de chaque annee: %

PA0: 0,37	PA1: 3,08	PA2: 3,42	PA3: 6,62	PA4: 9,04	PA5: 11.35
Post	Annee:				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures : annuelle

Cout de chaque mesure et cout total : 0

Autres remarques

Fiche : 10

Composante: CAPE

Libelle court de l'Indicateur : Montant total des DEAP disponibles pour micro-projets dans les ZP des AP Niveau A

Resultat a atteindre ou objectif recherche : ANGAP contribuent au developpement economique des populations riveraines des ZP des AP

Description de l'indicateur : Le montant des DEAP disponibles pour financer les micro-projets dans les ZP est constitue de 50% des droits d'entree dans les AP. L'indicateur ne prend en consideration que pour les AP de niveau A.

Formule :

Source de la mesure : ANGAP

Methode de mesure : Valeur des 50% des DEAP de chaque parc par an

Responsable de la mesure : ANGAP/DAF

Valeurs a la fin de chaque annee:

PA0	PA1	PA2	PA3	PA4	PA5
Post	Annee:				

Verification de la qualite

Objectivite	: X
non ambiguite	: X
mesurabilite	: X
specificite au projet	: X
Sensibilite	: X

Frequence des mesures : annuelle

Cout de chaque mesure et cout total : 0

Autres remarques

References Cited:

1. Brando and Wells, "Planning for People and Parks: Design Dilemmas", World Development, Vol. 20, No. 4, pp. 557-570.

2. Bruce Larson, "Changing the Economics of Environmental Degradation in Madagascar: Lessons from the National Environmental Action Plan Process", World Development, Vol. 22, No.5, pp. 671-689.

3. Richard Swanson, "Development for Conservation: Monitoring and Evaluation, Tropical Research & Development, ANGAP Madagascar , August 1994.