



## FINAL REPORT

# ANALYSIS OF EFFECTIVENESS OF THE IMPLEMENTATION OF ENVIRONMENTAL POLICY FOR CONSERVATION OF MIGRATORY SPECIES

Instructor: Juan Pablo Arce  
Director Latin America and the Caribbean  
NatureServe

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## **Background**

Since 2001, NatureServe has successfully contributed to building the capacity of decision makers, the scientific community, and local experts throughout the Western Hemisphere by developing a series of information management training activities for biodiversity conservation, conservation planning, and species distribution modeling.

In particular, NatureServe has been developing biodiversity conservation projects, training activities, and applying different tools and methodologies in Latin America and the Caribbean. For example, from 2003-2005, NatureServe and the Conservation Data Center of Paraguay developed the project “A Framework for Sustainable Conservation Practices in the Guarani Aquifer of Paraguay”, to assess the opportunities for implementing environmental policies described in the decentralization process of the Secretaria del Ambiente (SEAM) following three major environmental guidelines: Land Use Planning Policy, Environmental Quality Control Policy, and the Environmental Impact Assessment Policy. An important element of this project was the training activity for SEAM and CDC staff in methodological approach of environmental policy assessment.

Based on similar initiatives in Bolivia and Guatemala, NatureServe held a formal five-day training course on the analysis of effectiveness of the implementation of environmental policy for the conservation of migratory species at the Hotel Portal del Sol in Asuncion, Paraguay. This training further enhanced the work of the Western Hemisphere of Migratory Species Initiative (WHMSI). The primary beneficiaries of the training were mid-level decision makers such as the CMS focal points and/or Environmental/Natural Resources delegates of Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, and Venezuela who required updated knowledge on tools and methods to enhance their environmental policy work.

## **1. Goal and Objectives**

The goal of this initiative was to share new methodological procedures to analyze and evaluate the implementation of environmental policy in the context on the social, economic and biodiversity conservation situation of a developing country.

In this context, the training activity accomplished the following objectives.

Objective 1: Train decision makers to use practical statistical tools to evaluate options for successfully implementation of environmental policy.

This course provided to 17 decision makers the tools and methods to better implement environmental policy for migratory species conservation. The participants to this course were professional staff from 9 South American countries and provided a different scope of analysis, performance, and recommendations for environmental policy analysis to the entire group.

Comments from the Course Evaluation survey - Chile

**“El trabajo estadístico y las tablas utilizadas es bueno para dar coherencia e interpretación del trabajo. En la actualidad, la estadística es una de las herramientas fundamentales en la toma de decisiones y en el trabajo que ejecutan los servicios sobre diversas materias, entre ellas la ambiental. Los gobiernos están diseñando nuevas modalidades para la toma de decisiones, por lo que la metodología enseñada en este curso merece mi especial atención. Es ágil y no complicada. Es lógica.”**

The statistics and tables used here were good to provide consistency and interpretation during the course work. At present, statistics is one of the key tools in the decision making process. In particular for environmental decisions that most technical services provide. Governments are developing new methods for decision making. The methodology taught in this course deserves my attention. It is easy and friendly to apply. It is logical.

The application of the methodology and analysis in this course was very useful for medium-level decision makers, technical staff in the field, and policy advisors in the biodiversity conservation and land use planning of a specific country.

Objective 2: Increase human resource capacity for effective wildlife conservation and management in Latin America by increasing conceptual understanding of the linkages between environmental policy, biodiversity conservation and information management.

Using a practical case study from Paraguay, this training activity demonstrated the complexity in the use of data and information management, and the integration of biodiversity data with social and economic information. Looking to for this relationship in a scientific manner, the participants were able to embrace the context of the environmental policy process. This course attempted to bring a new approach and participants were capable of using methodologies from the social sciences.

Comments from the Course Evaluation survey - Ecuador

**“Por supuesto, como lo indique anteriormente, aplicaré esta metodología en los programas de censo de tráfico de especies de vida silvestre, como una de mis primeras iniciativas dentro de mi regional, que espero lograrlo en el transcurso del año.”**

Of course, as indicated above, I will apply this methodology in the current program of census of wildlife traffic. This will be my first initiative within the regional scope of my work in Ecuador which I hope to accomplish during this year.

Objective 3: Provide practical statistical tools to evaluate environmental policy.

Contribute to the WHMSI initiative by providing a theoretical concept of the linkages between environmental policy, biodiversity conservation, and information management.

This was a very interesting and time consuming activity and the overall performance of participants was very impressive. Using a case study, the instructor provided a set of statistical data. The purpose of teaching statistics was to give participants experience in performing similar operations multiple times on three selected environmental policy. Based on the experience in the application of correlation coefficients in other countries, the course educated participants to simply apply statistics in a geographic context and make a final interpretation of the results.

Comments from the Course Evaluation survey – Venezuela

**“Indudablemente este curso ha ampliado mis conocimientos, puesto que mis conocimientos de SIG eran nulos. Considero que los temas aquí tratados, incluido el ejercicio de búsqueda de financiamiento son de gran utilidad, no solo como herramientas para la conservación de especies migratorias, sino para casi cualquier tema ambiental. La meta a más corto plazo es implementarlas como parte del proyecto de monitoreo de aves que actualmente llevamos en el Ministerio.”**

Undoubtedly this training course has increased my knowledge, since my knowledge of GIS was very week. I believe that the topics learned here, including the exercise to seek funding were useful not only as tools for conservation of migratory species, but to almost any environmental issue. In the short term, my goal is to implement it as part of the Birds Monitoring project that currently is being carried out by the Ministry of Environment.

The application of a Geographic Information Systems (GIS), the Arc View 3.3 in the spatial analysis of the statistical results, brought participants a comprehensive conceptualization of environmental policy analysis. These maps were very useful during the final presentations of each group and promoted networking people around similar policy analysis.

Comments from the Course Evaluation survey - Argentina

**“El curso ha sido muy bueno, la instrucción fue personalizada, hubo un intercambio enriquecedor entre todos los participantes.”**

The course has been very good. The instruction was customized by participant. A good and friendly sharing environment between all participants was created.

### **3. Methodology and Agenda**

The core concept of this methodology was the implementation of efficient environmental policies to achieve sustainable development and biodiversity conservation goals in an ecoregion/municipality, which vary according to the legal, social, economical, and environmental factors, such as the ecosystems and selected migratory species of birds. In this course we used a case study from the aquifer Guarani of Paraguay.

In this course, four main outcomes were accomplished:

- Trained 11 international participants in the use of the methods and statistical tools for environmental policy analysis.
- Trained 6 staff from the Secretaria del Ambiente (SEAM) of Paraguay in the use of the methods for policy analysis.
- Engaged participants in the importance to evaluate policy and conservation as key factor for the conservation of migratory birds.
- Provided participants the opportunity to apply this knowledge to their own environmental concerns in the future.

Using the case study from Paraguay, this course assessed the opportunities of implementing environmental policy as described in the decentralization process,<sup>1</sup> which has three main environmental guidelines (Secretaria del Ambiente 2004):

- Land Use Planning policy in Municipalities and Departments.
- Environmental quality control related to the preservation, conservation, use and management of natural resources available and its uses in Municipal territory for the production of goods and services in the Department.
- Use environmental impact assessment as a tool for environmental management decentralization that allows preservation, conservation, use and management of natural resources in a sustainable way.

In the analysis, participants in groups of two discussed three questions for the statistical and spatial process and analysis: 1) Which variables will allow the implementation of environmental policies? 2) What are the main priorities that need attention? 3) Which

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<sup>1</sup> Duarte's government introduced the plan: Decentralize Environmental Policy to the Municipal and Departmental Governments (Gestion Ambiental Descentralizada de Gobiernos Departamentales y Municipales) under 1561/00 Law, that established the responsibility of SEAM to promote decentralization with the objective of improving environmental control and conservation

municipalities have better opportunities to implement a selected environmental policy for the conservation of migratory birds?

During 2003 to 2005, a case study was developed in 108 municipalities within seven Departments of the eastern region of Paraguay: Amambay, Canindeyú, Caaguazú, Guairá, Caazapá, Alto Paraná, and Itapúa (Map 1). The Guarani aquifer is located in this region.



Map 1. Study Area

In this course we used a bivariate analysis and selected two categories of ordinal variables: independent and dependent. The basic independent variables were the land cover, population, municipality income, environmental laws, and migratory birds species. Each independent variable had dependent variables, as shown in Table 1. Relationships were drawn by each independent variable with all dependents. Gamma was the statistical correlation coefficient used for measuring the association between the ordinal variables.

Table 1. Example of Independent variables with each dependent variable.

INDEPENDENT (X)	DEPENDENT (Y)
Ecosystems	Land use(agricultural, ranching)
Population	Poverty Illiteracy Level of Education Income
Migratory species distribution	Land use
Municipality Income	Municipality expenses Poverty
Legislation	Land Use Level of education

Finally, a spatial representation or mapping using a GIS application was used to graph the final outcomes or products. The course provided all technical assistance and computers to run Excel, Power Point and Arc View 3.3. Software. The 50 hour course consisted of five, 10-hour business days (Monday through Friday). In the training course, NatureServe provided the following materials to each student:

- Guidelines of the training course.
- Existing statistical data from Paraguay (Excel-base information tool).
- Basic concepts of statistics in word document.
- Spatial data from Paraguay (ecosystems, species distribution, departments, and municipalities).
- Evaluation Survey form
- One CD including all information described before

Comments from the Course Evaluation survey - Uruguay

**“El curso y el instructor fue excelente. Demostró conocimientos sólidos los transmitió con mucha dedicación y cariño. Se nota que nos brindó lo mejor de su persona. Aprendí sin sentir que era un tarea pesada.”**

The course and the instructor were excellent. He demonstrated sound knowledge and taught with great dedication and affection. We noticed that he gave us the best of him. I learned without feeling the hard work and tasks to be accomplished.

### Agenda

Activity	Deliverable	Completion Date
NatureServe coordination and logistics	Arriving participants Installation of computers and software Reading of Guidelines and Materials	Monday 9
1	Basic concept on Policy and environment Revision of statistical methods and correlation coefficients Hypothesis and selection of independent and dependent variables Presentation of Paraguay case study Brief description of the Guideline Establishment of 8 working groups (two per computer) Questions & Answers session	Tuesday 10
2	Definition of ordinal variable: Independent and dependent Selection of one environmental variable Selection of categories of variables Inclusion of data into the Excel spreadsheet provided Questions & Answers session	Wednesday 11
3	Statistical analysis Calculation of Gamma Correlation coefficient Interpretation of statistical results Statistical significance Explanation of GIS process in Arc View 3.3 Mapping analysis of environmental policy Interpretation of results using selected variables Preparation of power point presentation by group	Thursday 12
4	Presentation of each group describing: <ul style="list-style-type: none"> <li>• Background</li> <li>• Methodology</li> <li>• Description of variables</li> <li>• Prioritization of opportunities in the implementation of environmental policy</li> <li>• Recommendations on conservation, and socio-economic investments on biodiversity</li> </ul> Synthesis of the training course Evaluation Survey by participants	Friday 13

#### **4. Conclusions and recommendations**

The analysis of the implementation of environmental policy was very satisfactory, as evidenced in participants feedback. Students were motivated, participatory, and committed to WHMSI training opportunities. As a first funding award from the OAS/WHMSI, NatureServe greatly improved the course content, teaching method, organization, and logistics for this training course.

Participants were extremely motivated in the application of innovative statistical tools and GIS techniques for mapping environmental policy and distribution of key selected migratory and resident bird species. As a result, the students went far beyond the planned training tasks. The initial assignment was designed to work with a pair of variables (one independent and one dependent). The group actually worked with more than 10 pairs of variables. The general result of this new training course was very well received by delegates and/or focal points of the migratory species convention in South America.

Although, feedback about the Paraguay case study was positive, it is recommended to include more examples from participating countries as it is mentioned in the evaluation survey of the course. However, the preparation of data using information from each country is complex and will require additional funding and time to set up a complete training material (statistics and thematic maps).

Participants found the Aquifer Guarani topics interesting and challenging, particularly the practical exercises to identify the correlation between social, legal and economic values and biodiversity distribution. Although, all material has been available the first day of the training, future courses should consider more time to enhance the reading time about policy, basic statistics, GIS and biodiversity information. This is a valuable key lesson learned from this training course. The evaluation of the course by participants was graded an average of 4 over 5 points. This is an extremely positive result. It demonstrates the potential to replicate to similar audience of decision makers in the future.

Feedback about the Paraguay case study was positive. Analyzing three major policies, such as Land Use Planning, Environmental Quality Control, and the Environmental Impact Assessment were good examples for a comprehensive scenario of the effectiveness of the implementation of environmental policy. Furthermore, participants found this topic interesting and challenging, particularly the practical exercises to find the correlation between the political, legal, social, economic conditions and biodiversity conservation, including distribution of birds and ecosystems. It should be noted that most of the participants had a biological sciences undergraduate background.

The participants expressed their commitment to participate and support training courses in conservation planning, species distribution modeling, climate change and the training on environmental policy analysis in each country. From my point of view, this particular group of participants can be the seed to establish technical-decision makers teamwork specialized in biodiversity information management tools for conservation and sustainable development within each government in the region.

**The CD attached to this final report contains the following:**

**CD of Analysis of the Implementation of Environmental Policy**

- **Final report**
- **List of participants**
- **Guidelines for the Environmental Policy course:  
Statistical and Spatial Data, Literature, Presentation, Tables of  
Analysis, and Documents for Statistical Analysis and Significance.**
- **Final presentations by groups**
- **Course evaluation by participants**
- **Training course pictures**