A MATRIX FOR THE INDIRECT MONITORING OF THE DEGREE OF BIODIVERSITY CONSERVATION THROUGH THE EVALUATION OF THE MANAGEMENT CAPACITY OF PROTECTED AREAS

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This report was written by Pedro G Vasquez
with the collaboration of Vanessa Irus

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TITLE

A Matrix for the Indirect Monitoring of the Degree of Biodiversity Conservation Through theEvaluation of the Management Capacity of Protected Areas

AUTHOR

Pedro G Vasquez Vanessa Irus

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CONTRACTOR NAME

Pedro G Vasquez, Vanessa Irus

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SUMMARY

The need to preserve natural diversity or biodiversity is a topic receiving increasing attention among the community at large, because it is a worldwide concern, with interest concentrated on those areas known as megadiversity regions

Peru, which possesses a rich diversity of wild plant and animal species, and is not excluded from this concern The protection of biodiversity in Peru is considered to be a priority, due to the high degree of threat to which it is exposed and its importance for the satisfaction of the needs of the population

During this century, the importance of the role of protected areas in the conservation of biodiversity throughout the world has been widely recognized, and this strategy has also been adopted in Peru, through the creation of the System of Natural Areas Protected by the State (SINANPE), which is administered by the National Natural Resources Institute (INRENA) The principle mission of the protected areas system is to protect representative samples of the natural diversity of Peru for future generations This can only be achieved if a certain number of minimum requirements are met, both of an administrative nature (legal and policy framework, availability of human and financial resources, etc) and those related to the planning and management of these areas (management plans, zoning, feedback mechanisms and different levels of local participation)

While it is true that ideally an evaluation of the effectiveness of the protected area system should address the issue of their effectiveness in the protection of biodiversity, this could only be achieved through the ongoing monitoring of landscapes, ecosystems and species, which would require a considerable investment in terms of both time and money For this reason, the methodology proposed here provides an indirect method for measuring the degree of biodiversity protection, in terms of the capacity of protected areas to attain their objectives

An indirect evaluation is thus proposed based on the evaluation of information available from secondary sources regarding the administration of each protected area, taking into account 12 elements which are important for the definition of the capacity of protected areas to attain their objectives An important advantage of this process is that it makes use of information which is already available and thus does not involve laborious processes or extensive fieldwork, which would add to the cost of the undertaking At the same time it is important to point out that the process of validation of the results obtained through the application of the methodology (matrix for the synthesis and analysis of existing information) will require the more detailed evaluation of selected protected areas, as a sub sample of the protected area system Success in collecting the necessary information will depend on the facilities provided by the organizations which possess or manage the information concerned

The effectiveness of the protected area system in ensuring the survival of a representative sample of Peru's biodiversity is not only a necessity We are also obliged to be sure that this is what is happening Practical models for the evaluation of these areas, which allow us to identify gaps or limitations in the accomplishment of this mandate, are thus indispensable

The aim of the authors of this document and of the Regional Development Office of US-AID is to propose and simple and practical system which will allow progress in the management of protected areas to be identified, using information available among the different sectors which together make up the protected area system, and, if progress is not being made, to provide early warning of problems and limitations

A matrix which provides clear and detailed information regarding the degree of management efficiency in each protected area will permit planners of the protected area system to rapidly identify weaknesses in the management of biodiversity protection The matrix presented here aims to give the planner the opportunity to see at a glance which component of his management or administration program requires improvement, and where support should be directed towards to obtain the best results

In the application of this methodology, account should be taken of the fact that

a) It does not provide direct information about the quality of biodiversity protected, since the analysis does not involve a study of biological factors, such as the viability of populations or the recovery of threatened species

b) Neither can it be inferred from the matrix which protected area unit is best or most important from a biogeographical point of view

c) The analysis of the state of wild populations or their habitats requires more information, which in the majority of cases has not yet been generated and thus is not available for immediate analysis

The need for a tool which permits the measurement of the quality of effectiveness of the management and administration of protected areas is not one that has only been identified recently Since 1982, a number of monitoring systems has been proposed, which have provided the basic criteria for analysis

The increasing rate of establishment of protected areas has been greater than the rate of improvement in the quality of management of these areas While a number of important advances have been made in this respect, it is also true that there is a need for methodologies which permit the ongoing monitoring of management quality It is thus clearly the case that skills in the management of management effectiveness are of crucial importance for monitoring of the overall health of protected areas, and for identifying priority actions aimed at correcting limitations in their management programs

The elements selected for inclusion in this matrix are easily quantifiable and directly related to management effectiveness, as well as being relevant to almost all categories of Peruvian protected areas These elements provide coverage of the basic fields which affect management effectiveness, including legal, administrative and planning aspects, the state of knowledge of the area, present use and threats originating from other interests of State

These six dimensions or fields, which contain the groups of variables or elements to be assessed within the matrix, affect administration effectiveness with varying degrees of intensity and their influence in the matrix has been weighted accordingly Legal Field 6%, Administrative

Field 40%, Planning Field 30%, Knowledge of the Area Field 9%, Present Use of Resources Field 9% and Threats Field 6%

It shouldn't be forgotten that this matrix represents an effort of synthesis, whose only objective is to process secondary data in order to permit the evaluation of the great undertaking which the management of the protected area systems represents for a country with limited resources like our own

The processing of data obtained for each element and its components required the use of assessment tables and correction factors, as well as the assignment of its respective weighting factor to each element to be incorporated in the matrix

For each element in the matrix, an optimal scenario has been defined against which each specific situation is compared according to the defined criteria These values correspond to the maximum score which can be assigned to each component or element of the matrix These elements, considered as indicators of management effectiveness, are transformed into numerical values using conversion tables defined for each case In each case, higher values represent better management and thus better biodiversity protection Each element contains and is defined by a variable number of components which determine the maximum total score in each case, in an ideal scenario These total scores do not necessarily use the same scales of measurement and don't in themselves reflect the weight or influence of the element on the overall quality of protected area management The use of weighting factors applied to each variable is intended to resolve this problem

The final value determined for the sample as a whole is the value for comparison during each year of period being evaluated (1996-2000) Logically, increases in the value will signify *a priori* improvement in management standards and thus improved protection of biodiversity The resultant values should also permit the identification of priority elements or elements with a significant impact on the effectiveness of the management of the system This possibility means that the matrix will have a practical value for prioritizing actions in support of the protected area system

The validation of the values obtained in this way, and the explanation of how they exert their influence over management measures, are processes which it would obviously be desirable to carry out, but which would require the generation of primary information, by means of questionnaires, periodic evaluations and/or interviews undertaken in a sub sample of selected protected areas

The proposed methodology has been applied to a sample of 14 protected areas with the aim, firstly, of adjusting the methodological process in accordance with the actual availability of information and, secondly, to establish base line data against which the results of subsequent applications of the matrix can be prepared

As a result of the application of this matrix, values have been obtained for each element and for each protected area, which taken together indicate an overall effectiveness of 45%

It should be stressed that the proposed matrix can not be used to make comparisons of factors not related to the administrative capacity for the efficient management of protected areas

Naturally there is a risk that the matrix will be applied in an inappropriate way, for example by feeding in false information or adjusting the results to present an unrealistically optimistic vision of the state of protected area administration For this reason, the validation of the results obtained by the application of the matrix is of prime importance, by means of evaluations which correlate these results to data pertaining to the achievement of the objectives of the protected area in question

There are a number of risks associated with the application of this matrix Inaccurate results could be obtained if the processed information is inaccurate or untrue It would also be easily possible to tamper with the optimal scenarios to give an impression of effectiveness which in reality didn't exist This latter possibility could be detected during the process of validation, as recommended above

It is clearly the case, as was confirmed during the collection of information for use in the application of the matrix, that at present no complete or systematic data base exists for the ongoing monitoring of the progress of the protected area system, and in fact there is a complete absence of any kind of monitoring program These observations apply to all the dimensions incorporated in the matrix

These authors of this methodology consider that it would be a practical option for the administrative authority of the protected area system to analyze the results of a periodic application of the matrix, since this would enable them to identify gaps and limitations which restrict their management effectiveness in a very visible way This could also be a first step towards identifying priorities actions aimed at correcting these weaknesses and provide a stimulus for the establishment of complete and systematic data base to improve the capacity for management of information relating to the protected area system

Contents

I Introduction

The issue of biodiversity conservation, which isn't new in scientific circles, is being taken up ever more frequently by the community in general This issue is now a worldwide concern, both on account of its recognized importance for the satisfaction of human needs, and because of the continuing deterioration and threats confronting biodiversity over much of the planet This is also the case in Peru, one of twelve mega-diversity countries in the world

Proof of the existence of this concern in Peru can be seen in the official adherence by Peru to the Biodiversity Convention in 1993, and the inclusion of articles referring to the conservation of the environment in the Political Constitution of the State (1993) and the Penal Code (1991), and the promulgation of the Environment Code (1992)

The role of protected areas in the conservation of biodiversity is widely recognized to be an efficient and effective method for the *in situ* conservation of ecosystems and the maintenance and/or recuperation of wild populations of plants and animals in their natural habitats It is also recognized that protected areas can only fulfil this role if a minimum set of requirements are met both of an administrative nature (legal and policy framework, availability of human and financial resources, etc) and those related to the planning and management of these areas (management plans, zoning, feedback mechanisms and different levels of local participation)

While it is true that ideally an evaluation of the effectiveness of the protected area system should address the issue of their effectiveness in the protection of biodiversity, this could only be achieved through the ongoing monitoring of landscapes, ecosystems and species, which would require a considerable investment in terms of both time and money For this reason, the methodology proposed here provides an indirect method for measuring the degree of biodiversity protection, in terms of the capacity of protected areas to attain their objectives

The responsibility of the National System of Natural Areas Protected by the State (SINANPE) and society in general for guaranteeing the protected of the country's biodiversity is clear It is thus not only that the effectiveness of SINANPE in ensuring the protection of a representative sample of this biodiversity is a necessity, we also have an obligation to be sure that this is what is occurring Practical models for evaluating the effectiveness of the system, which allow us to identify gaps and limitations in the fulfillment of this mandate, and thus indispensable

The aim of the authors of this document and of the Regional Development Office of US-AID is to propose and simple and practical system which will allow progress in the management of protected areas to be identified, using information available among the different sectors which together make up the protected area system, and, if progress is not being made, to provide early warning of problems and limitations

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c) The analysis of the state of wild populations or their habitats requires more information, which in the majority of cases has not yet been generated and thus is not available for immediate analysis

For optimal decision-making, it is to be recommended that the planners of the protected area system have other complementary tools at their disposal, such as the matrices developed by the FANPE Project for prioritizing investments or for categorizing areas to be protected

II Background

2 1 The Natural Areas Protected by the State

Protected areas are spaces within the national territory, continental or maritime, legally established and protected by the State with the specific aim of the conservation of biodiversity and other associated values of cultural, landscape or scientific interest The natural condition of these areas should be maintained in perpetuity, with the possibility in some cases of permitting the regulated and limited use of certain resources

These natural areas possess features or qualities of national significance, being representative of the different ecosystems, association and populations of wild flora and fauna, and play an essential role in ensuring the conservation of biodiversity, as well as fulfilling important functions in the provision of ecological services In addition they often possess other attributes of equal significance, such as aesthetic, monumental or landscape qualities, as well as notable physiographic, geological geomorphological or other geological characteristics, cultural features and important archaeological sites

The legal antecedents of protected areas in Peru date from 1940 with the signing of the Convention for the Protection of the Flora, Fauna and Scenic Beauty of the Western Hemisphere was signed, and subsequently ratified by Peru in 1946 In 1961, the first National Park was established in the Province of Cutervo, Department of Cajamarca In 1971, the Convention of Wetlands of International Importance, Especially as a Habitat for Aquatic Birds was signed, and ratified by Peru in 1991 (Legislative Resolution 25353) In 1972, the World Heritage Convention was signed in Paris, and ratified by Peru in 1982

In 1975, the Law of Forestry and Wild Fauna was passed (D L 21147), which defined the legal framework for protected areas, being complemented by the Regulation of Conservation Units in 1977 (D S 160-77-AG) In 1978, Peru subscribed to the Amazon Cooperation Treaty, and the Special Environment Commission for Amazonia was set up in 1989 In 1990, the structure of the National System of Conservation Units was amended to establish the National System of Natural Areas Protected by the State (D S 010-90-AG) Article 68 of the new Political Constitution of the State (1993) stipulates the duty of the state to promote the conservation of biological diversity and the natural protected areas This obligation is underlined in the Environment Code (Articles 50-54 of Legislative Decree 613) and also in the Convention on Biological Diversity, ratified by Legislative Resolution 26181 in 1993

According to the General Law of the Ministry of Agriculture (Legislative Decree 25902 and Supreme Decree 055-92-AG), the agency responsible for the administration of protected areas is the General Directorate of Natural Protected Areas and Wild Fauna of the National Institute of Natural Resources (INRENA) It is worth drawing attention to the active role-played by non-government organization in the development and management of several of the areas which make up the national protected areas system

2 2 Objectives of the Natural Protected Areas

According to the draft version of the SINANPE Directive Plan, the objectives of the natural protected areas are

- Protect and improve environment quality
- Protect and preserve samples of biological diversity
- Maintain essential ecological processes and stop their damage
- Preserve, increase and manage renewable natural resources and use them sustainable
- Preserve, conserve, restore and improve air, water, and the quality of natural hydrological systems
- Conserve, restore and improve the productive capacity of soils
- Protect and conserve representative samples of every species of native wildlife and their genetic diversity
- Protect, conserve and restore distinctive landscapes
- Conserve geological, geomorphologic and physiographic formations
- Protect, conserve and restore the natural landscapes where samples of the Nation's cultural heritage are to be found, or which were the site of glorious events in the history of the nation

2 3 The Natural System of Natural Areas Protected by the State (SINANPE)

According to the legislation in force, the National System of Natural Areas Protected by the State (SINANPE) is formed by following categories National Parks[1], National Sanctuaries[2], Historic Sanctuaries[3], National Reserves[4], Protection Forests[5], Hunting Areas[6] and Communities Reserves[7] At present, we have 35 natural protected areas (Figure N°1), in the above-mentioned categories that cover a total of 6'820,337 04 ha Additionally, 10 zones reserved by the State for conservation purposes have been established These reserved zones have a transitory status until a definitive category in the SINANPE is assigned The reserved zones cover a total area of 3'403,363 84 ha

1 National Parks Areas destined for protection of wildlife, natural associations and landscapes so that it remain in a complete natural state (Art 16, D L 21147)

2 National Sanctuaries Areas destined to protect species or communities of certain plants or animals in a natural state They can also protect geologic formations of scientific or land scope interest (art 18, D L 21147)

3 History Sanctuaries Areas destined to protect in a natural state those areas important in Peruvian history (art 19, D L 21147)

4 National Reserves Areas where wildlife species of national conservation interest are protected Under some conditions wildlife in these areas can be utilized When the National Reserves must be established on agricultural lands, the Ministerio de Agricultura would approve that the utilization of wildlife would be done by the traditional managers of these lands (art 17, D L 21147)

5 Protection Forests Areas that by their characteristics and location are useful for the soils and waters conservation, to protect agricultural lands, roads or different and towns, such as to guarantee the availability of water for agricultural, industrial and human consumption (art 12, D L 21147)

6 Hunting Areas Areas destined to wildlife management for sport hunting (art 59, D L 21147)

7 Communities Reserves Areas destined to the wildlife conservation for the benefit of local people for which this resource is a traditional source of food (art 60, D L 21147)

Figura N° 1 Peruvian Protected Area System

National Park | National Reserve | National Sanct | Historic Sanct | Reserved Zone | Hunting Area | Community Reserve | Protected Forest

Table N°1 shows all the areas in the system, classifying them according to category, date of establishment and size

The conception of a natural protected areas system is based on the idea that its elements make an ordered whole, interacting and functioning organically, and encompassing the following components

a) **The physical component** formed by the network of natural protected areas

b) **The social component** formed by all the different sectors of government linked through their activities with the protected areas

c) **The legal framework supporting the system**

d) **Interactional elements**

The mission of SINANPE is to contribute to a sustainable development of the country through an efficient management of the natural protected areas, guaranteeing the contribution of their environmental, social and economic benefits to society

2 4 Biological representativity in the SINANPE

Peru, a megadiversity country, contains in its territory a notable percentage of the world's biological diversity, marine and continental This diversity is shown by the high number of biomes, ecosystems and the high species diversity existing in Peru

2 4 1 Biological Representativity Criteria

These are the criteria, which establish the values of the Peru's biological diversity that should be covered by the natural protected areas at an ecosystem, species and genetic level This means

- At least one sample of each region, landscape and ecosystem
- At least one population of each known species
- At least one population of each subspecies or genetic variation especially of wild relatives of domesticated species originating from Peru

To select the sites which best represent the biological diversity of the country, the following criteria have been established (INRENA, 1996)

a) Regions ecosystems and landscape diversity

Within the great ecological regions or biomes, those areas whose diversity of ecosystems and landscapes includes several kinds of vegetation, soils, climates, geology and geomorphological formations are of the highest priority This kind of area is important because many ecological and evolutive processes are associated with them and they also

Table N° 1 National System of Natural Areas Protected by the State

Category	Name	Legislation	Date	Area (ha)
National P	Cutervo	Law 13694	20 09 61	2 500
National P	Tingo Maria	Law 15574	14 05 65	18 000
National P	Manu	D S 644-73-AG	29 05 73	1 532 806
National P	Huascaran	D S 622-75-AG	01 07 75	340 000
National P	Cerros de Amotape	D S 800-75-AG	22 07 75	91 300
National P	Rio Abiseo	D S 064-83-AG	11 08 83	274 520
National P	Yanachaga-Chemillen	D S 068-86-AG	29 08 86	122 000
National P	Bahuaja-Sonene	D S 012-96-AG	17 07 96	5 370 053,25
Total National Parks				**2 918 179,25**
National R	Pampa Galeras	R S 157-A	18 05 67	6 500
National R	Junin	D S 750-74-AG	07 08 74	53 000
National R	Paracas	D S 1281-75-AG	25 09 75	335 000
National R	Lachay	D S 310-77-AG	21 06 77	5 070
National R	Pacaya-Samiria	D S 016-82 AG	04 02 82	2 080 000
National R	Salinas y Aguada Blanca	D S 070-79-AG	09 08 79	366 936
National R	Calipuy	D S 004-81-AA	08 01 81	64 000
National R	Titicaca	D S 185-78-AG	31 10 78	36 180
Total National Reserves				**2 946 686**
National S	Huallay	D S 750-74-AG	07 08 74	6 815
National S	Calipuy	D S 004-81-AA	08 01 81	4 500
National S	Laguna de Mejía	D S 015-84 AG	24 02 84	690,6
National S	Ampay	D S 042-87-AG	23 07 87	363,5
National S	Mangroves of Tumbes	D S 018-88-AG	02 03 88	2 972
National S	Tabaconas-Namballe	D S 051-88-AG	20 05 88	29 500
Total National Sanctuaries				**44 841,1**

Table N° 1 National System of Natural Areas Protected by the State (SINANPE) cont

Category	Name	Leglislation	Date	Area (ha)
Historic S	Chacamarca	D S 750-74-AG	07 08 74	2 500
Historic S	Pampas de Ayacucho	D S 119-80-AA	14 08 80	300
Historic S	Machupicchu	D S 001-81-AA	08 01 81	32 592
Total Historic Sanctuaries				**35 392**
F Protection	Aledaño a la Bocatoma de Nuevo Imperial	R S 087-80-AA-DGF	19 05 80	18,11
F Protection	Puquio Santa Rosa	R S 434-82-AG/D	02 09 82	72,5
F Protection	Pui Pui	R S 042-85-AG	31 01 85	60 000
F Protection	San Matias-San Carlos	R S 101-87-AG	20 03 87	145 818
F Protection	Alto Mayo	R S 293-87-AG	23 07 87	182 000
F Protection	Pagaibamba	R S 222-87-AG	19 06 87	2 078,38
Total Protection Forests				**389 986,99**
Hunt Area	El Angolo	R S 264-75-AG	01 07 75	65 000
Hunting Area	Sunchubamba	R M 462-77-AG	22 04 77	59 735
Total Hunting Areas				**124 735**
Communal R	Yanesha	R S 193-88-AG/DGFF	28 04 88	34 744,7
Communal R	Tamishiyacu-Tahuayo		1991	322 500
Total Communal Reserves				**357 244,7**
Total SINANPE				**6 817 065,04**

Table N °1 National System of Natural Areas Protected by the State (SINANPE) cont

Category	Name	Leglislation	Date	Area (ha)
Reserved Zone	Manu	R S 151-80-AA/DGFF	26 06 80	257 000
Reserved Z	Laquipampa	R M 692-82-AG	05 10 82	11 346,9
Reserved Z	Apurimac	R S 186-88-AG	28 04 88	1 669 200
Reserved Z	Pantanos de Villa	R M 144-89-AG	28 05 89	396
Reserved Z	Batan Grande	D S 031-91-ED	16 10 91	13 400
Reserved Z	Tumbes	R M 594-94-AG	28 09 94	75 102
Reserved Z	Algarrobal El Moro	D S 002-95-AG	13 01 95	320,69
Reserved Z	Chancaybaños	D S 001-96-AG	14 02 96	2 600
Reserved Z	Aymara-Lupaca	D S 002-96-AG	01 03 96	300 000
Reserved Z	Tambopata-Candamo	D S 012-96-AA	17 07 96	1 073 998,25
Total Reserved zones				**3 403 363,84**
Total SINANPE and Reserved Zones				**10 223 700,88**

contain a wide range of species, known and unknown to science, in populations sufficiently large to adequately represent their genetic diversity Regarding the smaller biomes, including those which are found only in Peru or shared with neighboring countries (e g Lake Titicaca), make up small ecosystems or are represented only to a very limited extent in Peru, the aim is to include the maximum possible absolute area within protected areas, according them the highest category of protection

b) Specific diversity

In this case, the objective is to include as far as possible the maximum number of families, genus and species in the set of areas Therefore, zones or centers of high species diversity will be a priority

Since areas of high diversity of one taxonomic groups do not necessarily coincide with those of other groups, the principle of the complementarity of areas will be adopted, and applied on the basis of the complement or complete list of known species of a taxonomic group

At this level it is also necessary to add criteria such as biogeographical barriers and the events of geological history which enable us to identify *a priori* sites with a distinct flora and fauna, above all when information relating to their precise distribution is scarce or if their are gaps in the information available Also to be recommended is the consideration of centers of dispersion, endemism or origin of groups of species, to the extent that these are known

c) Endemism

All the wild species, genus and families unique to Peru and, in general, all the species with a restricted geographic distribution, must be with in the Natural Areas Protected by the State

d) Rareness

Numerous or single populations of species of flora and fauna considered to be in the process of extinction, rare, or vulnerable, which, whether as a result of pressures arising from the use of these species or the destruction of their habitats, or naturally low population densities, have lost their capacity for recuperation, will be protected by the protected area system

e) Genetic diversity

Effectiveness in preserving samples of biological diversity requires an evaluation, not only of ecosystems and species, but also of the degree of protection of the genetic diversity of species

f) Additional criteria

Resting places during migration These areas a located on well-known migration paths of

species such as birds and other animals with a very wide distribution ranges

Connectivity, The design of the network of areas making up the system must avoid the creation of "natural habitat islands", in order to prevent the isolation of populations, interruption of genetic flow, and the creation of new barriers to dispersal

Likewise, it is necessary to ensure that the latitudinal gradients are properly interconnected, protecting complete gradients throughout valleys wherever possible Ideally, all the natural protected areas should be interconnected by natural areas that function as biological pathways

Size The Natural Areas Protected by the State should be a large as possible Areas which are too small will be unable to ensure the continuity of natural ecosystem processes, maintain populations above their minimum viable size, or conserve the genetic diversity of species

Potential for Buffer Zones Wherever possible, the design of a Natural Area Protected by the State should include territories which permit the continued protection of what is of interest, regardless of future changes resulting directly from human impacts or caused by environmental factors

Potential for restoration This criterion is very important for unique or very special ecosystems Priority zones and zones of special interest which have been extensively modified as a result of human impacts can be declared protected areas if their ecological restoration is feasible

III Methodology for matrix processing

The need for a tool which permits the measurement of the quality of effectiveness of the management and administration of protected areas is not one that has only been identified recently Since the III World Congress of National Parks in 1982, a number of monitoring systems have been proposed, which have provided the basic criteria for analysis

The increasing rate of establishment of protected areas has been greater than the rate of improvement in the quality of management of these areas While a number of important advances have been made in this respect, it is also true that there is a need for methodologies which permit the ongoing monitoring of management quality It is thus clearly the case that skills in the management of management effectiveness are of crucial importance for monitoring of the overall health of protected areas, and for identifying priority actions aimed at correcting limitations in their management programs

During the VI World Congress on National Parks and Protected Areas (1992) an evaluation methodology based on 10 management fields (Personnel, infrastructure, boundaries, financing, local support, legislation, management plans, management objectives, feedback and threats) was presented This model included a numerical evaluation system and classification of management according to the final score ranges obtained by adding together all the individual variables or elements

The matrix proposed in this document is based on 12 variables or elements which are easy to evaluate, using secondary data, that is, information which is available in existing data bases or in the offices of government and non-government organizations carrying out programs to support the management of protected areas

The elements selected for inclusion in this matrix are easily quantifiable and directly related to management effectiveness, as well as being relevant to almost all categories of Peruvian protected areas These elements provide coverage of the basic fields which affect management effectiveness, including legal, administrative and planning aspects, the state of knowledge of the area, present use and threats originating from other interests of State

These six dimensions or fields, which contain the groups of variables or elements to be assessed within the matrix, affect administration effectiveness with varying degrees of intensity, and their influence in the matrix has been weighted accordingly as shown in the table below

FIELD	Weighting Factor in management effectiveness
Legal	6%
Administrative	40%
Planning	30%
Area knowledge	9%
Management of conflict with the natural resources use	9%
Threats Management	6%

These values have been determined on the basis of an analysis of influence of the elements selected for each management field To get to these values we have consulted with ex Directors of the protected areas system and with the current Director General of the National Protected Areas and Wildlife of INRENA

The weighting factors suggested by these authorities and those proposed by the authors, were averaged to get a number which provides a realistic reflection of the influence of these elements in the effectiveness of protected areas management

3 1 Methodology for information collection

At present, the information required to feed into the proposed matrix is processed in many different ways by the different organizations involved in protected area management, and, according the tasks of the organization concerned, the information is to be found in data bases with different levels of organization and management

While an important advantage of this process is that it makes use of information which is already available and thus does not involve laborious processes or extensive field work, which would add to the cost of the undertaking, at the same time it is important to point out that the process of validation of the results obtained through the application of the methodology will require the more detailed evaluation of selected protected areas, as a sub sample of the protected area system

Success in collecting the necessary information will depend on the facilities provided by the organizations which possess or manage the information, and for this reason it is important that the characteristics and scope of the matrix should be explained to the organizations concerned

The information required to process this evaluation matrix may be stored in specially defined forms, which however is not essential for a good analysis of the data

3 2 Information processing

The processing of data obtained for each component and element of this matrix are explained in the paragraph 3 4 below in this document At the moment when each element and its components are described, the evaluation tables and the correcting or adjusting factors are assigned Likewise, for each element, the weighting factors values to be used in the matrix are assigned Furthermore, all the mechanical processes as well as the additional criteria to be used are presented

3 2 1 Score system for the evaluation matrix of SINANPE

For each matrix element an optimum scenery has been defined, against which a determined situation based on specific criteria is compared These values correspond to maximum scores assigned for each component or element
In some cases, the assignation of scores or evaluation is done based on percentage ratios of the existing situation to the previously defined optimum In others cases, a specific criterion of quality is applied It is also possible to define a total value for a determined area The addition of all of these values will give a total value for the system, for which the maximum possible value or the optimum value in an ideal scenario can also be determined

These elements, considered as management effectiveness indicators will be converted into numeric values through the application of conversion tables, defined for each case The principle to be applied is that the highest values considered for each matrix element will the best management quality level and therefore biodiversity conservation Each element has a variable number of components that define it, and its maximum total scores, in an ideal scenario, are not necessarily measured using the same scale For this reason they may appear arbitrary and not reflective of the weight or incidence of the element over the management quality of the protected area Thus, if the "personnel" element has a maximum final score of 4 (four) and the "financing" element which processed in different way has a maximum value of 1 (one), this does not mean that, for management purposes, the first element is four times as important as the second one This problem is solved by the application of weighting factors for each variable, as was explained in the introduction to section III

Each one of the 12 elements to be processed in this matrix will reflect, in its score, the state of management efficacy of in a determined area or for the whole sample of the selected protected areas Table N°2 presents the 12 matrix elements grouped by fields and also the weighting factors assigned, in order to clearly show their influence over management effectiveness Hence, the maximum score for the sample under an ideal or perfect scenario will be 100 points if we only consider one protected area in the matrix This value must be multiplied by the number of areas to be included in the matrix to obtain the value or maximum or ideal score for this SINANPE sample

The final value determined for the sample as a whole is the value for comparison during each year of period being evaluated (1996-2000) Logically, increases in the value will signify *a priori* improvement in management standards and thus improved protection of biodiversity The resultant values should also permit the identification of priority elements or elements with a significant impact on the effectiveness of the management of the system This possibility means that the matrix will have a practical value for prioritizing actions in support of the protected area system

The validation of the values obtained in this way, and the explanation of how they exert their influence over management measures, are processes which it would obviously be desirable to carry out, but which would require the generation of primary information, by means of questionnaires, periodic evaluations and/or interviews undertaken in a sub sample of selected protected areas

Table N° 2 WEIGHTING TABLE FOR THE EVALUATION MATRIX

Management Scope	Matrix element	Element Score	Weighting Factor	Maximum Last Value
LEGAL (6%)	Physical/Legal clearing	3	2 00	6 00
ADMINISTRATION (40%)	Personal	4	3 50	14 00
	Infrastructure/equipment	1	12 00	12 00
	Financing	1	14 00	14 00
PLANNING (30%)	Management plans	3	5 00	15 00
	Participative planning	1	4 00	4 00
	Management participative Prog	1	4 00	4 00
	Extension programs	1	3 00	3 00
	Coord With private sector	1	4 00	4 00
KNOWLEDGE OF AREA (9%)	Ecological monitoring programs	5	1 80	9 00
USE OF RESOURCES (9%)	Local participation in sustainable management programs	1	9 00	9 00
THREATS MANAGEMENT (6%)	Management of potential conflicts with other government sectors	1	6 00	6 00
MAXIMUM TOTAL THAT CAN BE REACHED				**100 00**

3 3 The sample of Natural Areas Protected by the State selected for the period 1996 - 2004

In the selection of the 14 protected areas to be monitored during the period 1996 - 2004, the following criteria were taken into account

A **Representativity** Coverage of a Biogeographical Province by the SINANPE (Udvardy 1975), and the presence of important natural associations in specific protected areas For this preliminary analysis the report on the representativity of the National System of Conservation Units (Sistema Nacional de Unidades de Conservación) prepared by the Conservation Data Center (CDC-UNALM) in 1991 was used as a base reference

B **Size** All the conservation objectives of each area are related to the area necessary to attain them, and although, there is no clear rule to follow in the establishment of a particular area, it is accepted that the larger the extension assigned, the better the results which will be obtained

For the application of this criterion, five size range categories were defined (larger than 1,000,000 ha, between 1,000,000 and 500,000 ha, between 500,000 and 100,000 ha, between 100,000 and 50,000 ha and smaller than 50,000 ha)

C **Organizational level** This criterion refers to the existence and application of planning and management tools, such as master plans or operative plans in each natural area At the same time, it takes into account the staffing levels (Park ranges and Chief) and operating budgets

In addition, it takes into account the existence of buffer areas (another complementary categories of protected area with lower status) or the potential for them establishment, as well as the distinction between strictly protected areas and managed resource areas

D **External financial and technical support** This criterion refers to the financial and technical support projects existence, financed by international technical cooperation agencies or non-government organizations (NGO's)

E **Data availability** This criterion considers the availability information for the application of the matrix

For the selection of the sample of natural protected areas had primacy criteria of representativity and size Also it had taken into account additional criteria about the management level and information availability for the area (Table N°3)

Tables N°4 and N°5 present a list of the natural protected areas selected and their participation in representativity coverage at the biogeographical province level Figure N° 2 shows the natural protected areas selected

Table N°3 Selection Criteria for the Natural Protected Area Sample

	Is the only Protected Area in the Biogegraphic Province	Is one of two Protected Area in the Biogeographic Province	The Protected Area includes important natural associations	The Protected Area includes Endemism centers	The Protected Area is site for migratory birds	Area > 1 000 000 ha	Area between 1 000 000 and 500 000 ha	Area between 500 000 and 100 000 ha	Area between 100 000 and 50 000 ha	Area < 50 000 ha	Protected Area with buffer zone	Protected Area with potencial for buffers zones	Strictly Protected Area	Resource management area	Area for extractive use	Protected Area with management plans	Protected Area with personnel and infraestructure	Protected Area with international support	Protected Area with relevant information available
Cutervo NP			x							x			x						
Tingo Maria NP			x							x			x						
Manu NP		x	x		x	x					x		x			x	x	x	x
Huascaran NP			x					x				x	x			x	x	x	x
Cerros de Amotape NP		x	x						x		x		x			x	x	x	x
Rio Abiseo NP			x					x				x	x			x	x	x	x
Yanachaga Chemillén NP			x					x			x		x			x	x	x	x
Bahuaja Sonene NP		x	x		x		x					x	x				x	x	x
Pampa Galeras NR										x				x			x		x
Junin NR			x		x				x		x			x			x		x
Paracas NR		x	x		x			x				x		x		x	x	x	x
Lachay NR			x							x				x		x	x	x	x
Pacaya Samiria NR			x		x	x						x		x		x	x	x	x
Salinas y Aguada Blanca NR	x		x		x			x				x		x		x			x
Calipuy NR		x							x					x					
Titicaca NR	x		x		x					x		x		x		x	x	x	x
Huallay NS										x	x		x						
Calipuy NS		x	x							x			x						
Lagunas de Mejia NS					x					x			x			x	x	x	x
Ampay NS			x							x			x				x		x
Manglares de Tumbes NS		x	x		x					x		x	x			x	x	x	x
Tabaconas Namballe NS			x							x		x	x				x	x	x
Chacamarca HS										x	x		x						
Pampas de Ayacucho HS										x			x						
Machupicchu HS			x							x		x	x			x	x	x	x
Cañete PF										x					x				
Puquio de Santa Rosa PF										x					x				
Pui Pui PF									x						x				
San Matias San Carlos PF								x			x				x				
Alto Mayo PF								x							x				
Pagaibamba PF										x					x				
El Angolo HA			x						x		x			x		x	x		x
Sunchubamba HA									x					x					
Yanesha CR										x	x				x				x
Tamshiyacu Tahuayo CR			x					x				x			x				x

Table N° 4 Natural Protected Areas proposed for inclusion in the matrix

Natural Protected Area	Year	Area (ha)
Manu National Park	1973	1 532 806
Huascaran National Park	1975	340 000
Cerros de Amotape National Park	1975	91 300
Río Abiseo National Park	1983	274 520
Yanachaga-Chemillén National Park	1986	122 000
Bahuaja-Sonene National Park	1996	537 053
Pacaya-Samiria National Reserve	1972	2 080 000
Junín National Reserve	1974	53 000
Paracas National Reserve	1975	335 000
Titicaca National Reserve	1978	36 180
Salinas & Aguada Blanca National Reserve	1979	366 936
Calipuy National Sanctuary	1981	4 500
Mangroves of Tumbes National Sanctuary	1988	2 972
Machupicchu Historic Sanctuary	1991	32 592

Table N° 5 Coverage of Biogeographic Provinces by the Sample of Selected Natural Protected Areas (CDC, 1991)

Biogeographic Province	Natural Protected Area
Equatorial Dry Forest	Cerros de Amotape N P Mangroves of Tumbes N S
Tropical Pacific Desert	Without established area
Sub Tropical Pacific Desert	Paracas N R
Warm Temperate Pacific Desert	Paracas N R
Tropical Southern Andes	Calipuy N S
Sub Tropical Southern Andes	Salinas & Aguada Blanca N R
Warm Temperate Southern Andes	Without established area
Northern Andes	Without established area
Tropical Puna	Huascaran N P Rio AbiseoN P Junin N R
Sub Tropical Puna	Manu N P Salinas & Aguada Blanca N R
Warm Temperate Puna	Without established area
Tropical Yunga	Rio Abiseo N P Yanachaga-Chemillén N P
Sub Tropical Yunga	Manu N P Machupicchu H S
Tropical Amazon	Manu N P Pacaya-Samiria N R
Sub Tropical Amazon	N P Manu N P Bahuaja-Sonene
Titicaca Lake	Titicaca N R

The 14 selected areas include a sample of most important strictly protection areas of the SINANPE and the most important national reserves from a biogeographical and socio-economic view point

Appendix 1 present more details justifying the selection of each one of the 14 natural protected areas selected for this sample of the SINANPE

3 4 Elements of the SINANPE Evaluation Matrix

3 4 1 Legal Field

Field	Element	Components
Legal	Physical/Legal clearing	Concordance between the descriptive memories of boundaries and the official National Geographical Maps Record on National Registries Physical Demarcation

3 4 1 1 Legal and physical clearing of the protected area

This section refers to the degree of concordance between the legal regulations and official maps used to determine the protected area, and the situation on the ground, physical demarcation of boundaries, and the recognition by neighboring population

One of the major problems for compliance with Article N°10 of D S 010-90-AG which orders the inclusion of all the boundaries of the Natural Areas Protected by the State in official maps and national cartography is the impossibility, in most cases, of tracing the boundaries on maps on the basis of the existing written descriptions, need for interpretation of the regulations that created these areas, and the risks that this implies In addition, at present most of the existing areas are not physically demarcated, increasing border conflicts with their neighbors Although the natural protected areas are covered by special regulations, these are not recorded in the National Registries

Components considered under this element

Concordance between the written description of protected area and the Peruvian National Map
Inscription of the protected area in National Registries
Permanent physical demarcation of boundaries in zones of conflict These zones are defined or identified in the management plan

In the case of the first two components scoring will be as follows 1(one) when the above considerations are met in 90 or 100% and 0 (zero) when not For the physical demarcation of the protected area boundaries, the score is 1 (one) if the boundaries of all the zones of conflict included in the management plan are demarcated, and 0 50 (point fifty) if this demarcation is incomplete The maximum score for this element will be 3 under an ideal scenario

For this element the weighting factor is 2 00, and applying it to the maximum score (given by its three components) the final value is 6, that is the combination of this field to overall management effectiveness is 6 %

Worked example

In the case of the Pacaya Samiria National Reserve (PSNR) many aspects must be considered first, the limits described in the legal provisions for the creation[r] and enlargement of this National Reserve include rivers with high hydromorphological activity that have changed their courses Second, the values of the boundary marker coordinates show some differences (90%) compared with the available cartographical information

This National Reserve is not recorded in the National Registries

Although the work of installing the boundary markers and signs posts in the conflict zones has been started, there is much work to do to complete the task

Accordingly, the scores below are assigned to each element component

Concordance between the written description and the National Map	1
Record in the National Registries	0
Physical demarcation of zones of conflict	0 5

Thus, the total score for this National Reserve regarding the Physical/legal clearing element evaluation is 1 5 Applying the weighting factor (2 00) we obtain 3 00 as final value, that is 50% of the maximum value under the ideal scenario for this field (see Table N°2), contributing 3 00% to the overall management effectiveness of the Pacaya Samiria National Reserve

3 4 2 Administration Field

Field	Element	Components
Administration	Personnel	Chief Professionals Park Rangers Administrative/Services
	Infrastructure/equipment	Adm center Control Posts Visitors centers
	Financial support	Budget from Treasury External Funds Direct incomes

3 4 2 1 Personnel

Number of park rangers and staff for each area

All the personnel requirements described in the master or operative plans must be considered for this criterion In the case of areas without such planning documents, the estimates calculated by each area chief-head will be used to define personnel needs

To convert information into a numeric value, the existing relation between the need identified and the personnel working in the area at the time of the evaluation must be taken into account This ratio (expressed in % or decimals) will be the value to be included in the work matrix This assigned value must then be corrected or adjusted using a training criterion

The maximum score to be assigned to each personnel component will be 1 (one) if all the requirements included in the management plan are fulfilled Four types of personnel have been identified in this element Chiefs, Professionals, Park rangers and Administrative and Services Personnel

Four (4) types or categories of personnel are considered Chiefs, Professionals, Park rangers and Administrative and Services personnel Each category obtains (1) one as maximum value Consequently, the total maximum score value for the element "personnel" is four (4) Applying the weighting factor (3 0) over the value obtained in the evaluation (4), we obtain 12 as maximum total score, that is a contribution of 14% to overall management effectiveness

Personnel Training Level

Training involves courses specialized in natural protected areas management given by education centers with experience in this field and in coordination with the national authorities of the natural protected areas system Due to the great variety of training events which have taken place during recent decades, these courses have been classified so that those which

Figura N° 2 Protected Area Selected

National Park

National Reserve

National Sanct

Historic Sanct

really are focused on the field of management, can be selected In the Appendix 2, which describes the application of this matrix to a sample of protected areas, the process and selection criteria are described in more detail

Level I Organized courses at a national level, for training protected area personnel training, in protected area management and related subjects

Level II Organized courses to provide training to personnel of a specific protected area in protected area management and related subjects

Level III Organized courses to provide training to the general public attended by some protected area chiefs or park rangers

Level IV International training courses in protected area management, attended by some chiefs and park rangers

Level V Working days, workshops, seminars and/or congresses dealing with issues related to protected area management

These criteria are used to assess the level of training received by park rangers and chiefs According to the scale given below, a value for training will be assigned, which will be used to correct the value obtained in the section above (number of personnel)

100% park rangers trained in more than one course	1
80-99% park rangers trained in more than one course or 100% park rangers with only one course	0 9
50-79% park rangers trained in more than one course or 80-99% park rangers with only one course	0 7
25-49% park rangers trained in more than one course or 50-79% park rangers with only one course	0 6
1-24% park rangers trained in more than one course or 25-79% park rangers with only one course	0 5
0% park rangers trained in more than one course or 1-24% park rangers with only one course	0 3
0% park rangers trained	0 25

In the case of Chiefs, the value obtained for his presence will be corrected by the following rating

Professional A trained in more than one training course	1
Professional A trained in only one course	0 9
Professional A without training	0 7
Professional B trained in more than one training course	0 95
Professional B trained in only one course	0 8
Professional B without training	0 65
Other Professionals/technicians trained in more than one course	0 75
Other Professionals/technicians trained in only one course	0 6
Other Professionals/technicians without training	0 4

For Professional personnel the evaluation scale is considered as follows

80 - 100%	with at least 1 training course	1
35 - 79%	with at least 1 training course	0 75
0 - 34%	with at least 1 training course	0 5

For the purposes of this methodology, **Professionals A** include all Forestry engineers and Biologists, the only professionals whose academic curricula include subjects directly related to protected area management **Professionals B** include all professionals from other related disciplines such as zootechnicians, agronomists, etc Finally, **Other Professionals** include all the professionals/technicians from non-related disciplines

For Administrative and Service personnel, there is no adjustment for training because these staff are employed with a minimum level of experience and do not require training in the management of protected areas

During the application of the element "personnel" of this matrix, the weighting factor is applied separately in each component The factor for Chiefs is 4 5, for Professionals is 3 5, for Park rangers is 4 and for Administrative/ Service personnel is 2 In this way we are also weighting the element "personnel" at an internal level, although it maintains the same general factor of 3 5

Worked example

For the Pacaya Samiria National Reserve whose Master plan was approved in 1986, the personnel needs were determined as follows

Chief	1
Professionals	12
Park rangers	134
Administrative/Services P	28

At present, the following personnel are working in this National Reserve

Chief	1
Professionals	2
Park rangers	37
Administrative/Services P	0

Applying the evaluation scales we obtain the following values for the number and type of personnel (needs to reality ratio)

Chief	1
Professionals	0 17
Park rangers	0 28
Administrative/Services P	0
Total	**1 45**

When correcting the result to take account of the training component we obtain

Chief (*1)	1	(1)	=	1
Professionals (*2)	0 17	(1)	=	0 17
Park rangers (*3)	0 28	(0 9)	=	0 25
Administrative/Services P 0	(0)		=	0

(*1) The area chief is a biologist and has attended three training courses
(*2) The professional personnel (supervisors, sector and area chiefs) have attended three training courses
(*3) All park rangers have attended one training course

The weighting factors are applied independently to respective personnel

Chief	1	(4 5)	=	4 50
Professionals	0 17	(3 5)	=	0 60
Park rangers	0 25	(4)	=	1 00
Administrative and Services	0	(2)	=	0

Thus applying this methodology we obtain as reference value of 6 10 for the theoretical effectiveness of personnel after applying the weighting factors That is 43 5% of the maximum possible value for the element Obviously, the improvement which could be envisaged, exclusively in terms of personnel training would have less impact on the matrix result than an increase in the number of trained personnel

3 4 2 2 Infrastructure and Equipment

This element considers as basic infrastructure for the protected area operation the items listed below

a) Administrative Infrastructure (headquarters, workshops, stores, archives and library buildings)
b) Control Infrastructure (control posts, boundaries demarcation)
c) Service Infrastructure (visitor centers, interpretation centers, basic services)

For evaluation of this parameter, the infrastructure levels have been defined by assigning values from 0 (zero value) to 1(adequate)

The ideal scenario for this matrix element is a natural area with

a) Administrative center, with offices, stores and maintenance workshop
b) Control posts (number according to the master plan) with an office or work area, bedrooms for park rangers and stores
c) Service area with an interpretation center, museum, exhibition room and basic services

Evaluation scales proposed for this element

Level 1	Full infrastructure (conforming to the master plan)	1(*)
Level 2	Partial infrastructure, the minimum required for operations (50% of control posts specified in the master plan and coordination offices functioning as administrative headquarters)	0 75
Level 3	Partial infrastructure, less than minimum required (control posts insufficient to meet the requirements of the plan)	0 40
Level 4	Without infrastructure	0

(*) Maximum score under an ideal scenario

Similarly as for the personnel element, the parameter relating to infrastructure must be adjusted or corrected to take account of the following element the equipment This parameter includes all unit equipment, from basic furniture to communications equipment, vehicles and equipment for patrolling and for monitoring environmental variables

To assess this parameter, ranges will be defined assigning values from 0 (zero value) to 1 (adequate)

Level 1	Full equipment (*)	1
Level 2	Minimum equipment required for operations (**)	0 75
Level 3	Equipment less than the minimum required	0 40
Level 4	Without equipment	0

(*) Furniture exhibition material for visitor centers, library, communications equipment, vehicles, and equipment for patrolling
(**) Basic furniture, communications equipment, vehicles and equipment for patrolling

For this element the weighting factor is 12, which applied to the evaluation value obtained by applying the criteria above gives the final score for the element 12 will be the maximum value In other words, the infrastructure and equipment contributed 12% to overall management effectiveness

Worked example

Using the same example, in the Pacaya Samiria National Reserve, the requirements specified in the master plan are administrative centers, 27 control posts and 6 biological stations At present, this National Reserve has one coordination office in Iquitos, two poorly equipped biological stations and 13 control posts with minimum operational equipment (buildings, boats, solar panels, furniture, radios, lightning rods, etc)

The score obtained for physical infrastructure is 0 75 and this value is adjusted by 0 75 to take account of the equipment component This means that the PSNR obtains 0 56 as evaluation Applying weighting factor for this element (12 00) we obtain 6 72, that is 56% of the ideal scenario for this element

3 4 2 3 Financial support

This section relates the measurement of the degree to which budgetary requirements at the end of the fiscal year are satisfied, the amounts officially assigned and the amounts actually executed

Ideally there should be an officially approved optimum budget against which to compare the budgets executed in each fiscal year taking all sources of finance into account (treasury, international cooperation and direct incomes) However, there are no officially defined optimum budgets for individual protected areas

With respect to external cooperation budgets, canalized through NGO's that carry out projects in protected areas, although they usually have a direct management support component, it is more convenient to work with total budgets since their objectives, such as environmental education or natural resources conservation programs, are closely related to the objectives of the protected areas where they work

The indicators used are based on the ratio of resources assigned to needs identified in the budgets This ratio value is 1 (one) if the budget is fully covered with the resources assigned and 0 (zero) if the treasury funds assignation is zero

In practice they will be cases where the real budget executed will be higher than the budget defined by the protected area administration This is explained by the inadequate definition of the official budgets that take as reference the treasury's funding capacity rather than the real needs of the protected area In these cases where the total budget execute exceeds the figure approved, the partial score will be equal to 1

The indicators obtained will be adjusted by a correction factor that introduces the composition of the executed budget, according to its source, into analysis The following table shows the possible compositions of the protected area budget If the budget is derived from three principal sources (Public funds, extern financial support and direct incomes), their relative contribution to the overall budget could imply, on the one hand an ideal solution and on the other hand an undesirable situation

ANPE Financial support source in order of importance

←----------Desirable situation----------

Public funds	1°	2°	1°	3°	2°	3°
International cooperation	3°	3°	2°	2°	1°	1°
Direct incomes	2°	1°	3°	1°	3°	2°
Correction factor	**1**	**0 90**	**0 80**	**0 70**	**0 60**	**0 50**

----------Non Desirable situation----------→

Thus in an ideal scenario, protected area financial support derived principally from public funds (central or regional governments), followed by direct incomes and, lastly, by the international cooperation support This is because it is understood that each protected area should be funded principally by the State In this case, the correction factor will be 1

An undesirable situation will occur when financial support is derived principally from international cooperation, followed by direct incomes and, lastly, by the public funds In this case, the weighting factor will be 0 50 This situation is considered to be undesirable because it involves a significant dependence on external funds In the case where financial support is derived from a single source, since in the table the other two factors will occupy the same position, the correction factor applied will the lesser value

For this element the weighting factor is 14 which applied to the score assigned to the element gives 14 as maximum value Thus, financial support contributes 14% to overall management effectiveness

Section 4 of Appendix 2 gives more information about procedure followed to process the available information

Worked example

The Pacaya Samiria National Reserve headquarters estimated its budget needs for the 1996 fiscal year at S/ 1,010,000 The budget approved and being executed reaches S/ 2,675,000 This amount includes the contributions from public funds (INRENA and Regional Government) as well as from the Employment and Natural Resource Sustainability Project being carried out Pro Naturaleza

The simple comparison of these amounts indicates a satisfaction level (in relation to estimated budget) of 1 00 This score must be corrected by the budget structure factor In this case, external support is the most important source of funds, follow by public funds The adjustment factor obtained is 0 6 and the final score is (0 60 x 1 00) = 0 60

Applying the weighting factor (14) we obtain 8 40 as the final value for this protected area

3 4 3 Planning Field

Field	Element	Components
Planning	Management Plans	Directive Plan Master Plans Monitoring Plans
	Participatory planning	Participatory Plans
	Participatory management programs	Participatory Management Programs
	Extension programs	Extension Programs
	Coordination with public and private sectors	Management support agreements

3 4 3 1 Existence, type and degree of implementation of the management plans

This section involves all planning levels, from a Directive (Protected Area System) Plan approved by the protected area authority to Zoning[8] undertaken within the cover of the Master Plan, Annual Work Plans and specific thematic programs, for example Public Use, Tourism and Recreation Programs

The features below will be considered in the evaluation

a) The existence document or plan, its official approval by the competent agency and its age

8 According D S 160-77-AG zones in the natural protected areas may include a closed zone primitive zone restricted zone direct use zone and restoration zone

In the country several well designed plans exist but not officially approved by the competent agency, and this will affect the maximum score attainable under an ideal scenario There are other well designed and officially approved plans, which due to their age are not longer in force or applicable, so the final score will also be affected according to the scales established in this section Protected area zoning will be considered as part of the management plan Table N°6 illustrates the existing management plans for the Peruvian protected area system

b) The existence of a program to monitor the application of the plan and extent of implementation This is another adjustment element The existence of a plan is not enough to guarantee a good management, which will however be guaranteed to a great degree if the plan is supported by a monitoring program or periodic evaluations of the application or the fulfillment goals and objectives in the implementation of the plan

Ideal scenario

- An updated Directive Plan officially approved by the competent governmental agency	1
- The protected area has a master plan in force with operative and/or specific thematic plans in operation	1
- Plans being executing in the area are supported by a monitoring program or periodical evaluations	1
Total (under an ideal scenario)	**3**

On the basis of the deal scenario described the following correction (or adjustment) factors will be applied according to the following criteria

a) Directive Plan

Existing and approved	1
Existing but not approved	0 5
Not existing	0

This criterion is applied just once for the entire sample of protected areas the application of this evaluation matrix

Table N°6 Existing Management Plans for the Peruvian Protected Area System

Directive Plans		
Protected Area System Directive Plan	1996	Not yet approved
Master Plans		
Manu NP	1985	R D 028-85-DGFF (1-7-85)
Yanachaga-Chemillen NP	1987	R D 0035-87-DGFF (2-9-87)
Huascaran NP	1990	R D 087-90-DGFF (26-7-90)
Titicaca NR	1980	R D 097-80-DGFF (19-12-80)
Lachay NR	1980	R D 098-80-DGFF (19-12-80)
Paracas NR	1979	R D 099-80-DGFF (19-12-80)
Salinas & Aguada Blanca NR	1985	R D 037-85-DGFF (1-8-85)
Pacaya-Samiria NR	1986	R D 072-86-DGFF (24-7-86)
Paracas NR	1996	R D 053-96-DGFF (12-3-96)
Operational Plans & Thematic Programs		
Cerros de Amotape NP	1989-90	
Rio Abiseo NP	1990-92	R D 014-91-DGFF (22-3-91)
Huascaran NP	(*)	
Titicaca NR	1988-89	
Paracas NR	1992	R J 055-93-INRENA (15-6-93)
Tabaconas-Namballe NS	1995	
Mangroves of Tumbes NS	1993-94	
Manu NP & Manu RZ	1992-94	
El Angolo hunting area	1991	
Plan for Tourist and Recreational Use of the Huascaran NP	1996	R J 056-96-INRENA
Environmental Education Plan for Pacaya-Samiria NR	1991	

(*) Since 1982, annual work plans have been prepared for the Huascaran NP on a regular basis

b) Master or operational Plans

	AGE				
MANAGEMENT PLAN TYPE	Not existing	> 10 years	5-10 years	1-5 years	Current year
Master plan	0	0 25	0 75	1	1
Operational Plan	0	0	0 5	1 - 0 75	1
Annual Work Plan	0	0	0	0 25	0 65

Using these criteria the maximum score obtained with respect to any one of the three types of plan (master plan, operational plan or annual work plan) is assigned

c) Monitoring programs

Existing and periodic (annual)	1
Existing but not periodic	0 75
Not existing	0 5

Note that the monitoring programs must be applied to the management plans and not only to support programs of other agencies or non-government organizations

For this element the weighting factor is five (5) which must be applied separately to the Directive Plan component score since this will be evaluated once for the entire matrix The total weight for the "management plan" element is 15 or 15% of overall management effectiveness

Worked example

Using again the example of the Pacaya Samiria NR

Directive Plan, drawn up but not officially approved	0 5
1986 Master plan and annual work plans (*1)	0 75
Evaluation or follow-up programs (*2)	1

(*1) At the time of written, work has already started on updating the master plan for this reserve

(*2) The score assigned for ongoing evaluations takes account of the project being carried out by Pro Naturaleza, which includes support for the management of the reserve (personnel, infrastructure, equipment, etc)

According to this assessment the Pacaya Samiria National Reserve obtains a score 1 75 for management plans Applying the weighting factor we obtain 8 75 Including the

Directive Plan component, 2 50 (0 5 x 5 00) is added, giving a total of 11 25 or 75% of the ideal scenario

3 4 3 2 Local participation in the formulation of management plans

This element assess the participation of local people in the formulation of management and thematic plans In the evolution of the protected areas system in Peru, the formulation of management plans has passed through a number of phases independently of the management level concerned Although master plans has been approved since 1979 The development of diagnostic and participatory planning processes started in the middle of the last decade

The advantages of this planning strategy are nowadays indisputable The joint (local people and administration) identification of management problems and limitations, and formulation of strategies and actions for solutions, saves time and money and increases the possibility of success in protected area management

For these reasons and because of their implications for local politics, participatory processes must be considered as an essential part of protected area planning, and thus as an independent element in this evaluation matrix, and not only as an adjustment or correction factor

The scores assignation table for these element is

Regular participatory appraisal and planning processes are undertaken	1 (*)
Occasional participatory appraisal and planning processes are undertaken	0 75
Some experience of participatory appraisal and planning processes	0 45
No experience of participatory appraisal and planning processes to support the management of the protected area	0
* Under an ideal scenario, the maximum value that can be assigned is	1

For this element the weighting factor is 4 00

Worked example

During the implementation of programs currently being implemented in the Pacaya Samiria National Reserve, many Participatory Rural Appraisal Workshops (PRA) and community action plans were organized in the various Conservation and Development Centers (CECODES) of Pro Naturaleza Employment and Natural Resource Sustainability Project In addition, in 1996, work was started organizing participatory workshops to update the master plan for this reserve However, this is not sufficient to reach 100% of the maximum score Consequently, the score assigned is 0 75 Applying the weighting factor we obtain 3 00 as the final score or 75% of maximum value for this element

3 4 3 3 Local participation in the implementation of management programs

This element assess the existence of programs involving the local people in the management of protected areas, i e neighbors acting as voluntary park rangers or programs intended to restore certain natural resources As mentioned before, it is essential for the areas to have programs involving local o neighboring communities not only in appraisals and conflict resolution and the identification of management requirements, but also in application of the solutions

Criteria to be applied in this case are

Institutionary programs, within the management programs contained in the master or operational plans, involve the local community in the management of resources	1(*)
Similar programs but at an experimental or pilot stage	0 75
Neighbors involved in surveillance programs	0 5
The intention exists to involve the local population in resource management programs	0 25
Participatory management programs do not exist	0

The maximum value for this element is 1(*) and the weighting factor is 4 00, thus its contribution to the management efficacy is 4% under an ideal scenario

Worked example

The Samiria Pacaya National Reserve has pilot programs for the community management of wildlife resources through the CECODES Therefore, 0 75 is assigned for this element Applying the weighting factor (4 00) we obtain 3 00 as the final value or 3% of overall management effectiveness under an ideal scenario

3 4 3 4 Existence of extension, environmental education and other programs

This element assesses the existence of extension programs targeted towards neighboring communities, including resources management programs as well as in the environmental education in general

Similar criteria are considered as for the element above

Institutionary programs within the management programs contained the master or operational plans involve the protected area in environmental education programs and extension activities in the management of resources targeted towards local communities	1(*)
Similar programs at an experimental or pilot stage	0 65
No extension or environmental educational programs exist	0

The maximum value for this element is 1(*) and the weighting factor is 3 00, that is 3% of overall management effectiveness under an ideal scenario

Worked example

The Samiria Pacaya National Reserve includes pilot extension and environmental education programs being undertaken by CECODES Therefore, 0 75 is assigned for this element Applying the weighting factor (3 00) we obtain 2 25 as final value, that is 2 25% of overall management effectiveness under an ideal scenario

3 4 3 5 Level of coordination with the private sector, the local community and local government

This element relates to the existence of agreements or letters of intent subscribed between the protected area administration authority and private organizations, grass roots organizations or local government, in order to

- Support the management of the protected area
- Provide support in the form of personnel training programs
- Undertake research programs to provide data for the monitoring programs
- Coordinate the administration of the protected area with Regional Governments

The protected areas headquarters must provide the information to be processed Under a ideal scenario, all the activities performed in a determined protected area should be authorized by

headquarters, and when these activities have components involving management, they will obviously require a minimum level of coordination and clear rules, that is, a formal agreement

The type of agreements described above are not obligatory or exclusive According to the characteristic of each protected area and to the nature of existent relations, the scores below will be applied

Agreements subscribed between the administrative authority of the protected area or the national system and civil organizations or Universities for the execution of actions supporting management and/or research in the protected area or surrounding area	1(*)
No agreements subscribed but actions are being executed in the protected area by civil organizations	0 5
No agreements subscribed, nor actions being executed in the protected area by civil organizations such as NGO's, Universities, etc	0

(*) Maximum value assigned to the element

The weighting factor for this element is 4 00, that is 4% of overall management effectiveness

Worked example

In the Pacaya Samiria National Reserve many programs supporting the management and local communities development are being executed within the frameworks defined by the agreements subscribed between INRENA and organizations, such as Pro Naturaleza and Worldwide Fund for Nature In this case the score assigned is 1 Applying the weighting factor (4) we obtain the final score value 4, or 4% of overall management effectiveness

3 4 4 Knowledge about the Protected Area Field

Field	Element	Components
Knowledge about the natural protected area	Information for ecological monitoring	- Covered by the National Map - Biological information - Physical parameters - Ecological appraisal - Feedback processes

3 4 4 1 Information for the ecological monitoring

This element assesses the existence of processes or research orientated towards monitoring either the ecosystems or their components

To assign the scores in this element, the following components are be considered

- Cartographic information
- Biological information
- Information about environmental parameters
- Ecological assessment
- Feedback processes

The first component includes the existence of quality cartographic information (National map at 1/100,000 or better) The score values are

Full information	1
Sufficient partial information	0 75
Insufficient partial information	0 50
Without information	0

The second component (biological inf) includes the extent of knowledge about the fauna and flora in the protected area The score values are

Full information	1
Sufficient partial information	0 75
Insufficient partial information	0 35
Without information	0

The third component (information about environmental parameters) includes the existence of facilities for obtaining information about basic environmental parameters, meteorological, hydrological and/or limnological stations, adequately distributed according to the characteristic of the area generating information which is available for use The score values are

Adequate in number and quality	1
Exist but with limitations	0 50
Inexistent	0

The fourth component relates to the existence of ecological appraisals[9] carried out in the protected area and the availability of their results The ecological evaluation concept is wider than the botanical or fauna inventory The evaluation values are

9 A process of synthesis and analysis all existing information about flora, fauna and natural communities obtained from field studies and from secondary information with the aim of making specific recommendations for the conservation of the area

Recent appraisals (< 5 years)	1
Old appraisals > 5 years	0 50
No information	0

The fifth and last component related to existence of feedback processes, which allows better decision making or management practices on the basis of information from the previous components The score values are

Within a decision making structure	1
Exist but occasionally	0 50
Feedback processes do not exist	0

The total value assignable for this element under an ideal scenario is five (5) Applying the weighting factor (1 80), we obtain 9 as final value, that is 9% of overall the management effectiveness

Worked example

For the Pacaya Samiria National Reserve, the values assigned to the different components of this element are

Cartographic information	1
Biological information	0 75
Information about environmental parameters	0 50
Ecological appraisal	1
Feedback processes	1
Total	**4 25**

Thus a total score of 4 25 is obtained Applying the weighting factor we obtain 6 32, that is 79% of the maximum total under an ideal scenario It is clear that on the basis of results obtained using this system of assessment, the need has been identified for improvements in the generation of information about environmental parameters and living resources, in order to improve the management of the Pacaya Samiria National Reserve

3 4 5 Use of Natural Resources Field

Field	Element	Component
Use of the Natural Resources	Local participation in sustainability activities	Institutional programs, in the management plan involving the protected area in the sustainable resources management

3 4 5 1 Local participation in sustainability activities

This element assesses the existence of programs for the sustainable use of resources in areas surrounding strictly protected areas (National Parks, National Sanctuaries and Historical Sanctuaries) In the case of National Reserves sustainable resource use programs can exist both within the protected area and in the influence zone An example is the development of dry forest management system based on the harvest and processing of mesquite products in the area surrounding the Cerros de Amotape National Park The participation of the protected area authority in these tasks is essential to get the local community involved and to improve the quality of life of neighboring populations as a strategy arising from a protected area

Criteria considered within this element

Institutional programs, within management programs contained in master or operational plans involve the protected area in the sustainable management of the zone resources	1(*)
Similar programs but at an experimental or pilot stage	0 65
No supporting management programs	0

For this element the maximum value under an ideal scenario is 1(*) one and the weighting factor is 9 00, that is 9% of overall management effectiveness

Worked example

The Samiria Pacaya National Reserve includes pilot programs for the sustainable management of "taricaya turtles" (*Podocnemis unifilis)* and it is initiating the organization of Community Fishing Units with the aim of rationalizing the artisanal fishing activities These programs are undertaken by CECODES Therefore, a value of 0 75 is assigned for this element Applying the weighting factor (9 00) we obtain a final value of 6 75, that is 6 75% of overall management effectiveness in this National Reserve Note that the existence of these programs is the best way to solve the conflicts generated by the use of resources

3 4 6 Conflicts with other State Interests Field

Field	Element	Component
Threats management	Conflicts with other State interests	- Adequate inter-sectorial coordination processes or mechanisms with the active participation of the protected area and the protected area system administrative authorities

3 4 6 1 Land use conflicts with development programs supported by the State

This matrix element assesses the level of conflicts generated by other government agencies This problem will be measured in terms of the existence of mechanisms in protected areas management, or protected area system, to coordinate with these government agencies to control the threats

Hydrocarbons development activity, for example is essential for the State and the zones to be offered for prospecting / exploitation include the protected areas Although it is untrue that this activity is necessarily destructive, a very special level of inter-sectorial coordination capacity is required to ensure the compatibility of the two objectives, although obviously it would be preferable that these conflicts did not exist A similar situation occurs with respect to mining activity

In the same agricultural sector, conflicts occur with the development projects affecting the protected areas, e g irrigation projects (damming, new irrigation zones, etc), and the ongoing rural land titling process, which is closely related to the element 2 4 1 1

This matrix element should not be understood as a synonym for the destruction of resources protecting the area, but as a serious potential for threat and eventual of destruction These potential conflicts are generated by the existence of

- Hydrocarbons projects
- Hydro-energetic projects
- Mining projects
- Highway/roads and communications projects
- Fisheries projects (introduction of exotic species incorporation)
- Agricultural projects (dams, irrigation canals, and drainage projects)

Criteria to be considered

Adequate inter-sectorial coordination processes or mechanisms with the active participation of the protected area and the protected area system administrative authorities	1(*)
Reactive mechanisms in response to threats	0 65
Mechanisms exist within civil society, but not within the protected area authority	0 50
No reactive or management capacity in response to threats	0

For this element the total value assigned in an ideal scenario is one (1) and the weighting factor is 6 00, that is 6% of overall management effectiveness

Worked example.

The Pacaya Samiria National Reserve was exposed to a possible threat when an oil company wanted to initiate the prospecting works within its boundaries Regardless the admitted risks of this activity (since that time, another oil company has been extracting oil within the reserve), the reserve authority together with the region population organized a very active campaign to prevent the initiation of these works Finally, the company decided to withdraw

The mechanisms used weren't organic but were effective This is not an ideal situation, because regional defense campaigns were necessary Hence, for this element the score is 0 65 Applying the weighting factor (6 00) we obtain 3 90 as the final score

3 5 Information sources

3 5 1 Physical and legal clearing of the protected areas

The information required to process this element is managed by INRENA's own General Administration of Natural Protected Areas, the Conservation Data Center (UNALM), the Peruvian Society of Environmental Law (SPDA), the National Geographic Institute (IGN) and the NGO's involved

3 5 2 Personnel, number of park rangers and staff for each area and training levels

The organizations involved in the park rangers training have developed up to date databases Some of the most important are those at the Conservation Data Center (CDC-UNALM) and from the Natural Areas Strengthening Program (FANPE) Additional information will be obtained from the General Administration of Natural Protected Areas (DGANP/INRENA) as well as from the NGO's, Pro Naturaleza and the Peruvian Association for Conservation (FPCN and APECO respectively) These institutions have participated actively in the training process

3 5 3 Infrastructure and Equipment

The basic sources of information are the inventories of goods acquired for each area These inventories are located in each protected area and can be obtained through DGANP/INRENA as well as the NGO's involved in support programs whose objectives include the acquisition of goods

3 5 4 Financial support

This information is provided by the protected area and DGANP/INRENA headquarters in Lima and NGO's with protected area support programs In addition, the budgets assigned by the local (regional and/or provincial) governments

For this element there is a problem caused by the dispersion of the relevant information, a situation complicated by the different execution periods of the projects (calendar years and fiscal years of the donating countries for example)

3 5 5 Existence, type and degree of implementation of the management plans

SINANPE's Directive Plan Project compiled all the relevant information up to 1995 in its protected area system appraisal for the Directive Plan (FANPE, 1995) In addition, there are the files of DGANP/INRENA and NGO's at involved in the management and planning of Protected Areas, and data bases at CDC-UNALM, institution that has been associated with the majority of management plans formulated for protected areas in the country

3 5 6 Local participation in the formulation of management plans

Directive Plan Appraisal collected all the information regarding participatory planning experiences This will be the starting point for future monitoring of the situation Other information sources include files of DGANP/INRENA and NGO's involved in the protected area management

3 5 7 Local participation in the implementation of management programs

Similarly to the section above

3 5 8 Existence of extension, environmental education programs

The main source of information is located at DGANP/INRENA as well the NGO's involved in the implementation of these programs

3 5 9 Level of coordination with the private sector, the local community and local government

The sources of information for this element are located in each protected area headquarters, and the extent of their existence can be determined by questionnaires Other sources of

information include DGANP/INRENA as well as the NGO's involved in the protected area management support

3 5 10 Information for ecological monitoring

Files at DGANP/INRENA, which should receive copies of all the researches undertaken in the natural protected areas, NGO's, CDC-UNALM and the Museum of Natural History

3 5 11 Local Participation in sustainable economic activities

The main source of information is DGANP/INRENA as well as NGO's involved in sustainable development programs

3 5 12 Land use conflicts with development programs supported by the State

Although the problems only get known when they become a real threat, the information managed by other State agencies will allow the identification of possible conflicts On the other hand, knowledge of the level of organization of the administrative authorities of the different protected areas, from DGANP/INRENA and the NGO's involved in the supporting the system will allow the assessment of level of capacity to respond for threats of this kind

IV Results of the application of the matrix

In this section of the report we present the results of the application of the matrix described above to a sample of 14 protected areas The two aims were firstly to adjust the methodological process in accordance with the actual availability of information and, secondly, to establish base line data against which the results of subsequent applications of the matrix can be prepared

In Table No 7 shows the values of the indices obtained for the 12 elements processed in the protected areas in the sample It can bee seen that there are clear differences between the total values for the different elements and also between the different protected areas As was noted above, these variations are indications of the differences in the allocation of the means required for management to each area If one wishes to correct these deficiencies, it is clear that the most important aspects with inadequate coverage can be rapidly identificed using the matrix

Appendix 2 provides detailed information about each element obtained through the application of the matrix This appendix includes comments about the types of available information held by the different organizations involved in the management of protected areas, which logically includes the protected area administrative authority, both centrally and at the level of the headquarters of each protected areas

During the course of the development of the proposed matrix, a series of limitations and gaps have been identified which affect the efficiency of the system as a whole, which are included in the list of conclusions and recommendations

It should also be stressed that the proposed matrix can't be used to make comparisons of factors not related to the administrative capacity for the efficient management of protected areas Naturally there is a risk that the matrix will be applied in an inappropriate way, for example by feeding in false information or adjusting the results to present an unrealistically optimistic vision of the state of protected area administration For this reason, the validation of the results obtained by the application of the matrix is of prime importance, by means of evaluations which correlate these results to data pertaining to the achievement of the objectives of the protected area in question

Table N 7 MATRIX FOR INDIRECT EVALUATION OF MANAGEMENT EFFECTIVENESS OF THE PERUVIAN PROTECTED AREA SYSTEM

	CAPACITY					ADMINISTRATION ATTITUDE									
	Physical/Legal Clearing	Personnel (2)	Infraestructure and Equipment	Financing	Management Plans (3)	Participative Planning	Participative Management	Extension Programs	Coordination with Private Sector	Ecological Monitoring	Conflicts with the use of the natural resources	Management of conflicts with State Programs	A Total Assigned to NPA	B Total Max under Optimum Scenario (4)	%
Manu NP	1 00	6 78	6 72	8 40	10 00	3 00	1 00	3 00	4 00	4 95	9 00	3 90	61 75	95 00	65 00
Huacaran NP	1 00	6 12	1 92	10 64	7 50	4 00	1 00	1 95	4 00	6 30	5 85	3 90	54 18	95 00	57 03
Cerros de Amotape NP	3 00	3 90	1 92	8 40	8 25	3 00	1 00	3 00	4 00	5 85	9 00	3 00	54 32	95 00	57 18
Rio Abiseo NP	3 00	5 75	6 72	8 40	8 75	3 00	1 00	3 00	4 00	4 50	9 00	3 90	61 02	95 00	64 23
Yanachaga Chemillen NP	2 00	5 05	4 80	8 40	8 25	1 80	0 00	1 95	4 00	4 95	0 00	3 00	44 20	95 00	46 53
Bahuaja Sonene NP	3 00	4 79	4 80	8 40	3 25	4 00	1 00	3 00	4 00	6 03	9 00	3 90	55 17	95 00	58 07
Junin NR	2 00	3 18	0 00	12 32	3 25	0 00	0 00	0 00	0 00	6 30	0 00	0 00	27 05	95 00	28 47
Paracas NR	3 00	4 09	1 92	12 60	7 50	3 00	2 00	1 95	4 00	5 40	9 00	3 90	58 36	95 00	61 43
Titicaca NR	2 00	4 52	1 92	14 00	3 25	1 80	0 00	0 00	0 00	5 40	5 85	0 00	38 74	95 00	40 78
Salinas y Aguada Blanca NR	2 00	4 28	0 00	0 00	1 25	0 00	0 00	0 00	0 00	2 43	0 00	0 00	9 96	95 00	10 48
Pacaya Samiria NR	3 00	7 86	6 72	8 40	8 75	4 00	3 00	3 00	4 00	7 65	9 00	3 90	69 28	95 00	72 93
Calipuy NS	2 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	2 70	0 00	0 00	4 70	95 00	4 95
Manglares de Tumbes NS	3 00	3 10	6 72	7 00	10 00	3 00	0 00	3 00	4 00	8 10	5 85	3 90	57 67	95 00	60 71
Machupicchu HS	1 00	4 84	1 92	11 20	3 25	0 00	0 00	0 00	0 00	4 95	0 00	3 90	31 06	95 00	32 69
Maximum Score Assignable to Each Element by NPA (1)	3 00	4 00	1 00	1 00	2 00	1 00	1 00	1 00	1 00	5 00	1 00	1 00			
Weight Factor for Each Element	2 00	3 50	12 00	14 00	5 00	4 00	4 00	3 00	4 00	1 80	9 00	6 00			
Maximum Weight Score for Each Element by NPA	6 00	14 00	12 00	14 00	10 00	4 00	4 00	3 00	4 00	9 00	9 00	6 00		95+5	
Ideal Score for Each Element in the Sample (14 Areas)	84 00	196 00	168 00	196 00	210 00	56 00	56 00	42 00	56 00	126 00	126 00	84 00		1400 00	
Weight Score Asigned to Each Element (November 1996)	31 00	64 26	46 08	118 16	85 75	30 60	10 00	23 85	36 00	75 51	71 55	37 20	629 96	######	45 00
% of Ideal Score	36 90	32 79	27 43	60 29	40 83	54 64	17 86	56 79	64 29	59 93	56 79	44 29			

1 Score prior to weighting
2 Weighting factors to personnel element are applied by independ out way for each component (Chiefs Professionals Park rangers Administrative staff)
3 The Plan Director weight factor is used on the final score of the element (once in the sample)
4 A total score of 95 points for each NPA was considered Tha plan Director value is applied once for all the sample

V Conclusions and recommendations

The matrix presented in this document is the result of an effort to systematize information about Peruvian protected areas which at present is dispersed throughout the country, and manage it in a way that enables it to be used to contribute to improving administration and planning of the protected area system

If the reader reviews the elements considered in evaluating the effectiveness of management of the protected areas, he will notice that what is really being assessed is the extent to which favorable or optimal conditions exist for the fulfillment of the objectives defined for each protected area, the matrix does not directly measure the extent to which these objectives are actually being fulfilled It is very important to stress this aspect, and underline the need expressed above for a validation of the results of the assessment of the elements of the matrix by means of a specific evaluation of a number of protected areas, to determine whether or not there really is a correlation between the means available to the administrative authority of a determined area and fulfillment of the basic objectives for which the protected area was created

This validation should be carried out in a sub sample of the fourteen areas selected for the application of the methodology, containing at least one representative of each category of protected area The selection of areas for inclusion in the sub sample should be made at random, within each category

The validation of the proposed methodology should be carried out at two levels Firstly, with the aim of verifying the quality of the information fed into the matrix Since the collection of information used to supply the matrix is a process of management of secondary data, a process of *in situ* validation is required to detect changes, differences or omissions in relation to the information being managed in Lima

In the case of the verification of the fulfillment of biodiversity conservation objectives, the problem is more complex and, for this reason, it would be advisable to work both at a macro level (changes in landscapes and/or ecosystems) and at the level of indicator species A practical way of undertaking this activity is by working in collaboration with other organizations such as Universities or NGOs working in protected areas with the capacity to carry out monitoring programs The monitoring of landscapes and/or ecosystems would require the installation of a certain amount of capacity in these institutions, to enable them, for example, to undertake analyses of satellite images, both in digital format and in the form of photographic images The monitoring of indicator species requires that they should be adequately selected so that the state of their populations provides a good indication of the state of the habitats or ecosystems in which they are found

It is to be recommended that the process of validation is undertaken on an annual basis To verify the quality of information at year one visit a year should be undertaken to the areas in the sub sample, and in the case of the monitoring of landscapes and indicator species, which is by nature a long and continuous process, an annual report is required detailing progress or limitations with respect to the objectives of the protected area

There are a number of risks associated with the application of this matrix Inaccurate results could be obtained if the processed information is inaccurate or untrue It would also be easily possible to tamper with the optimal scenarios to give an impression of effectiveness which in reality didn't exist This latter possibility could be detected during the process of validation, as recommended above

In the evolution of concepts and practices in the management of protected areas, the participation of local communities, whether grassroots organizations or NGOs, is a factor of ever increasing importance While the matrix proposed in this report does not include a dimension exclusively covering this dimension, it does take up the question of the influence of local participation both in the planning and management of the area in question and its resources

It is clearly the case, as was confirmed during the collection of information for use in the application of the matrix, that at present no complete or systematic data base exists for the ongoing monitoring of the progress of the protected area system The few existing data bases are located in various institutions and are not regularly consulted by the administrative authority (head office or protected area Headquarters) This deficiency could be gradually overcome through the regular application of the proposed methodology, which requires the collection, ordering and systemization of dispersed information

One of the most important characteristics detected in the administration of protected areas in general, is a complete absence of monitoring programs of any kind These observations apply to all the dimensions incorporated in the matrix

As part of the process of the elaboration of this methodology, a workshop was held in the auditorium of the Offices of US AID/Lima on 23rd January 1997 All the principal organizations working in protected areas and based in Lima were invited to this meeting Unfortunately the participation of organizations based outside Lima was limited, due to the cost of travel to Lima and limitations of time, principally Participants in the workshop included 22 people invited as representatives of 16 organizations from the public and private sector, as well as 10 members of the US AID mission in Lima Appendix three gives a list of participants and the organizations to which they belong

Subsequently, the people who attended the workshop received a letter requesting further comments about the proposed methodology and suggestions for correcting any limitations which had been identified by the institutions or individuals concerned Of the 22 participants, 10 responded by sending additional comments to those expressed during the course of the workshop These comments were analyzed and some of them were incorporated into the final version of this document Among the failings detected was that the title of the report did not accurately reflect its contents and this has been corrected Also it was pointed out that the use of the word "threats" to identify one of the management fields analyzed caused a certain amount of confusion, when in fact what was being analyzed was "threat management", and this has also been corrected

Other recommendations dealing with more in depth issues, such as the need to measure the degree of biodiversity protection, have not been incorporated into the methodology of the matrix, but specific recommendations are being made in this respect

Table No 7 shows the results of the assessment of the proposed matrix These results can be summarized, using a scale of assessment of management capacity, as follows

Table N° 8 Management capacities evaluation

Evaluation scale	Poor	Deficient	Acceptable with limitations	Good	Excellent
Percent range (%)	0 - 39	40 - 59	60 - 69	70 - 84	85 - 100
	Junin NR (28 47) Salinas NR (10 48) Calipuy (4 95) Machupicchu HS (32 69)	Huascaran NP (57 03) Cerros de Amotape (57 18) Yanachaga NP (46 53) Titicaca NR (40 78) Bahuaja Sonene NP (58 07)	Manu NP (65) Rio Abiseo NP (64 23) Manglares de Tumbes NS (60 71) Paracas NR (61 43)	Pacaya Samiria NR (72 93)	

These authors of this methodology consider that it would be a practical option for the administrative authority of the protected area system to analyze the results of a periodic application of the matrix, since this would enable them to identify gaps and limitations which restrict their management effectiveness in a very visible way This could also be a first step towards identifying priorities actions aimed at correcting these weaknesses and provide a stimulus for the establishment of complete and systematic data base to improve the capacity for management of information relating to the protected area system

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Appendix N°1

Arguments and justification for the inclusion of each Natural Protected Area selected for the sample

Arguments and justification for the inclusion of each Natural Protected Area selected for the sample

Manu National Park (MNP)

Manu is the largest National Park in Peru and the second largest protected area It is one of the most important protected areas in terms of biodiversity, both for the number of biogeographical provinces it covers and the number of species reported (CDC-UNALM, 1991,Dinerstein *et al* 1995) With respect to its conservation status, Manu is also outstanding within the Peruvian protected area system It has been identified as a priority area by the Natural Protected Areas Support Program (PROFONANPE) and is located in a top priority region according to eco-region conservation priorities defined for Latin America (Dinerstein *et al*, 1995)

In the Manu National Park, 800 species of birds, 200 mammals, 54 reptiles and 79 amphibians have been reported Four ethnic groups inhabit the National Park Machiguengas, Maschco-Piros, Nahuas and Yoras, and probably Amahuacas so well

Informations about Manu required for the application of this matrix is available Manu has been and continues to be the object of planning and management processes The first management plan was approved in 1985 and in 1992 a series of workshops was organized to formulate an operational plan Both private and public sector organizations are present in Manu, which receives both local and international support

Huascarán National Park (HNP)

This is Peru's largest National Park It contains a good sample of high Andean ecosystems (Tropical Puna Biogeographical Province) (CDC - UNALM, 1991) and includes the highest tropical mountain range in the world (30 glaciers and more than 100 lakes) It is located in highly threatened eco-region (Dinerstein *et al*, 1995), of maximum regional conservation priority Its biodiversity includes a number of species of flora and fauna in danger of extinction and in a vulnerable situation

The Park has a long history of planning and management It has a master plan, approved in 1990 and a plan for tourist and recreational use, approved in 1996 Additional information, required for the application of this matrix, is also available

Cerros de Amotape National Park (CANP)

Although this National Park is not very extensive it covers an excellent sample of the Tropical Dry Forest Biogeographical Province in the Peruvian northwest (CDC -

UNALM, 1991) The dry tropical forest region is considered to be subject to a number of threats It is an area with a distinctive biological content, rich in endemism and has been defined a priority conservation area (CDC - UNALM, 1991) The Cerros de Amotape National Park has also been identified as a priority area by PROFONANPE

At present a number of development projects with links to conservation are being carried out in the region, with the participation of NGO's and the local communities It has an operational plan, which was drawn up in 1989 following a series of workshops held with active local participation

Río Abiseo National Park (RANP)

The National Park is located in one of the country's most fragile regions The Andean cloud Forests Its outstanding features include not only its biodiversity but also archeological monuments In terms of conservation needs, Abiseo is located in a high priority biogeographical province (CDC-UNALM, 1991) and a threatened eco-region (Dinerstein *et al*, 1995) Abiseo has also be identified as a priority area by the PROFONANPE

This National Park contains a number of the region's most important endemic species, which are not protected by other areas in the protected area system

Abiseo has an Operational Plan, approved in 1991, and commendable efforts have been made to involve the local populations in protection programs

Yanachaga-Chemillén National Park (YCHNP)

Like Abiseo, Yanachaga-Chemillen is located in one of the country's most fragile ecosystems the Andean cloud Forests The area is rich in endemism and contains a number of animal species considered to be in danger of extinction or in a vulnerable situation 80 species of mammals and 450 birds have been reported

Yanachaga-Chemillen is considered to be a priority protected area by the Parks in Peril program, being undertaken in Peru by Pro Naturaleza and The Nature Conservancy, with the support of US-AID The area is one of maximum regional priority for the conservation of eco-regions in Latin America (Dinerstein *et al,* 1995)

It has a master plan approved in 1987, which is currently being updated

Bahuaja-Sonene National Park (BSNP)

This is Peru's newest National Park, created in 1996,and incorporating the Pampas del Heath National Sanctuary and part of the Tambopata-Candamo Reserved Zone This

region is outstanding in terms of biodiversity Its conservation status is relatively stable, but of maximum regional priority for the conservation of eco-regions in Latin America (Dinerstein *et al*, 1995)

It is assumed that this new protected area is included within the Parks in Peril program referred to above, by virtue of incorporating the Pampas del Heath National Sanctuary, which has been covered by the program

Although Bahuaja-Sonene has no officially approved management plan, both the Tambopata-Candamo Reserved Zones and the Pampas del Heath National Sanctuary have been the object of a series of planning processes

Pacaya-Samiria National Reserve (PSNR)

This is Peru's largest protected area and although it is not outstanding in terms of biodiversity (94 species of mammal, 330 birds and 95 reptiles and amphibians) it is of outstanding importance for the relations which have been established with the human populations located on the banks of the rivers Ucayali and Marañon (Achung *et al*, 1995)
It is located in the most important wetland region on the Peruvian Amazon As a National Reserve, its role in the conservation of biodiversity is twofold to protect the living resources of the region and to ensure their sustainable use

At present it is the location of one of the country's most important conservation projects, being carried out by Pro-Naturaleza with the support of US-AID

It has a master plan approved in 1986, drawn up with the active participation of the local population

Paracas National Reserve (PNR)

Paracas is the largest protected area in the Peruvian coast and is, for practical purposes, Peru's only marine protected area As a National Reserve its objective is to ensure the sustainable use of the hydro-biological resources it contains On account of its scenic beauty, the archaeological remains it contains, and its accessibility, Paracas is an important tourist destination during all the year

In terms of biodiversity, Paracas is an important seasonal feeding ground for migratory birds from the Neartic, and is home to important colonies of marine mammals

The first master plan for the Reserve was approved in 1979 and an updated version was approved in 1996

In the area surrounding the Reserve, projects to prevent coastal pollution are being undertaken with the support of US-AID These projects were initiated in November 1995

Junín National Reserve (JNR)

This National Reserve includes the largest and most important lake in the central Andes of Peru, fed by approximately 12 rivers and 20 seasonal watercourses The lake is considered to be important for the future supply of water to the city of Lima As an aquatic habitat for fauna, it is irreplaceable both in terms of its size and its characteristics, the more so because it contains a number of endemic species which have not be reported in similar habitats nearby

As a National Reserve, this protected area should play an important role in the management of high Andean resources However, at present it is faced by a severe water pollution problem This is particularly serious because the hydro-biological fauna of the lake is important for the subsistence of the local population The Reserve still has no master plan

Titicaca National Reserve (TNR)

This National Reserve covers part of the highest navigable lake in the world It is located opposite the city of Puno (Puno sector) and protects the largest part of the rush beds in the Peruvian sector of the lake Being an aquatic environment, its natural diversity includes birds and fishes which are used in different ways by the rural populations living on the shores of the lake, as well as by the Uro-Aymara indigenous population, for whom the lake and its resources represent virtually the natural source resources for their subsistence

Like many other water bodies in the Andean region it is seriously affected by pollution, and is the principal site for the discharge of domestic and industrial waste from the city of Puno

Titicaca has a master plan approved in 1980 and an operational plan drawn up in 1988

Salinas and Aguada Blanca National Reserve (SABNR)

This National Reserve contains a good sample of high Andean ecosystems in the South of Peru In addition to the landscape values represented by typical high Andean grasslands, salt lakes, snow-covered mountains and volcanoes, the reserve is also home to wildlife typical of the region, including its largest threatened mammals

Since the National Reserve category implies the sustainable use of renewable resources, its management should also aim to ensure the well being of the resident population and surrounding communities

Although, because of its size, it is highly important at the regional land, the reserve has not received the attention it merits as part of the protected area system This area has been classified as vulnerable by the appraisal of the conservation status of terrestrial eco-regions of Latin America and the Caribbean (Dinerstein *et al*, 1995)

Calipuy National Sanctuary (CNS)

Together with the Calipuy National Reserve, this sanctuary contains the only sample within the Peruvian protected areas system of Tropical Southern Andes Biogeographical Province It has been chosen for inclusion in the sample for application of the matrix because of its classification as a strictly protected area, although both protected areas lock available information, management plans, infrastructure personnel and equipment

Tumbes Mangroves National Sanctuary (MTNS)

The Sanctuary protects the only sample of mangrove ecosystems in the Peruvian coast Created in 1988, the sanctuary faces serious problems and threats caused by economic activities in surrounding areas It is the location of a number of projects who activities include planning, management and the restoration of the most important natural features

As it was created recently, and since this date has been receiving the support of Pro Naturaleza, good quality information about the sanctuary is available

Macchu Picchu Historical Sanctuary (MPHS)

The sanctuary protects one of the Peru's most important archaeological sites of the Inca period and the surrounding natural environment It is probably the protected area, which receives the largest annual number of visitors Among the ecosystems it protects the most important are the cloud forests and Andean grasslands Notable wildlife includes birds, the spectacular bear (*Tremarctos ornatus*) and felines typical both of the Puna and sub-tropical environments

As in other cases mentioned above, this zone is located in eco-regions considered to be of highest conservation priority (Dinerstein *et al*, 1995)

Appendix N° 2

Application of criteria for each element of the matrix and each Natural Protected Area in the sample

Application of criteria for each element of the matrix and each Natural Protected Area in the sample

1 Legal and physical status of the protected area

1 1 Information

For the evaluation of this element the following basic information has been considered

The legal decrees establishing for each natural protected area and the written descriptions of their boundaries

National maps at a scale 1/100,000 covering each protected area

The management plans (master and/or operational plans and annual work plans) existing for each protected area

The availability of evaluation reports, identifying control problems areas of conflict, as well as the comments of chiefs of the protected areas during the III National Meeting of the protected area chiefs

1 2 Processing

The processing of the available information for this element has not been difficult because all the necessary information is easily accessible On previous occasions preliminary analysis have been made of the degree of concordance between the written descriptions of the boundaries and information from the National Map, so the status of this component was already known With a few exceptions, the majority of the areas have problems in this respect This is because reliable cartographic information, of the kind contained in the 1/100,000 scale National Map, was not available when many of the protected areas were created It is worth emphasizing that before 1990 the National Map covered only about 45% of the country, and the majority of protected areas were created before this date

Until 1990, the rate of publication of new sheets of the national map was only 4 or 5 new sheets a year Only recently, since 1990, the rate of publication of new sheets has increased and it is hoped to have covered the entire territory by 1997

It is also common knowledge that none of the protected areas is inscribed in national registers of goods or property

The evaluation reports of the different protected areas, the workshops held with area chief and discussions during training courses, provide information about the degree of progress in the physical demarcation of the boundaries of protected areas

It is worth singling out the case of the Bahuaja-Sonene National Park, which was recently been created, where the only demarcation which exists is of the ex-Pampas del Heath National Sanctuary, and it still remains to demarcate the points of conflict in the enlarged territory

2 Personnel, number of Parks Rangers and Staff for each area and training levels

2 1 Information

This information should be separated under two broad headings firstly the optimal situation and secondly the current situation

A serious problem was identified in the definition the figures which define the optimal situation in terms of the numbers of personnel which should be employed in each protected area On the one hand, there is the information derived from the management plans (Master Plan and Operational Plans), some of which are officially approved However, according to the official position of INRENA's General Directorate of Protected Areas (DGANP), in some cases these figures correspond to policies and strategies which are no longer applicable, since they were calculated in a period when the role of the state was understood differently, as being to cover all the needs of protected area management, without taking account of the participation of the local population in control and surveillance activities, as envisaged by today's policies

On the other hand, there are the reports drawn up by consultants working for the FANPE Project, which analyze the personnel requirements of the protected areas under ideal conditions However unlike the management plans which were drawn up by teams of professionals working together, the consultants reports are written by a single professional working independently

Finally, there are the work plans drawn up by the chiefs of the protected areas, whose vision is derived from an identification of maximum operational requirements, corresponding to a crisis emergency situation, rather than the optimal state of affairs According to conversations held with Luis Alfaro, General Director of Protected Areas and Wild Fauna (INRENA) no decision has yet been reached on which of the official figures defining the number of personnel under an ideal situation are appropriate ones for use, in each protected are, in the context of current pollicies and strategies

For the application of this matrix, the figures contained in master plans and operational plans have been used where these documents exist In other cases the reference point used has been the report prepared at the request of the project team in charge or drawing up the Directive Plan for the protected area system

1 3 Results of Physical and Legal Clearing Analysis

Protected Area	Concordance with written descriptions	Record on National Registries	Physical demarcation	Score	Weighting Factor	Total Score
Manu NP	No	No	Partial	0 5	2 00	1 00
Huascaran NP	No	No	Partial	0 5	2 00	1 00
Cerros de Amotape NP	Yes	No	Partial	1 5	2 00	3 00
Rio Abiseo NP	Yes	No	Partial	1 5	2 00	3 00
Yanachaga Chemillen NP	No	No	Partial	1	2 00	2 00
Bahuaja - Sonene NP	Yes	No	Partial	1 5	2 00	3 00
Junin NR	Yes	No	Partial	1	2 00	2 00
Paracas NR	Yes	No	Partial	1 5	2 00	3 00
Titicaca NR	Yes	No	Partial	1	2 00	2 00
Salinas y Aguada Blanca NR	Yes (Partial)	No	No	1	2 00	2 00
Pacaya Samiria NR	Yes (partial)	No	Partial	1 5	2 00	3 00
Calipuy NS	Yes	No	No	1	2 00	2 00
Manglares de Tumbes NS	Yes	No	Partial	1 5	2 00	3 00
Machupicchu HS	No	No	Partial	0 5	2 00	1 00
TOTAL SCORE				15 5	2 00	31 00

With respect to personnel currently working in the protected areas, the staff list needs to be continually bought up to date, since the perennial problem still exists of frequent changes of personnel, including both area chiefs and professionals, and park guards and administrative staff

For the training component, information is available in the protected area training files, located in the National Park and Wild Fauna Department at the La Molina National Agrarian University (UNALM) an institution which has been actively involved in this activity Additional information is available in the files and data bases maintained by the FANPE project in recent years

Given the large number of training events held since 1965 (43 events are recorded in the data bases of the Conservation Data Centre at UNALM) it was decided to classify these events into the following levels

Level I Courses organized at a national level, for training protected area personnel in the management of protected areas and related topics

Level II Courses organized to train personnel from a specific protected area in the management of protected areas and related topics

Level III Courses organized to provide training to a wide target group, attended by some protected area chiefs or park guards

Level IV International courses in protected area management, attended by some protected area chiefs or park guards

Level V Work days, workshops, seminars or congress where the issues addressed included topics related to protected area management, and other events indirectly related to protected areas

2 2 Processing

For the definition of optimal scenarios, with respect to the number of personnel required in each protected area, the basic reference point used were the figures contained in the master plans and operational plans While the validity of this information could now be considered to be debatable, these documents are still valid until INRENA produces up to date lists of the personnel requirements for protected areas In those cases where no master plan or operational plan exists, the reference point used was the report prepared by Oscar Rada for the Directive Plan Project in 1995 In the case of the Pacaya Samiria NR, the figures have been taken from the FANPE report, since those contained in the master plan correspond to a policy which has since been abandoned by the Protected Area Directorate (DGANP/INRENA) needs to bring the personnel requirement for

protected areas into live current policies and strategies as the basis for an officially approved reference document

With respect to the training adjustments, both for park guards and area chiefs and professionals, only events in levels I, II and IV have been taken into account, since these events are designed specifically for protected area personnel and cover topics related to protected area management

For administration and service personnel, no adjustment for training was made, since they are employed on the basis of experience and qualifications obtained prior to starting work in the protected area, and subsequent training would not have a significant impact of management efficiency

There is also the need for an officially approved integrated training plan, which provides a continuous and coherent program of training events which takes account of the serious problems of high staff turnover rates in the protected area system This plan should include, not only courses and other training events, but also an effective means monitoring and evaluating trained personnel

3 Infrastructure and equipment

3 1 Information

There is no register of existing infrastructure in the offices of the Protected Area Directorate (DGANP), so information for this component has been taken from the data bases maintained by CDC-UNALM This information comes from a number of different sources evaluation reports of the protected areas, visits to the protected areas, and conversations with area chiefs for private organizations involved in protected area support work Information on equipment is derived from inventories of goods acquired for each area by management support projects, reports by protected area chiefs and reports of workshops and/or meetings with protected area chiefs

3 2 Processing

For the processing of this information account has been taken of the existence of the infrastructure defined in the master plans or operational plans The score assigned has been corrected using the component of equipment of existing infrastructure

For the future applications of this matrix systematic databases are required, incorporating information from inventories of goods, updating on a regular basis

4 Finance

4 1 Information

2 3 Results of Personnel and Training Analysis

	Optimun Level				Actual Level				Score				Training			
Protected Area	Ch	P	PR	Ad	Ch	P	PR	Ad	Ch	P	PR	Ad	Ch	P	PR	Total Score
Manu NP	1	4	32	16	1	5	20	9	1	1	0 63	0 56	0 7	0 5	0 3	6 78
Huascaran NP	1	8	14	8	1	4	8	5	1	0 13	0 57	0 63	0 75	0 75	0 5	6 12
Cerros de Amotape NP*	1	2	12	4	1	0	9	0	1	0	0 75	0	0 7	0	0 25	3 90
Rio Abiseo NP	1	3	14	4	1	1	10	1	1	0 33	0 71	0 25	0 75	1	0 25	5 75
Yanachaga - Chemillen NP	1	10	16	16	1	0	7	1	1	0	0 44	0 06	0 9	0	0 5	5 05
Bahuaja Sonene NP*	1	4	15	4	1	1	9	0	1	0 25	0 6	0	0 7	0 5	0 5	4 79
Junin NR*	1	5	15	4	1	0	1	0	1	0	0 07	0	0 65	0	0 9	3 18
Paracas NR	1	12	20	8	1	3	5	0	1	0 25	0 25	0	0 7	0 5	0 5	4 09
Titicaca NR	1	6	8	-	1	0	1	0	1	0	0 13	0	0 9	0	0 9	4 52
Salinas y Aguada Bl NR*	1	4	20	4	1	0	0	0	1	0	0	0	0 95	0	0	4 28
Pacaya Samiria NR*	1	6	30	8	1	4	41	2	1	0 67	1	0 25	0 8	0 75	0 5	7 86
Calipuy NS	1	2	15	3	0	0	0	0	0	0	0	0	0	0	0	0
Manglares de Tumbes NS*	1	3	12	3	1	0	2	0	1	0	0 17	0	0 65	0	0 25	3 10
Machupicchu HS*	1	4	25	3	1	2	4	0	1	0 5	0 16	0	0 65	1	0 25	4 84
Weight Factor									4 5	3 5	4	2				
Total Score	14	81	248	77	13	20	117	18								64 26

(*) The source for the optimun number in personnel data was provided by Rada report (1995), if the Master Plan dose not exist or is very old

3 3 Results of Infrastructure and Equipment Analysis

Protected Area	Adm Build	Control Post	Visitor Centers	infraStructure	Equip	Score	Weighting Factor	Final Score
Manu NP	Salvacion	6	Pakitza	0 75	0 75	0 56	12	6 72
Huascaran NP	Huaraz	2	Llanganuco	0 40	0 40	0 16	12	1 92
Cerros de Amotape NP	Casitas	3	Casitas	0 40	0 40	0 16	12	1 92
Rio Abiseo NP	Pataz	3	Pataz	0 75	0 75	0 56	12	6 72
Yanachaga Chemillen NP	Oxapampa	1	Paujil	0 40	1	0 40	12	4 80
Bahuaja Sonene NP*	Pto Maldonado	2	San Antonio	0 40	1	0 40	12	4 80
Junin NR	Ondores	--	--	0	0	0	12	0
Paracas NR	Paracas	2	Paracas	0 40	0 40	0 16	12	1 92
Titicaca NR	Puno	1	Yes	0 40	0 40	0 16	12	1 92
Salinas y Aguada Bl NR	---	- -	--	0	0	0	12	0
Pacaya Samiria NR	Iquitos	13	In CECODES	0 75	0 75	0 56	12	6 72
Calipuy NS	---	---	No	0	0	0	12	0
Manglares de Tumbes NS	Tumbes	1		0 75	0 75	0 56	12	6 72
Machupicchu HS	Yes	2		0 40	0 40	0 16	12	1 92
TOTAL SCORE						3 84	12	46 08

(*) The Bahuaja Sonene NP information includes the available data for Pampas del Heath NS

As was explained in the description of methodology, this element evaluates the degree of fulfillment of budgets assigned from public sector funds The idea would be to contrast the optimal budget defined for each area with the total amounts executed at the end of each financial year using funds from all (i e both public and private) sources However, since no official definition of optimal funding yet exists, the analysis is based on the officially approved assignation of public sector funds and the amounts received from the same source Since this provides a comparison in terms of percentages, the budgets administrated by NGO's have not been taken into account, since it is assumed that the entire budgets obtained by management support programs are in fact executed

With respect to indirect incomes, the information comes basically from the headquarters of the protected areas in the sample and official information at a centralized level provided by the Protected Areas Directorate (DGANP/INRENA)

4 2 Processing

Problems arose in the definition of official budgets since these were defined using a number of different criteria It was observed that, in annual work plans or other short term planning documents, drawn up by protected area chiefs, in some cases these contain emergency budgets (that is, the minimum required for the maintenance of the protected area) while in other cases the budget proposed is based on a move fully developed vision of the management of the protected area in question A restricted budget will be easier to get approved and so this isn't necessarily a good indicator of management efficiency

For future applications of the matrix, the Protected Areas Directorate should provide official information regarding the budgets executed using public sector funds

Difficulties were also encountered in integrating information about central government funding with information about funds received from regional governments, external cooperation programs and support canalized through NGO's Information from NGO's, organizations like FONANPE and international cooperations agencies was less confused and easier to process, but a systematic database is still required

As in the case of budgets, information about direct incomes generated by protected areas is unclear and dependent on the degree to which records are kept up to date, with respect to both funds generated and to funds reinvested The Protected Areas Directorate requires a certain amount of time to process this information, and this determines its availability

There are two protected areas, which generate direct incomes, which are not assigned to the administration of these areas In the case of the Titicaca National reserve, the

There are two protected areas, which generate direct incomes, which are not assigned to the administration of these areas In the case of the Titicaca National reserve, the funds are transferred to the Uro-Aymara rural community, funds generated by the Macchu Picchu Historic Sanctuary are transferred to the National Institute of Culture

5 Existence, type and degree of influence of management plans

5 1 Information

The Directive Plan Project compiled all the relevant information, updated to 1995, in the appraisal document "Diagnostico para el Plan Director del SINANPE" (FANPE, 1995) Additional sources of information include the files of the Protected Areas Directorate, of the NGO's involved in the planning and management of protected areas and the databases of CDC-UNALM

5 2 Processing

At the time of writing, work on editing the Directive Plan has been completed, but it still has not been officially approved Master plans have been drawn up for a number of protected areas but all of these are still in force

Operational plans have only been used by the Peruvian protected area system since the end of the 1980's Some existing operational plans are still in force

Annual work plans are different from the above-mentioned plans both in structure and content, being limited to a description of activities in response to emergencies

For the processing of information for this element, all master plans and operational plans were reviewed, as the majority of annual work plans

It is important to emphasize that the more existence of a management plan says nothing about the quality of the plan nor whether it is being correctly implemented Regular evaluation of these aspects is a fundamental part of protected area management, so that adjustments and improvements can be made during the period of implementation of the plan and to provide improved guidelines for drawing up future plans

Equally, if plans are not regularly updated, it is very likely that they will be not of step with the development of protected area strategy, both in Peru and the rest of the world Strategies are revised from time to time and may sometimes be abandoned and replaced with new strategies, which correspond more closely to our developing vision of protected areas This evolution in the approach towards management of the protected area system involves abandoning paradigms, as for example in the case of the abandonment of the practice of delegating the formulation of management plans to terms of professional experts, and its replacement by participatory planning processes

4 3 Results of Financial Operations Analysis

Protected Area	Budget Approved (1) S/	Budget Executed (4) (Treasury Funds) S/	External Funds (2) (International Cooperation) S/	Direct Incomes S/	Adjust-ment Factor	Score	Weighting Factor	Total Score
Manu NP	31,360	23 757	1,823,286	0	0 60	0 60	14	8 40
Huascaran NP	161 000	28 800	17,760	89 504 (4)	0 90	0 76	14	10 64
Cerros de Amotape NP	30 204	7 200	88,800	0	0 60	0 60	14	8 40
Rio Abiseo NP	61 840	36 393	556 321	0	0 60	0 60	14	8 40
Yanachaga - Chemillen NP	28 640	0	301 521	0	0 60	0 60	14	8 40
Bahuaja Sonene NP	60 880 (3)	15 313	1 774 484 (3)	0	0 60	0 60	14	8 40
Junin NR	12 510	11 067	0	0	1 00	0 88	14	12 32
Paracas NR	88 360	16 533	0	81 750 (4)	0 90	0 90	14	12 60
Titicaca NR	38 640	42 427	0	0	1 00	1 00	14	14 00
Salinas y Aguada Bl NR	28 240	0	0	0	0 00	0 00	14	0 00
Pacaya Samiria NR	46 600	29,187	3 543 120	8,629 (5)	0 60	0 60	14	8 40
Calipuy NS	0	0	0	0	0 00	0 00	14	0 00
Manglares de Tumbes NS	30 240	0	222,000	0	0 50	0 50	14	7 00
Machupicchu HS	21 450	27,200	0	0	0 80	0 80	14	11 20
Total Score	601,324	237 877	8,327 312	179,883		8 44	14	118 16

(1) Source Informe sobre el financiamiento del SINANPE (Rada 1995)
(2) Source Informe sobre el financiamiento del SINANPE (Rada 1995)
(3) Include the budget for Pampas del Heath NS and the Tambopata Candamo Reserve Zone
(4) Source DGANP/INRENA 1996
(5) Source RPPS 1996
Note Average Exchange Rate for 1995 = 2 22 Nuevos Soles per US Dollar

5 3 Results of Planning Tools Analysis

Protected Area	Directive Plan	Management Plan	Score	Appraisal	Score	Score	Weighting Factor	Final Score
Manu NP		Plan Maestro 85 Plan Operativo 92-93	1	Annual	1	2	5	10 00
Huascaran NP		Plan Maestro 90 Programa Uso 96 Plan anual de trabajo	1	Irregular	0 5	1 5	5	7 5
Cerros de Amotape NP		Plan Operativo 89-90 Plan anual de trabajo	0 65	Annual	1	1 65	5	8 25
Rio Abiseo NP		Plan Operativo 90-92 Plan anual de trabajo	0 75	Annual	1	1 75	5	8 75
Yanachaga - Chemillen NP		Plan Maestro 87 Plan anual de trabajo	0 65	Annual	1	1 65	5	8 25
Bahuaja Sonene NP		Plan de corto plazo	0 65	---	0	0 65	5	3 25
Junin NR		Plan anual de trabajo	0 65	---	0	0 65	5	3 25
Paracas NR		Plan Maestro 96 Plan Operativo 92 94	1	Irregular	0 5	1 5	5	7 5
Titicaca NR		Plan Maestro 80 Plan Operativo 88-90 Plan anual de trabajo	0 65	___	0	0 65	5	3 25
Salinas y Aguada BI NR		Plan Maestro 85	0 25	---	0	0 25	5	1 25
Pacaya Samiria NR		Plan Maestro 86 Plan anual de trabajo	0 75	Annual	1	1 75	5	8 75
Calipuy NS		---	0	---	0	0	5	0
Manglares de Tumbes NS		Plan Operativo 93-94	1	Annual	1	2	5	10
Machupicchu HS		Plan anual de trabajo	0 65	---	0	0 65	5	3 25
Score	0 5						5	2 5
TOTAL SCORE	2 5							85 75

6 Local participation in the formulation of management plans

6 1 Information

The appraisal carried out for the Directive Plan Project compiles all the available information about participatory planning experiences Other sources of information include the archives of the Protected Areas Directorate and of NGO's involved in protected area management

6 2 Processing

Information about this element was ordered and compared to corresponding assessment table, contained in the methodological description of the matrix A value corresponding to the characteristics of each process was assigned

7 Local participation in the implementation of management plans

7 1 Information

As in the previous case, the information comes from inventories carried out for the Directive Plan Additional information has been provided by NGO's undertaking protected area management support programs

Account has also been taken of the objectives, policies and strategies proposed Also, it has been taken into account the objectives, the policies and proposed strategies in the management plans, where it is showed, for example, the intention to implicate the local people in the several management programs

This lists version of the matrix does not consider co-management of protected areas Although this concept forms part of the most recent strategies for protected area management being developed in a number of countries, hasn't been officially adopted by the Peruvian protected area system

7 2 Processing

The information obtained was ordered and compared the assessment table contained in the methodological description of the matrix

6 3 Results of Participatory Planning Analysis

Protected Area	Period	Kind of workshop	Score	Weighting Factor	Final Score
Manu NP	1991-1992	Local and Regional Workshop	0 75	4	3
Huascaran NP	1987-88 1989-90	Local and Regional Workshop	1	4	4
Cerros de Amotape NP	1987- 1988	Local and Regional Workshop	0 75	4	3
Rio Abiseo NP	1988-1989	Local and Regional Workshop	0 75	4	3
Yanachaga - Chemillen NP	1996	Regional Workshop	0 45	4	1 80
Bahuaja Sonene NP	1991-1995	Local and Regional Workshop	1	4	4
Junin NR	--	-	0	4	0
Paracas NR	1994-1995	Regional Workshop	0 75	4	3
Titicaca NR	1988	Local Workshop	0 45	4	1 80
Salinas y Aguada BI NR	---	---	0	4	0
Pacaya Samiria NR	1994-1995	Local and Regional Workshop	1	4	4
Calipuy NS	---	---	0	4	0
Manglares de Tumbes NS	1988, 1993	Local and Regional Workshop	0 75	4	3
Machupicchu HS	---	---	0	4	0
TOTAL SCORE			7 65	4	30 60

7 3 Results of Local Participation in Management Programs Analysis

Protected Area	Programs Existence	Comments	Score	Weighting Factor	Final Score
Manu NP	Yes	Involvement of local communities in control and vigilance programs proposed	0 25	4	1
Huascaran NP	Yes	Involvement of local communities in control and vigilance programs proposed	0 25	4	1
Cerros de Amotape NP	Yes	Involvement of local communities in control and vigilance programs proposed	0 25	4	1
Rio Abiseo NP	Yes	Involvement of local communities in control and vigilance programs proposed	0 25	4	1
Yanachaga - Chemillen NP	No		0	4	0
Bahuaja Sonene NP	Yes	Involvement of local communities in control and vigilance programs proposed	0 25	4	1
Junin NR	No		0	4	0
Paracas NR	Yes	Existence of volunteer -ranger program	0 5	4	2
Titicaca NR	No		0	4	0
Salinas y Aguada BI NR	No		0	4	0
Pacaya Samiria NR	Yes	Involvement of local communities in control and vigilance programs proposed and management resources	0 75	4	3
Calipuy NS	No		0	4	0
Manglares de Tumbes NS	No		0	4	0
Machupicchu HS	No		0	4	0
TOTAL SCORE			2 50	4	10

8 Existence of extension programs, environmental education programs and others

8 1 Information

The principal source of information is the Protected Areas Directorate, as well as NGO's involved out these programs

8 2 Processing

The information was processed in a similar way as for the element above, that is, information relating to each protected area was compared with the assessment table contained in the methodological description of the matrix

9 Level of coordination with the private sector, the local community and local governments

9 1 Information

Sources of information are located in the headquarters of each protected area, the Protected Areas Directorate and NGO's involved in protected area support programs

9 2 Processing

The information was ordered and compared with the corresponding table, as in the preceding cases

10 Information for ecological monitoring

10 1 Information

The sources of information for the five components of this element are to be found in the archives of the Protected areas Directorate, which should receive copies of all reports of research undertaken in protected areas, from NGO's involved, from CDC-UNALM and the Natural History Museum In addition we consulted the catalog of cartographical information held by the National Geographic Institute and the National Meteorological and Hydrological Service (SENAMHI)

It should be stressed that the information required for the evaluation of this element has not been ordered or even collected together in one place In general it is widely dispersed and few protected areas have created archives relating to their areas

8 3 Results of Extension Programs Analysis

Protected Area	Programs Existence	Comments	Score	Weighting Factor	Final Score
Manu NP	Yes	Programs executed by NGO s in coordination with the Protected Area authority	1	3	3
Huascaran NP	Yes	Programs executed by NGO's in coordination with the Protected Area authority	0 65	3	1 95
Cerros de Amotape NP	Yes	Programs executed by NGO's in coordination with the Protected Area authority	1	3	3
Rio Abiseo NP	Yes	Programs executed by NGO s in coordination with the Protected Area authority	1	3	3
Yanachaga Chemillen NP	Yes	Executed by personnel of the Protected Area	0 65	3	1 95
Bahuaja Sonene NP	Yes	Executed by personnel of the Protected Area and NGO s	1	3	3
Junin NR	No	--- --------	0	3	0
Paracas NR	Yes	Universities in coordination with Protected Area authority	0 65	3	1 95
Titicaca NR	Yes	Programs exsit but inactive	0	3	0
Salinas y Aguada BI NR	No	------ -------	0	3	0
Pacaya Samiria NR	Yes	Programs executed by NGO s in coordination with the Protected Area authority	1	3	3
Calipuy NS	No		0	3	0
Manglares de Tumbes NS	Yes	Programs executed by NGO's in coordination with the Protected Area authority	1	3	3
Machupicchu HS	Yes	Programs exsit but inactive	0	3	0
TOTAL SCORE			7 95	3	23 85

9 3 Results of coordinations with the private sector, local community and local governments analysis

Protected Area	Coordination exists	Comments	Score	Weighting Factor	Final Score
Manu NP	Yes	Agreement with Pro-Naturaleza Apeco and Regional Government	1	4	4
Huascaran NP	Yes	Agreement with Mountain Institute	1	4	4
Cerros de Amotape NP	Yes	Agreement with Pro-Naturaleza	1	4	4
Rio Abiseo NP	Yes	Agreement with Pro-Naturaleza and Apeco	1	4	4
Yanachaga - Chemillen NP	Yes	Agreement with Pro-Naturaleza	1	4	4
Bahuaja Sonene NP	Yes	Agreement with Pro-Naturaleza, Conservation International and local communities	1	4	4
Junin NR	No		0	4	0
Paracas NR	Yes	Agreement with Pro-Naturaleza and Local Commitee	1	4	4
Titicaca NR	Yes	Agreement with Apeco but isn't active today	0	4	0
Salinas y Aguada BI NR	No		0	4	0
Pacaya Samiria NR	Yes	Agreement with Pro-Naturaleza WWF and Regional Government	1	4	4
Calipuy NS	No		0	4	0
Manglares de Tumbes NS	Yes	Agreement with Pro-Naturaleza	1	4	4
Machupicchu HS	No		0	4	0
TOTAL SCORE			9	4	36

10 2 Processing

The five components of this element have been processed independently Cartographical coverage was ascertained on the 1 100,000 sheets of the national map and compared with the assessment table

In the case of meteorological information, the existence of meteorological stations in or near the protected area was ascertained by consulting the catalogs of the Word Meteorological Organization Account was taken of the amount of information available and its availability in SENAMHI

For the biological inventories account was taken of expeditions undertaken by academic institutions and also by NGO's, including not only their occurrence but also the area covered and their date

For ecological evaluations account was taken of the fast that these are not simply inventories of Flora and fauna, but are based on a more integrated vision of the general status of the ecosystems studied, with reference to the methodologies proposed by the Nature Conservancy (Rapid Ecological Appraisal) and Conservation International (Rapid assessment Procedure)

Finally, account was taken of the existence of procedures for integrating all the existing information, and information being generated, to improve decision making procedures The information was compared with the values shown in the table contained in the methodological description of the matrix

11 Local participation in economically sustainable activities

11 1 Information

The fundamental source of information is the Protected Areas Directorate, as well as archives and reports of NGO's carrying out development programs

11 2 Processing

As in the case of elements described previously, the information was compared with the assessment table in the methodological description of this evaluation matrix

12 Management of conflicts between land use and government development programs

12 1 Information

While it is true that the problems only come to light when they are no longer a remote threat, information managed by other state agencies can enable potential conflicts to be identified In addition, knowledge of the degree of organization of the administrative authorities of the different protected areas, of the Protected Areas Directorate and the NGO's involved in actions in support of the protected area systems to respond or collaborate in the face of threats of this nature

12 2 Processing

The procedure used was based on a compilation of case studies, where external threats tested the response capacity of central government agencies, protected area authorities, local governments and civil organizations The information was compared to the respective assessment table

12 3 Results of Conflicts Management with other Governmental Proyects Analysis

Protected Area	Current process	Comments	Score	Weighting Factor	Final Score
Manu NP	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 65	6	3 90
Huascaran NP	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 65	6	3 90
Cerros de Amotape NP	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 50	6	3 00
Rio Abiseo NP	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 65	6	3 90
Yanachaga Chemillen NP	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 50	6	3 00
Bahuaja Sonene NP	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 65	6	3 90
Junin NR	No	----------	0	6	0
Paracas NR	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 65	6	3 90
Titicaca NR	No	--- ---- - ------	0	6	0
Salinas y Aguada BI NR	No	--- ---------- ---	0	6	0
Pacaya Samiria NR	Yes	Reactive capacity exists in the Protected Area administration NGO s and Regional Authorities	0 65	6	3 90
Calipuy NS	No	---------- ---	0	6	0
Manglares de Tumbes NS	Yes	Reactive capacity exists in the Protected Area administration NGO's and Regional Authorities	0 65	6	3 90
Machupicchu HS	Yes	Reactive capacity exists in the Protected Area administration, NGO s and Regional Authorities	0 65	6	3 90
TOTAL SCORE			5 55	6	37 20

Appendix N° 3

Protected area system monitoring matrix workshop
List of participants

PROTECTED AREA SYSTEM MONITORING MATRIX WORKSHOP

Auditorium of US AID/Lima
Date January 23, 1997

LIST OF PARTICIPANTS

- Ing Antonio Tovar
  Centro de Datos para la Conservación (CDC)
  Universidad Nacional Agraria La Molina

- Dr Pedro Solano
  Sociedad Peruana de Derechos Ambiental (SPDA)

- Blga Mariela Leo Luna
  Asociación Peruana para la Conservación de la Naturaleza (APECO)

- Dra Lily Rodríguez
  Museo de Historia Natural Javier Prado / APECO

- Ing Carlos Ponce
  Conservation International

- Dr Alejandro Camino
  PROFONANPE

- Mrs Alexandra Cugler
  Instituto de Factibilidad Ecolgica (IDEFE)

- Lic Luis Alfaro Lozano
  Instituto Nacional de Recursos Naturales (INRENA)

- Lic Omar Ubilluz
  Instituto Nacional de Recursos Naturales (INRENA)

- Ing Guillermo Idrogo
  Instituto Nacional de Recursos Naturales (INRENA)

- Mrs Patricia Fernández Dávila
  Proyecto FANPE (GTZ/INRENA)

- Dra Patricia Flores

Instituto para el Desarrollo y Medio Ambiente (IDMA)

- Blgo Víctor Pulido Capurro
  Programa Humedales Perú

- Blgo Daniel Blanco
  Asociación para la Conservación de la Selva Sur (ACSS)

- Ing Antonieta Gutierrez
  Directora de Biodiversidad del Instituto de Investigaciones de la Amazonía Peruana (IIAP)

- Ing Miriam Torres (Huaraz)
  Mountain Institute

- Dr Jorge Recharte
  Mountain Institute

- Blgo Alvaro Torres
  Consultor independiente

- Blga María Luisa del Río
  CONAM

- Ing Antonio Bernales
  Jefe, Unidad Ejecutora del Proyecto SENREM (CONAM)

- Econ Raúl Tolmos
  Unidad Ejecutora del Proyecto SENREM (CONAM)

- Ing Luis Egocheaga
  Unidad Ejecutora del Proyecto SENREM (CONAM)

- **Personnel of US AID/Lima:**

  Dr Alan Davis

  Ing Edilberto Alarcón

  Econ Jorge Elgegren

  Dra Marilú Bagacigalupo

  Dr Thomas Moore

  Dr Tommie Fairlie

Dr Gerardo Arabe

Dra Miriam Choy

Dr Bernardo Espinoza

Dr David Bayer

- **Expositor:**

  Ing Pedro Vásquez R

11 3 Results of Local Participation in Sustainability Activities Analysis

Protected Area	Management Programs	Comments	Score	Weighting Factor	Final Score
PN Manu	Yes	'Taricayas" Secundary Forest, Cedros and "Tornillos	1	9	9
PN Huascaran	Yes	Livestock management	0 65	9	5 85
PN Cerros de Amotape	Yes	Livestock management Algarroba and toxic scrub management	1	9	9
PN Rio Abiseo	Yes	Livestock managemnt and livestock with alpacas	1	9	9
PN Yanachaga Chemillen	No		0	9	0
PN Bahuaja Sonene	Yes	'Castaña" management in Sonene community (ex- Pampas del Heath NS)	1	9	9
RN Junin	No		0	9	0
RN Paracas	Yes	Scallop management with artisanal fisheries	1	9	9
RN Titicaca	Yes	'Totora' management with Uro-Aymara communities	0 65	9	5 85
RN Salinas y Aguada Bl	No		0	9	0
RN Pacaya Samiria	Yes	"Taricaya" nesting beaches and "Aguaje Palm" management with local communities	1	9	9
SN Calipuy	No		0	9	0
SN Manglares de Tumbes	Yes	Mollusk harvest control	0 65	9	5 85
SH Machupicchu	No		0	9	0
TOTAL SCORE			7 95	9	71 55

10 3 Results of Ecological Monitoring Analysis

Protected Area	1	P1	2	P2	3	P3	4	P4	5	P5	Score	Weighting Factor	Final Score
Manu NP	100%	1	Partial	0 5	Partial	0 75	No	0	Partial	0 5	2 75	1 80	4 95
Huascaran NP	100%	1	Partial	0 5	Enough	1	No	0	✓	1	3 50	1 80	6 30
Cerros de Amotape NP	100%	1	Partial	0 5	Partial	0 75	No	0	✓	1	3 25	1 80	5 85
Rio Abiseo NP	80%	0 75	No	0	Partial	0 75	No	0	✓	1	2 50	1 80	4 50
Yanachaga - Chemillen NP	50%	0 50	Partial	0 5	Partial	0 75	No	0	✓	1	2 75	1 80	4 95
Bahuaja Sonene NP	100%	1	No	0	Partial	0 35	1994	1	✓	1	3 35	1 80	6 03
Junin NR	100%	1	Enough	1	Enough	1	1980	0 5	No	0	3 50	1 80	6 30
Paracas NR	100%	1	Partial	0 5	Enough	1	No	0	Partial	0 5	3 00	1 80	5 40
Titicaca NR	100%	1	Enough	1	Enough	1	No	0	No	0	3 00	1 80	5 40
Salinas y Aguada Bl NR	100%	1	No	0	Partial	0 35	No	0	No	0	1 35	1 80	2 43
Pacaya Samiria NR	100%	1	Partial	0 5	Partial	0 75	1994	1	✓	1	4 25	1 80	7 65
Calipuy NS	100%	1	Partial	0 5	No	0	No	0	No	0	1 50	1 80	2 70
Manglares de Tumbes NS	100%	1	Enough	1	Enough	1	1985	0 5	✓	1	4 50	1 80	8 10
Machupicchu HS	100%	1	Partial	0 5	Partial	0 75	No	0	Partial	0 5	2 75	1 80	4 95
TOTAL SCORE		13 25		7		10 2		3		8 5	41 95	1 80	75 51

Components
1 National Map
2 Meterological Data
3 Biological Assessment
4 Ecological Assessment
5 Feed back process

Scores
P1 Component 1 Score
P2 Component 2 Score
P3 Component 3 Score
P4 Component 4 Score
P5 Component 5 Score