



## Six Case Studies in Latin America and the Caribbean: Access to Genetic Resources and Benefit Sharing



IUCN's Regional Office for South America



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**Six Case Studies in Latin America and the Caribbean:  
Access to Genetic Resources and Benefit Sharing.**

**Strengthening the Implementation of  
Regimes of Access to Genetic Resources and  
Benefit Sharing in Latin America and the Caribbean**

**Montserrat Ríos and Arturo Mora**

**Editors**

**Regional GEF Project “Strengthening the Implementation of Regimes of Access to Genetic Resources and Benefit Sharing in Latin America and the Caribbean” executed by the Regional Office for South of the International Union for Conservation of Nature (IUCN South America ) and implemented by the Regional Office for Latin America and the Caribbean of the United Nations Environment Programme (UNEP-ROLAC).**

## Case Study in Ecuador



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Cortés



# **Global Ocean Sampling Expedition, Galapagos National Park: collection activities and implementation of legislation**

## **1. Introduction**

During the course of 2003 and 2004 researches led by J. Craig Venter conducted a “Global Ocean Sampling Expedition”, collecting more than 150 samples from 200 liters of sea water every 200 miles. In Ecuador, according to the Memorandum of Understanding (MU) signed between the “Institute for Biological Energy Alternatives” (IBEA) and the State, the following scope was established: “Whereas IBEA is undertaking a global ocean expedition to implement a scientific research project on microbiological diversity in Galápagos with the aim of characterizing it in coastal waters and terrestrial communities around the islands.”

The project was presented to its implementers as an activity to raise awareness about microorganisms that inhabit the seas, discovering how they function in their natural systems. This in itself would provide the basis or would allow the possibility to conduct studies on the effects humans have on the environment and understand the evolution of life on Earth.

In the case of Ecuador the signed MU states that “(...) to determine the complex interrelationship between microorganisms groups, especially the ones affecting environmental processes of regional and global importance, a microbial sampling using a “whole environment” genomic approach will be performed with the vessel R.V. Sorcerer II” (MU, Background 3).

Samples were mostly collected in international waters i.e. not subject to national ABS rules, while others were collected in the territory of 17 countries of Central and South America including: Ecuador, Mexico, Panama and Honduras. Additionally samples were collected in: North America (Canada and United States of America); Oceania; South Pacific (New Caledonia, French Polynesia and Vanuatu); Africa (Tanzania and Seychelles); Europe and United Kingdom (Sargasso Sea and Bermuda).

## **2. Biological resources and by-products of the “Global Ocean Sampling Expedition”, Galapagos National Park**

The MU talks about microbial diversity of microorganisms without specifying quantities or giving a greater level of details. In this sense, this situation is partly explained by the type of resources but there is no further description. There may be eventually more information on the collection permits issued by the Galapagos National Park but at the time of data collection for this case study it was not possible to access this document.

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Nemogá-Soto, G.R. and Lizarazo Cortés, O.A. 2013 Global Ocean Sampling Expedition, Galapagos National Park: collection activities and implementation of legislation. In: Rios, M. and Mora, A. (Eds.), **Six case studies in Latin America and the Caribbean: Access to genetic resources and benefit-sharing**. IUCN- UNEP/GEF-ABS-LAC. Quito, Ecuador. Pp. 77-88.

## 2.1 Actual or potential use of biological resources

In the MU the actual or potential uses of the resources collected are not detailed. It simply mentions in a general and abstract way that the samples on which the project lies are “(...) to determine the complex interrelationship between microorganisms groups affecting environmental processes of regional and global importance (...)”:

It is worth mentioning that in 2004 it was already known that marine microorganisms have potential in different processes such as enzymes industries and associated fields and in the biofuel sector.

## 2.2 Main national and foreign stakeholders

The main stakeholders involved in this research according to the reviewed documents are as follows:

- i. MU: signed by IBEA and Ecuador.
- ii. National Competent Authority: Ministry of Environment of Ecuador (MAE) subscribes the MU on behalf of the country.
- iii. Applicant: IBEA represented by its CEO J. Craig Venter Ph.D., who subscribes the MU as applicant.
- iv. Research permit for collection: issued by the Galapagos National Park.
- v. Research permit: The Charles Darwin Research Station, an academic and scientific institution recommended the approval of the research “as it is of great value to better understand the role of microorganisms in marine environmental processes”.
- vi. Technical Advisor: researcher at the University of Guayaquil who submitted a report which partially supports the issuance of the research permit. The document mentions that the proposed research “will promote the scientific, technological and technical capacity at a national level with purposes of conservation of biological diversity and sustainable use of biological resources”.

## 3. International contractual agreements and national stakeholders

The following are the contractual agreements established among the main stakeholders involved in this research in accordance with the documents reviewed:

- i. Research permit for collection: issued by the Galapagos National Park.
- ii. “Memorandum of Understanding for the Collaboration in Microbial Biodiversity”.
- iii. Duration of permits and MU, a term of two years was established from the signing on March 15th, 2004, and it may be renewed by mutual agreement of the parties.
- iv. Joint Project Plan, if the parties do not develop within one year from the signing of the MU it will terminate without any further obligation.

Clauses 4 (Intellectual Property), 5 (Publication and Dissemination) and 8 (Miscellany) of the MU will survive any termination.

### 3.1 Detail of benefits included in the agreement

The MU has no specific clause on monetary benefits per se because according to the CBD terminology, it refers to obtaining more “knowledge” on biodiversity than “conservation”. In this sense, the situation is materialized in a general and abstract way, without indicators in the fifth clause that establishes:

“5. Publication and Dissemination of Information.

In order to make the information available to the global scientific and public communities, the parties specifically agree that the raw genomic data shall be provided only with their express permission. Once the data have been analyzed, all the information shall be deposited in public databases and published in scientific forums, where it shall be acknowledged that the information obtained is part of the genetic patrimony of the state of Ecuador.

The IBEA and the MAE, through the *Parque Nacional Galápagos*, shall jointly collaborate on one or more scientific publications analyzing the genomic data in the manner established in the Project Plans approved by the appropriate authority. The parties agree that scientists from other countries, who are also collaborating in the global sampling expedition, may be acknowledged as coauthors. The MAE, through the *Parque Nacional Galápagos*, agrees to provide cooperation within the scope of its jurisdiction and the applicable legal framework in order to facilitate the objectives of the global sampling expedition in the Galapagos Islands.

The parties shall also work, as appropriate, on joint activities to disseminate and communicate information about and deriving from the collaboration, not only to the scientific community, but also to the public in general, and to educational institutions, particularly those in Ecuador, as long as this information is used solely for scientific, not commercial, purposes...

## 4. Results of the “Global Sampling Expedition”, Galapagos National Park

The first results of the expedition were broadcasted in 2004, in the prestigious international journal “Science”. Other data was published during 2007 in a series of eight articles in a publication of free access called “PLOS Biology”, where three of them were classified as scientific (Natarajan *et al.* 2007; Rusch *et al.* 2007; Yooseph *et al.* 2007).

### 4.1 Benefits generated and shared up until 2012

Not one publication has an Ecuadorian researcher as co-author. In the first research published by the journal “PLOS Biology”, among the 34 co-authors we find: 28 residents in the United States of America; 4 assigned to Mexican universities; 1 assigned to research institutions in Costa Rica, and 1 linked to an institution in Chile.



Authorship or co-authorship are not something you get or deserve by way of a fair distribution of benefits; it depends on the effective participation and contribution in a project and on the writing of the manuscript. One of the published documents mentions the Ecuadorian Staff on the acknowledgments, while in others the sovereignty of countries over the samples is recognized, which is a positive and unusual step forward but still not enough. It must be clarified that by the time of the expedition, the Bonn Guidelines 2002 –which are not binding– were known but could nevertheless be considered in the relationship between governments, especially between the Ecuadorian government, and the J. Craig Venter Institute (JCVI).

#### **4.2 Scope and status of activities**

The genetic information obtained during the research was made available in two databases known as:

- i. Gen Bank, a database managed by the National Institute of Health of the United States of America.
- ii. CAMERA, a new database for metagenomic information.

The JCVI said that it would not seek patents or other intellectual property rights on genomic DNA and sequenced data. Preliminary searches do not show directly related patent applications. However, since it is mandatory to disclose federal grants (Bayh Dole Act), there are two that cite the same funding from the Department of Energy of the United States of America who co-founded the expedition. When analyzing the documents, it was notified that the funds covered two different JCVI projects: on the one hand the ocean expedition and on the other the study “Reconstruction of a Bacterial Genome from DNA Cassettes”.

#### **4.3 Chronology of the expedition led by J. Craig Venter**

The main facts related to the case study on the expedition led by J. Craig Venter are listed below:

- i. August 2003, presentation of the Global Ocean Sampling Expedition in Halifax, Nova Scotia.
- ii. J. Craig Venter and his team collected samples in Mexico on January 9, 2004, fact published by researchers in: “A collection of articles from the J. Craig Venter Institute’s Global Ocean Sampling expedition” (PLOS Biology, Special Collection, March 2007, Volume 5, Fascicle 3).
- iii. J. Craig Venter collected samples in Honduras on January 10, 2004, fact reported by researchers in: “A collection of articles from the J. Craig Venter Institute’s Global Ocean Sampling expedition” (PLOS Biology, Special Collection, March 2007, Volume 5, Fascicle 3).
- iv. J. Craig Venter collected samples in Panama between January 12 and 20, 2004, fact reported by researchers in: “A collection of articles from the J. Craig Venter Institute’s Global Ocean Sampling expedition” (PLOS Biology, Special Collection, March 2007, Volume 5, Fascicle 3).

- v. J. Craig Venter collected samples in Costa Rica between January 21 and 28, 2004, fact reported by researchers in: “A collection of articles from the J. Craig Venter Institute’s Global Ocean Sampling expedition” (PLOS Biology, Special Collection, March 2007, Volume 5, Fascicle 3).
- vi. J. Craig Venter collected samples in Ecuador between February 1 and March 2, 2004, fact reported by researchers in: “A Collection of Articles from the J. Craig Venter Institute’s Global Ocean Sampling Expedition” (PLOS Biology, Special Collection, March 2007, Volume 5, Fascicle 3).
- vii. J. Craig Venter collected samples in Galapagos during February 2004, authorizations issued by the Ministry of Foreign Affairs and the Galapagos National Park granting permission to export samples PT 7.5 FR 28”.
- viii. J. Craig Venter gives a press conference on March 4, 2004 in Washington D.C.
- ix. J. Craig Venter and the expedition vessel ship out of Ecuador on March 7, 2004.
- x. The MU is signed on March 15, 2004, requesting to formalize the document before allowing him to ship out with the samples.
- xi. J. Craig Venter and JCVI request on August 30, 2005 permission to publish the results.
- xii. J. Craig Venter receives an answer from MAE on October 25, 2005 specifying that he should:
  - Sign a contract to access genetic resources.
  - Not pursue intellectual property rights.
  - Request authorization from MAE before publishing any data.
  - Complete a series of requirements before being granted with any authorization.
  - Discontinue using means to stop using the results until an access contract is signed.
  - Translate to Spanish: trip reports, laboratory analysis, preliminary interpretations and genetic sequences of samples collected.
- xiii. J. Craig Venter and his team members on March 2007 published a collection of eight documents including three scientific research articles in PLOS Biology (Table 1).

## **5. Models for the dissemination of results**

Nowadays, the great potential and sometimes the need for open approaches is recognized in its various forms as well as in its limitations, including what Chander and Sunder (2004) call “The Romance of the Public Domain”, i.e. to believe that if a resource is open to all it may be equally exploited, forgetting that in reality the different circumstances of knowledge, infrastructure and power would determine the possibility of profit. It also refers to the Martinez and colleagues topic (2003) in his article “The Geography of the Genome”.

Regarding the dissemination of results there are two models. The first, stemming from the interest of protecting intellectual property rights and obtaining patents such as *Diversa*, who operates under the concept of property by patenting what has been achieved in research. The second is a model which promotes the dissemination of information gathered from a wide and free distribution database such as the Venter Institute’s case. This last argument is presented as beneficial to mankind but could have a negative impact and prevent the country where the resources originated from benefiting from their potential marketing. Bermuda is an example since

Sargasso has a research program in partnership with

a local station and has invested six years through *Diversa*. In contrast, the Venter Institute published 1.2 million fragments of genes of the same geographical area. The facts do not cease to raise questions for a company such as *Diversa*, since one wonders if it would be willing to maintain its strategy of negotiated access and pay for resources that can now be freely available in a public database.

The context of this legal scenario can be transferred to the J. Craig Venter Institute's proceedings that promised not to patent microorganisms or genetic sequences collected. Nevertheless, it could request patents on modified microorganisms or new artificially designed life from microorganisms obtained by the "ETC Group, Playing God in the Galapagos: J. Craig Venter, Master and Commander of Genomics on Global Expedition to Collect Microbial Diversity for Engineering Life" (Communique 84, March/April 2004, cited in Rimmer 2009).

With regards to the open source model promoted and associated to the project for its benefit to science and humanity, a closer look is required. In practice this system of forthright provision to promote innovation seems to incorporate elements of a non-market and solidarity economy emphasizing open access and promoting participation. Concerning this, Barbrook (1998) and Rullani (2005) consider that, on one hand, software and high technology companies use it to take the additional value produced by the free online collaboration; and on the other hand, that Delfanti and his colleagues think that "free and open access are new models of capitalist exploitation and not just two paradigms of scientific ethics." (Delfanti 2009)

Open source models could be closest to common property regimes of mankind such as the UN Convention on the Law of the Sea. Thus, it would be further away from the proprietary model and national sovereignty established by the CBD that entails a participation of the benefits derived under an owner-based business relying on contracts, patents, trade secrets or other intellectual property rights.

## 6. Lessons learned

Among the main lessons learned, especially due to the legal difficulties and complexities found in the project, the following can be highlighted:

- i. The implementation of a public policy and legislation related to facilitating the access to genetic resources and contracts for scientific research on biodiversity with foreign institutions must balance the specific benefits for the country of origin of the resources, especially for the effective strengthening of their scientific and technological capacities.
- ii. Consider the development of a rule to indicate the origin of samples because it is a political, legal and technical issue as it has components in partnership with the "International Nucleotide Sequence Database Collaboration" (INSDC), patent and scientific journal offices.
- iii. Create a minimum standard of terms of use for digital genetic information that takes into account the need for a scientific information exchange.
- iv. Caution establishing checkpoints, avoiding an overload for nationals in Latin America and the Caribbean.
- v. Consider changes on the ways of bioprospecting.

Table 1. Academic articles: authorship by nationality in the research published by the PLOS Biology journal, showing the number of domestic and foreign participants of the expedition. Ecuadorians are mentioned in the acknowledgment but are absent in the co-authorship even when the authorization considered the participation of researchers of the University of Guayaquil.

“The Sorcerer II Global Ocean Sampling Expedition: Northwest Atlantic through Eastern Tropical Pacific”	Total	United States of America	Mexico	Costa Rica	Chile	Ecuador	
Number of people who conceived, designed and performed the experiments and wrote the scientific papers.	34	28	4	1	1	0	
Acknowledgment		6				Washington Tapia, Director, Galapagos National Park. Charles Darwin Station Staff. Héctor Chauz Campo, Institute of Oceanography of Ecuador. Simón Ricardo Villamar Tigrero, national parks in the Galapagos Islands.	
“The Sorcerer II Global Ocean Sampling Expedition: Expanding the Universe of Protein Families”	Total	United States of America	Mexico	Costa Rica	Ecuador	Honduras	Panama
Number of people who collaborated in writing the article	33	33					
Acknowledgment Ecuador, and		4					Governments: Canada; Mexico; Honduras; Costa Rica; Panama; France for French Polynesia, collections authorized in waters of their genetic heritage.
“Structural and Functional Diversity of the Microbial Genome”	Total	United States of America	Mexico	Costa Rica	Ecuador	Honduras	Panama
Number of people who collaborated in writing the article.	5	5					
Acknowledgment		8					Governments: Bermuda; Canada; Mexico; Honduras; Costa Rica; Panama; Ecuador, and France for French Polynesia, collections authorized in waters of their genetic heritage.

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Source: Natarajan *et al.* 2007; Rusch *et al.* 2007; Yooseph *et al.* 2007.

- vi. Correct application of the Bonn Guidelines as they were almost omitted from the project, suggesting an adequate implementation of the Nagoya Protocol.
- vii. Raise awareness because microbial diversity presents a greater challenge in the exercise of sovereignty.
- viii. Consider a common treatment for microorganisms as well as debates on the idea of common microbiota taking into account its distribution.
- ix. Relation to similar projects considering international treaties, in this case the CBD, and the UN Convention on the Law of the Sea (Rimmer 2009, p. 12; p. 158) and the Exclusive Economic Zone.
- x. Consider the development of a regional cooperation and unified positions to participate in this kind of projects or similar.
- xi. Legal advice to strengthen provisions and disseminate signed contracts publicly (subject to confidentiality). The MU signed with Australia (November 2004) regarding the Sorcerer II Expedition registers a greater content than the one with Ecuador (March 2004), possibly revealing a difference in bargaining power. Rimmer says:

“The agreement is much better than the previous memorandum of understanding established between the Institute and other jurisdictions. The Sorcerer II Expedition has been working with research teams from Australian universities and research institutes” (Rimmer 2009, p. 36; p. 182).

“MUs with countries in Latin America and South Pacific were rather poorly structured. The agreement on Biological Resources established between the Australian Government and the Institute was by far more rigorous on benefit-sharing. The Sorcerer II Expedition reinforces the need of a stronger and harmonized national regime to access genetic resources in Australia” (Rimmer 2009, p. 39; p. 185).

- xii. Consider a scheme for results dissemination based on free and open dissemination does not prevent eventual situations of biopiracy because raw data is usually published.
 

If genetic information is publicly accessible, chances of obtaining its patent are prevented or reduced, even when the issue is more complex, there is a possibility to request patents on modified, processed and combined data; additionally, in some cases business models are built based on charging for related services but not for access to information. In this regard experts say: “Trade secrets, intellectual property rights and services that come from open access to data are three main methods of making money with biological information” (Delfanti *et al.* 2009, P. 423).
- xiii. A clarification about obtaining patents is needed because it does not necessarily entails acts of biopiracy if new products and procedures of high inventiveness are obtained and developed from genetic resources and/or from by-products with Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT).
- xiv. Establishment of a suitable model for dissemination of results, whether proprietary or open, considering that no scheme is best since each style has potential and limitations, advantages and disadvantages. This is why there must be a thorough understanding of intellectual property and how to articulate it with bio-businesses as its diffusion can play for or against the interests of stakeholders involved.

- xv. Consider establishing more expedite and fluid communication channels between Competent National Authorities of each country and other related entities such as the Ministry of Foreign Affairs, National Parks, Intellectual Property Authorities and Universities among others (Thornström 2012). This situation would apply not only when formulating public policies, but also –when necessary– to promptly solving special , complex or “novel” cases or situations while considering all relevant technical and legal elements.
- xvi. Documenting the management experiences in research, bioprospecting, and access and benefit-sharing cases. The experience in the Venter Galapagos case could serve so other countries in Latin America properly address the sampling expeditions in marine areas such as the Malaspina led by Spain and Tara Oceans led by France, but available information suggests that it may not always be the case.
- xvii. Consider that the “omics” –genomics, proteomics, metagenomics and bioinformatics– could also provide an opportunity in research, knowledge, conservation and sustainable use of biodiversity for Andean and Caribbean countries. In some countries like Colombia, there are research centers working in these areas and building national capacities. The design of rules, public policies and contractual agreements to access genetic resources must anticipate the need for cooperation with foreign research centers in order to strengthen scientific and technological capacities of the countries of origin of resources and other aspects on benefit-sharing

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