



ECOTICOS

Civil Society Using Multidimensional Ecological Economic Valuation for Socio-Ecological Conflict Resolution in Costa Rica

Bernardo Aguilar-González¹ and Azur Moulaert²

¹ Executive Director, Fundación Neotrópica, San José, Costa Rica; Adjunct Faculty, Northern Arizona University, USA; corresponding autor: baguilar@neotropica.org.

² Research Associate, Community Development and Applied Economics, University of Vermont, USA; Board member, Fundación Neotrópica, San José, Costa Rica.

Draft. September 2010.

ECOTICOS: Civil Society Using Multidimensional Ecological Economic Valuation for Socio-Ecological Conflict Resolution in Costa Rica

In a time of crisis and environmental uncertainty, environmental conflicts abound. Costa Rica is a good example of this statement. The latest administrations have developed high profile environmental programs which have been criticized as very strong for public relations but lacking substance and representing a double discourse. The double discourse accusation refers to policies that have restricted public participation in environmental matters while stimulating/endorsing unsustainable practices such as mega touristic projects in coastal areas, laxly controlled real estate development and open pit mining. Meanwhile, recent public opinion polls show that environmental concerns are still high in the priorities of the Costa Rican population and a determinant of their voting trends.

Ecological economics has taken a multidimensional approach to valuation. This approach is represented in three positions that usually do not overlap: monetary (or allocative), biophysical and multi-criteria (MCA). In fact some defenders of monetary cost benefit analysis present the relationship between monetary analysis and MCA as scientifically oppositional (i.e. Dobes & Bennett, 2009). This position does not distinguish the postnormal foundations of ecological economics arising from the nature of its object of study: socioecological conflicts where the interests at stake are many and systemic uncertainty is high.

In Costa Rica, several studies are using an integrative approach. Essentially, this approach combines environmental service valuation techniques and biophysical indicators with multi-criterial techniques in order to gain a more comprehensive perspective that may lead to develop potentially more effective means to address the problems causing ecological conflicts.

This paper focuses on the case study of the Térraba-Sierpe National Wetland Reserve (TSWR) in Costa Rica's South Pacific region. The threats to this area include today real estate and tourism development, an international airport, and a hydroelectric dam. Added to this, the area lacks adequate personnel, financial resources and governmental support which has made the implementation of a management plan developed through a participatory approach impossible.

The collaborative Project ECOTICOS has sought to contribute in the resolution of this conflict through the integration of GIS information, biophysical data, environmental service valuation and multi-criteria analysis. The MCA component included the leadership of Fundación Neotrópica, one of Costa Rica's main environmental Non Government Organizations and a participatory process which incorporated various significant civil society actors from the national, international and TSWR region level. The geographic, biophysical and monetary valuation information was used as part of the inputs to evaluate scenarios through a combined Delphi, focus group and visioning session approach of scenarios combining the threats above stated. The end product of this participatory process, aside from ranked preferences and the identification of social alliances, is a menu of productive options that may better fit the goals for sustainable management of this protected wetland.

Keywords: Civil Society driven Multi-criteria analysis, ecological economic valuation, participatory processes, wetland conservation, levers for socio-ecological change, ecological conflict resolution.

Draft. September 2010.

I. The current juncture of Costa Rican environmental politics and threats to the Térraba-Sierpe Wetland Reserve (TSWR) in the “South South” Pacific Region.

In a time of crisis and environmental uncertainty, environmental conflicts abound. Costa Rica is a good example of this statement. The latest administrations have developed high profile environmental programs which have been criticized as very strong for public relations but lacking substance and representing a double discourse. The double discourse accusation refers to policies that have restricted public participation in environmental matters while stimulating/endorsing unsustainable practices such as mega touristic projects in coastal areas, laxly controlled real estate development and open pit mining. Meanwhile, recent public opinion polls show that environmental concerns are still high in the priorities of the Costa Rican population and a determinant of their voting trends (Rodríguez, 2009).

Since 1982, Costa Rica has been governed by a sequence of 8 governments all leaning toward what is known in the country as a political and economic neoliberal agenda. This agenda is characterized by a strong control of economic and trade policies by technocratic neoclassical economists (most of them inspired by the work of Von Hayek, Friedman and a few neo-Keynesians), accompanying ideologues and only incipient attempts to break this monopoly of “truth” by academic institutions. This wave has led the country away from a social democratic model. Processes of privatization or concession of public enterprise/services and market liberalization have characterized this agenda for almost 30 years. The cusp of this trend is the controversial approval in a national referendum of the Central American Free Trade Agreement with the United States in 2007 by a narrow margin.

Interestingly, during these three decades the country has also become a high profile environmental performer. The creation of an ambitious National Parks system, regionally organized in conservation areas and covering 25% of the land territory of Costa Rica has given the country an environmentally enlightened reputation. The parks system has been accompanied by visionary and abundant environmental legislation, the recognition of the right to a healthy and clean environment in the country’s Constitution, the creation of the National Institute of Biodiversity to “protect biodiversity by making it useful” and other highlights.

Evans (1999) labels Costa Rica “The Green Republic”. This reputation has promoted the growth of tourism to Costa Rica to the point of becoming one of the main sources of foreign revenue. A capstone of this reputation came in 2010 with the promotion of the country as the highest ranked in the Happy Planet Index. Yet, this performance has also seen contradictory behavior from governmental policies in the latter years. The promotion of large scale tourism, amenity migration related real estate business and the declaration of public interest for controversial mining projects have tainted the green reputation of Costa Rica. As a symbol of this apparent contradiction, the unsustainable urban development patterns of the country, leading to a higher ecological footprint per capita than that of many of its surrounding neighbors, has been pointed by foreign media (Pera, 2008; Rogers, 2009; Honey, Vargas & Durham, 2010). Further, an area that has recently been highlighted as a weakness is the lack of sufficient channels of effective participation for communities in environmental decision making. The trend has been strengthened by the veto exercised by the Arias administration of an environmental participation bill that had been approved by the Legislative Assembly. Further, reports on lack of access by the citizenship to public environmental information have confirmed the diagnosis (FUNPADEM, 2005; Sáenz & Rivera, 2008)

The base of Costa Rica’s relative enlightened behavior is its social base. A well educated population and relatively higher social indicators, resulting from its social democratic past, have been essential in promoting

Draft. September 2010.

scientific and technical development. One result of neoliberal policies has been the decrease in some of these indicators and a widening gap between the wealthier and the poorest.

On the political front, the country has enjoyed a reputation of stability and peace promotion which has greatly contributed to its privileged position as a tourism destination and potential investment site. Yet, two clear trends have developed in the latter years: the narrowing of participation on political decisions and the emergence of corruption. Despite the apparent alternative of parties (PLN-historically social democrat- and PUSC-historically Social Christian), the agendas of the two groups have continuously converged and have colluded on a consistently increasing right wing oriented agenda. PLN has resulted the winner of this political evolution as two of the last 8 Presidents (both from PUSC) are now facing criminal processes for corruption and one of them (the only other PUSC president from this era) keeps a low profile since he left as one of the most unpopular presidents in the history of the country. The feeling in the country is that of a monopoly of power in the hands of a sector of the PLN with uncontrollable political "clientelism"

The result is a mixed bag of GDP and trade growth (GDP up to levels of 5 and 6% per year until 2009 when the GDP decreased by a 2.5% due mostly to the U.S. economic crisis) and ambiguous environmental and social indicators. For instance, 16% of the Costa Rican population still lives below the poverty line (in 1970 it was as high as 24%), the GINI Index of inequality in income is currently around .49 after having been in 1985 at its lowest level of .44. The ecological footprint of the country has increased from 1.95 global hectares per capita in 1999 to 2.77 today (lower ranking as 55th in the world down from 37 in 2001) and its biocapacity decreased from around 5.00 in 1960 to 2.50 in 2001 to 1.81 global hectares per capita today.

This scenario has led to the development of ecological conflicts in areas where unsustainable models of development have been promoted or tolerated by local and national authorities. At the same time, some conservation agencies are trying to do their jobs and local communities are either organizing or getting the effects of these development projects. A clear gradual shift from a reality of "cult of wilderness" or "gospel of eco-efficiency" to a "environmentalism of the poor" situation is happening in Costa Rica.

Such diagnosis is confirmed by criticism from abroad which is coming in diverse forms. The release of critical case studies is now common (Blake, 2001; Dasenbrock, 2002; Pera, 2008). Time magazine published in 2009 a critical report entitled "Costa Rica's President: It's Not Easy Staying Green" which fully commented on the accusations to former president Arias and ended with the dictum: "with little more than a year to go in his second, environmental presidency, a growing number of "Ticos" (nickname for Costa Ricans) feel Arias still needs to get more in touch with his inner frog" (Rogers, 2009). Further, the Center for Responsible Travel (a non-profit working with Stanford University) recently released "Cracking the Golden Egg" a critical documentary of the tourism model applied in Costa Rica's Pacific coast accompanied by a document with ten policy recommendations for the government which focus on several of the problems that are brought by focusing more on a model of mass tourism than on a model of high value added amenities: water conflicts, poor land use planning, lack of mandatory and well developed sustainability standards, poorly regulated real estate development, etc. (Honey, Vargas & Durham, 2010).

Along these lines, a southbound drive along the Pacific coastline of Costa Rica reveals the rapid spread of sun and sea tourism. Habitat destruction is obvious; high-rise hotels sprout; billboards for American real estate firms litter the roadside; illegal developments abound; roads carved through forested mountainsides collapse blocking rivers; runoff from new construction fills mangrove estuaries with so much sediment that navigation is no longer possible. Social and cultural impacts include increased drug usage, prostitution, and theft. The area is clearly under siege and in dire need of increased sustainability practices to improve the

Draft. September 2010.

performance of economic, cultural and environmental indicators and overall quality of life for the local communities.

The protected area of the “Humedal Nacional Térraba-Sierpe” (TSWR) presently marks the end of the development boom and the start of the Osa peninsula, one of Costa Rica’s best preserved wilderness areas, boasting one of the planet’s greatest concentrations of biodiversity. The TSWR mangrove forest, one of the largest on the pacific coast of Central America, is a keystone ecosystem within this complex system. Limited access has played a large part in protecting this area from runaway development. The protected area lacks adequate personnel, financial resources and governmental support which have made the implementation of a management plan developed through a participatory approach impossible.

Until fairly recently the government was planning to build one of the largest international airports in Central America, capable of landing 2000 tourists a day. There are plans for many traditional marinas. The Pan-American Highway is slowly creeping forward, and a massive power plant looms on the horizon.

The social landscape of the region is complex. High mobility among local populations is typical due to the shifting nature of exogenous economic models and the restrictions in land use typical of a region with high concentration of protected areas. The region is nicknamed the “south south” of Costa Rica with high rates of emigration (both national and international) and lagging education and other quality of life indicators. This situation highly increases the challenge of maintaining a stable balance between conservation goals and human development.

II. The ECOTICOS Project: A Levers Approach to the Problems that Generate Environmental Conflicts

In a complex ecological economic system like the one described above, it is extremely difficult to answer the questions required to resolve all of the problems that cause environmental conflicts in these situations, yet it is imperative to try. To address these questions the Community Development and Applied Economics Department and the Gund Institute for Ecological Economics at the University of Vermont (UVM) received a two year grant from the Blue Moon Fund to work in the TSWR mangroves of Costa Rica. In August 2008 UVM launched the ECOTICOS Project (Education, COmmunication, Technical, Institutional and COncceptual Solutions) with the primary goal of identifying the threats, examples, and opportunities to promote the sustainable development of the TSWR region.

Local Costa Rican organizations Escuela Latinoamericana de Areas Protegidas (Latin American School of Protected Areas-University for International Cooperation), the Centro Nacional de Alta Tecnologia (National Center for High Technology), University of Costa Rica’s Center for Marine Research (CIMAR) and one of the most recognized Costa Rican NGOs, Fundación Neotrópica partnered in the project along with the US NGO Earth Economics and the Florida Institute of Technology.

The work of Donella Meadows, one of the world’s leading systems thinkers, provided insights as to how to proceed. In one of her more relevant works "Leverage points", Meadows identified twelve leverage points for changing complex systems (Meadows, 2009); the ECOTICOS Project adapted these principles into a practical framework entitled Technical, Institutional and Conceptual Solutions and proposed that to promote sustainability it is imperative to work within and across all three levels.

Draft. September 2010.

(A) Technical Lever Solution – This lever involved the use of innovative techniques and technological alternatives to aid in the resolution of the problems causing the environmental conflicts in the region. These included alternative valuation methodologies (to be applied in the institutional lever area), the use of Geographic Information Systems and communication technology. The purpose was to make information available on the status of the TSWR, its challenges and opportunities, both for the national Costa Rican community and potential international interested parties. Over the course of the project a series of GIS and Google Earth maps were generated to illustrate land use trends, points and areas of interest, protected area boundaries and distribution of ecosystem services. This was complemented with a combination of site visits, reconnaissance flights, personal interviews, and on the ground training. An online gallery has been made public for every resident and visitor to share their images or videos empowering them to become better stewards of the land and sea.

(B) Institutional Lever Solution – On this end the purpose was to make explicit the value of the ecosystems services at stake and to measure community preferences, while internalizing these values, regarding the alternatives of conservation and development that they were facing. Hopefully these exercises could influence policy to benefit the conservation of the TSWR. Therefore, led by Fundación Neotrópica, a series of community meetings were convened to capture the views of local stakeholders (including civil society organizations) on what they saw and would like to see across their landscape. These meetings allowed fine tuning for both an Ecosystem Services Valuation Exercise and a Multi-criteria Analysis. We met with local leaders to explain the ECOTICOS process and invite them to join our group exercises. Further, we sought to keep local conservation and municipal authorities informed of our advance.

(C) Conceptual Levers Solution – Our aim was to apply novel (ecological economic and political ecology among them) conceptual tools to address the problems that generate the environmental conflicts that affect the TSWR and its surrounding communities. This made the combination of pertinent information and its effective presentation with participatory valuation exercises necessary. Yet, the full spectrum of potential conceptual tools to be applied cannot be developed in an area that lacks basic baseline information. To fully understand this complex socio-ecological system, substantial efforts were made towards the development of multiple baselines to assess habitats, water quality and the current status of fisheries. Even though there is no silver bullet for assessing threats to sustainable development the application of the information developed will provide robust measures of ecosystem health in order to prioritize and better apply future management and restoration practices.

Figure 1 shows the general model of TICO levers. Figure 2 shows how these levers combined specifically for the application in the TSWR. By combining technical, institutional and conceptual models in a way that adjusts to the specific context of the TSWR, we believe to comply with Meadows' dictum of having the flexibility to transcend paradigms, yet to be able to affect the current paradigm of environmental politics in Costa Rica. It allows us to focus on solutions, using adequate flows of information, which maintain and enhance the socio-ecological system's resilience, diversity and productivity. This way, we believe to comply through our model with the recommendations laid out by Donella Meadows on her leverage recommendations (Meadows, 2009)

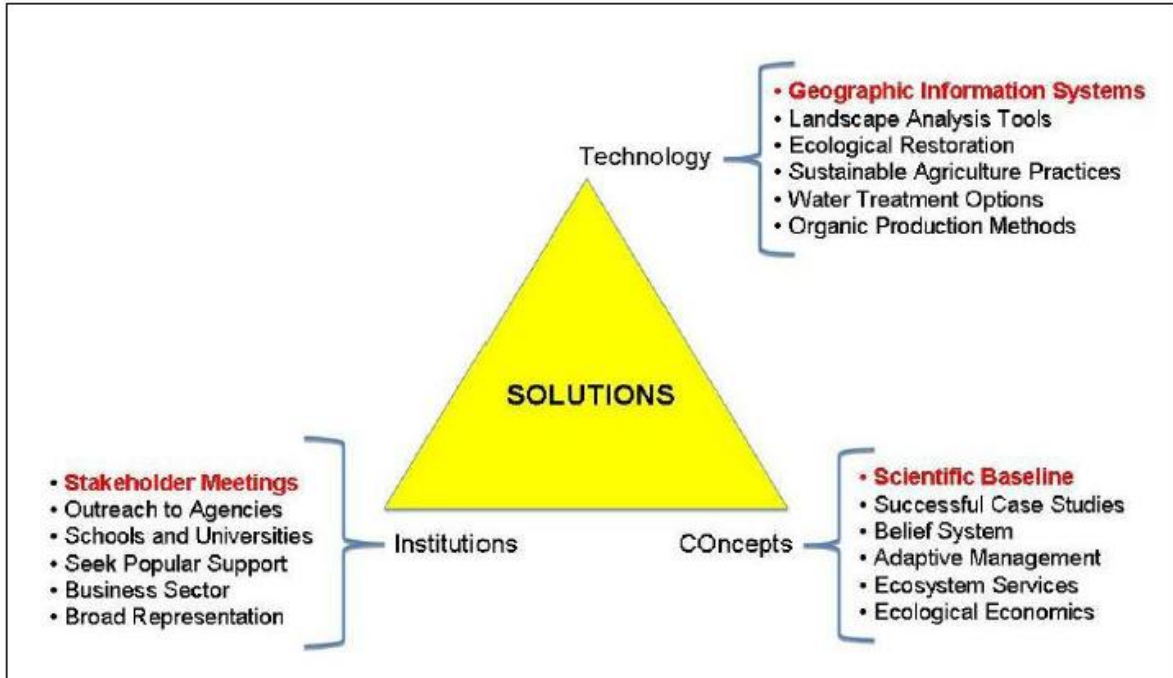


Figure 1- The ECOTICOS General Methodological Model. Source: ECOTICOS (Unpublished)

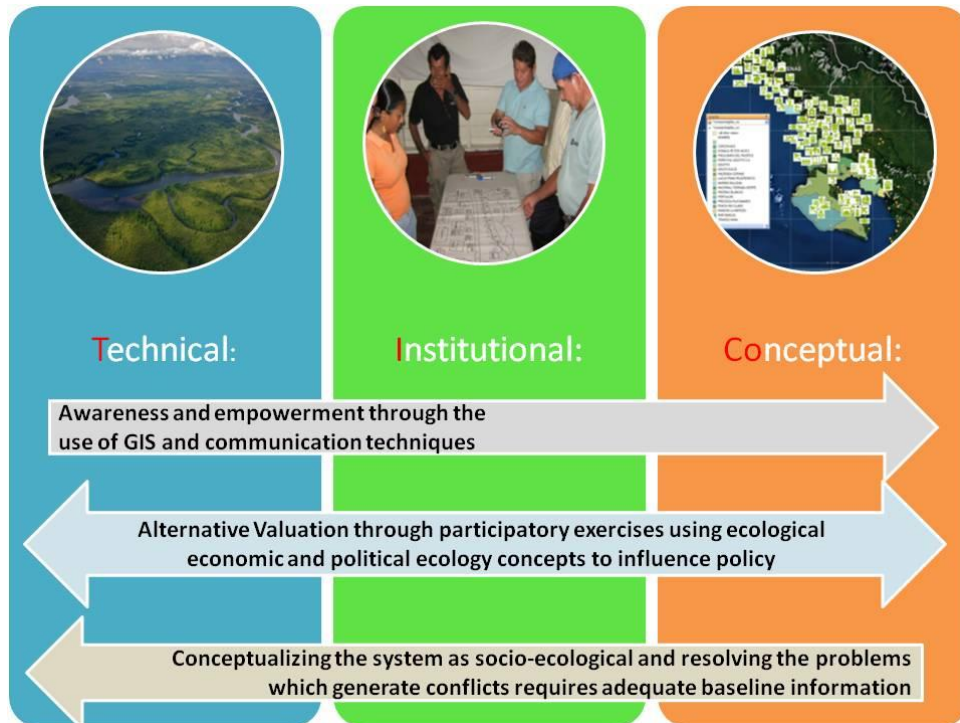


Figure 2-The ECOTICOS Levers Approach as Applied to the TSWR. Source: Authors elaboration.

Draft. September 2010.

For the purposes of this case study we focus on the alternative valuation component of ECOTICOS. It allows showing how these methodologies can be used through a participatory approach, with strong civil society guidance and presence, to influence policy effectively and in a timely manner.

III. The Multi-criteria Valuation Component: A Case Study of Participatory Valuation, Policy Incidence and Socioecological Conflict Resolution for the TSWR

Fundación Neotrópica came into the ECOTICOS team in order to contribute with the valuation of ecosystem services process. Its role through 25 years of work among the most recognized environmental NGOs in Costa Rica has pioneered many areas of work and inquiry. Today it has explicitly embraced the use of ecological economic and political ecology tools for its work with environmental conflicts.

During the methodology refinement stages, the ECOTICOS team, by initiative of Fundación Neotrópica, understood that applying the most innovative and participative methodology was necessary in order to assure that the project achieved its desired goals. Therefore, the initial aim of the valuation exercise was expanded to include a Multi-Criteria analysis.

A. Specific Theoretical Framework

1. Literature Review for Alternative Valuation and Multi-criteria Analysis in Costa Rica and Latin America

Ecological economics has taken a multidimensional approach to valuation. This approach is represented in three positions that usually do not overlap: monetary (or allocative), biophysical and multi-criteria (MCA). Multicriteria is specially recognized for its possibilities of being a method that highlights participation and the harmonization of a high diversity of stakeholder positions. Some defenders of monetary cost benefit analysis present the relationship between monetary analysis and MCA as scientifically oppositional (i.e. Dobes & Bennett, 2009). This position does not distinguish the postnormal foundations of ecological economics arising from the nature of its object of study: socioecological conflicts where the interests at stake are many and systemic uncertainty is high.

A literature review was completed for pertinent studies (both published and grey), according to the scope defined for the project. It relied in 3 sources of information. A general ecological economic literature survey resulted in several studies that have focused specifically on wetlands. This survey resulted in several studies that have applied GIS-value transfer/total value equation (TVE) methodologies to these ecosystems (one representative recent example is Kerchner, Boumans, Boykin-Morris (Unpublished)).

General studies critical of the sole application of TVE methodologies were gathered. The justification to expand the scope in this project to include an MCA component was solidified. Representative examples of such studies are Munda (2004) and Giampietro & Ramos-Martín (2005). These studies point to the need to include multi-criteria analysis in order to overcome major limitations with technical and social incommensurability typical of monetary valuations. These characteristics are especially important in regions where cultural capital diversity may play an important role in interpreting stakeholder preferences as is the case of the study area of ECOTICOS. Further, the region is characterized by local distrust to conservation efforts due to their traditional vertical nature (top down management and enforcement oriented) as

recorded in its environmental history (Gullette, 2001). This can be overcome through methodologies with a strong participatory nature.

Through Aguilar-González (2007), we determined the general trends regarding valuation studies in the Latin American region and in Costa Rica specifically. This study surveyed 3 reputable regional sources of studies: the web site of the Salvadorian Research Program on Development and the Environment (PRISMA) (<http://www.prisma.org.sv/>), the Regional Forum on Environmental Service Payments organized by the regional office of FAO within the Latin American Meeting on Watersheds (Arequipa, Perú, 2003) and the Electronic Forum on Environmental Service Payments in Watersheds, organized by FAO also between April and May 2004. The total of studies selected as representative was 55. The trends found (summarized in Figure 3) point to a majority of studies using the monetary ecological economic approach without distinguishing it from traditional valuation methods. The use of MCA is really incipient in valuation studies in the region- only 7.3% of the studies. In this sense, we feel that ECOTICOS confirmed the timeliness of its integrated approach to valuation.

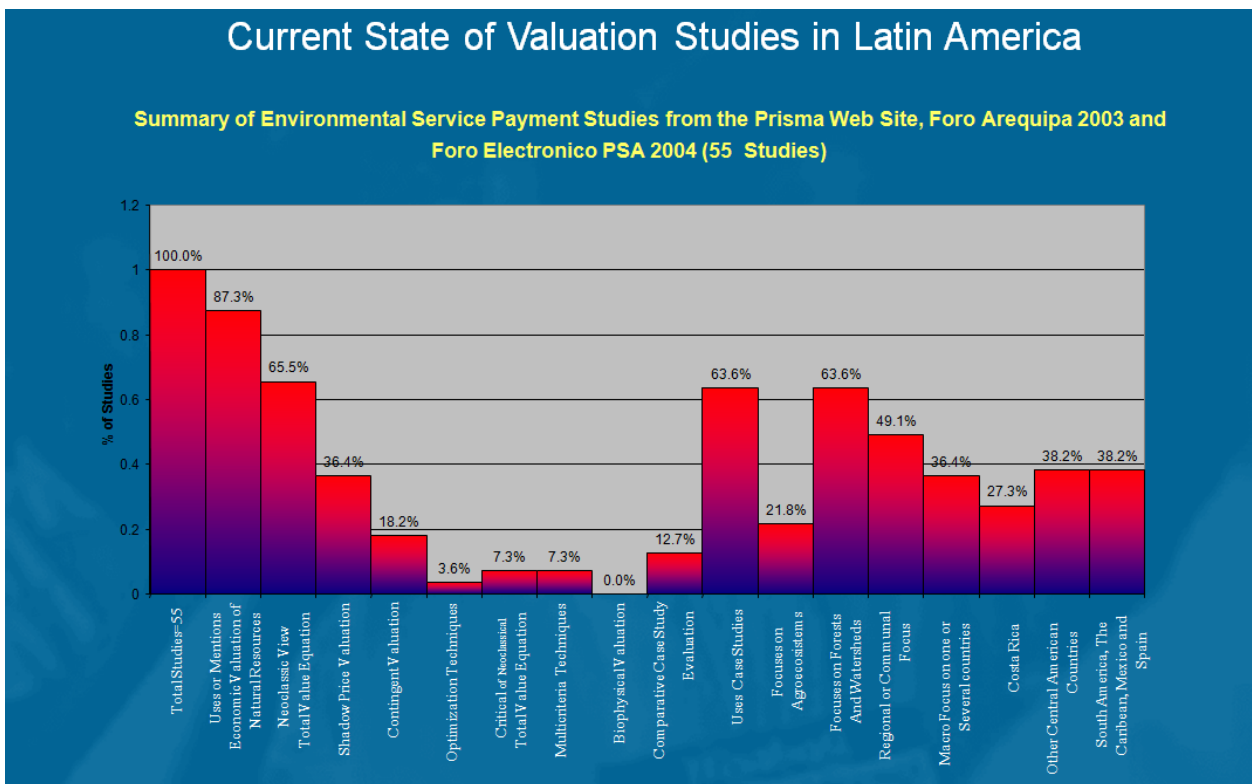


Figure 3- Current State of Valuation Studies in Latin America. Source: Aguilar-González (2007).

The most significant example of studies integrating the monetary and multi-criteria methodologies was found in Marozzi and Solís (unpublished). This study, made for the Alianzas program of IUCN, focused on the valuation of the Gandoca-Manzanillo Wildlife Refuge (Costa Rica) and San San Pond wetlands (Panamá). It applied and integrated methodology which included focus groups, a Delphi expert analysis, MCA/monetary valuations and stakeholder interaction analysis (through the NAIAD software developed at University of Barcelona). Its conclusions are therefore fairly comprehensive including an integration of qualitative preference rankings by stakeholders and monetary valuation.

From the synthesis of this literature review, a concept paper on the use of MCA in the ECOTICOS project was developed (Farley and Aguilar, unpublished). This paper concluded on the potential usefulness and importance of the use of this methodology for the project.

2. Development of MCA Methodological Framework

Using the data that Earth Economics produced with a full environmental service valuation of the study area (including the TSWR) and based on the literature review that was completed, an integrative methodological framework was developed. It sought to develop a multi-criteria stage integrated with monetary and biophysical evaluations as is presented in Figure 4.

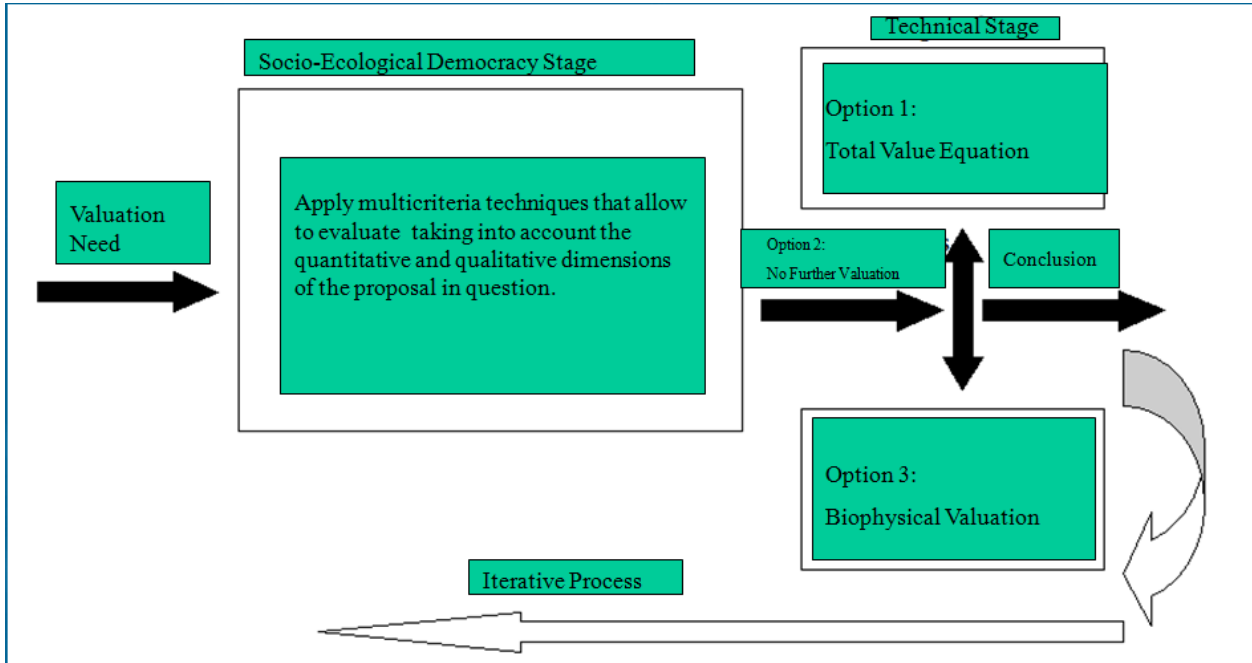


Figure 4- Integrative MCA Methodological Model to be used in the ECOTICOS project. Source: Aguilar-González (2007).

The process of multi-criteria evaluations included the NAIADE multi-criteria methodology used in Marozzi and Solis (unpublished). This MCA process relied on a sequence of expert (Delphi methodology), focus group and visioning workshops. The goal in sample selection was to make it representative of the diverse stakeholders affected by/affecting the health of the TSWR.

B. Methodological Application

Figure 5 shows a map including the approximate project area and the diverse communities of the socio-ecological system. In dark we see the shape of the TSWR area. A bit less dark is the influence area of the protected area. Red squares indicate communities where activities for the MCA process took place and yellow ones indicate additional communities from which the participants of the workshops came from. The figure also shows the areas where the main challenges for the sustainability of the system that were highlighted by the project are located: areas of real estate and tourism development (profiting from the views of the coastline and the coastal range); the Diquís hydroelectric project and the approximate route of the Térraba River (which it will regulate) and the international airport project. The shape in the lower side of

the figure indicates the most likely expansion area for tourism and real estate on the high areas that surround the Dulce Gulf entering the Osa Peninsula.

The first round of participatory workshops for the MCA data collection was organized in October 2009 . This round included a Delphi expert group workshop in San José, a Focal Group workshop and a Visioning workshop in Palmar Norte/Sur, Osa.

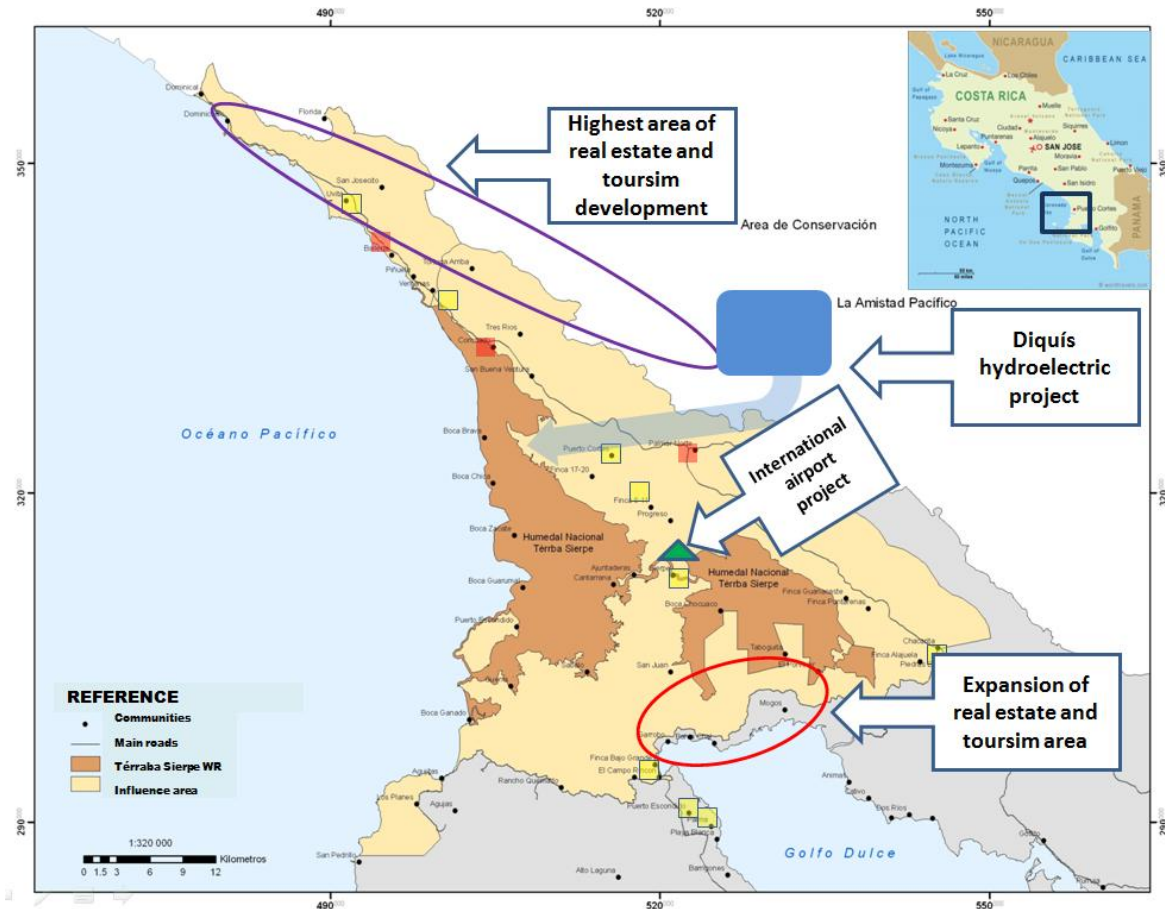


Figure 5- Project area containing the TSWR socio-ecological system and the main challenges highlighted by the ECOTICOS Project. Source: Authors elaboration based on a Map by the Nature Conservancy.

The goals of these activities were:

A- Delphi expert group: This group, composed of scientists, administrators, technicians and environmentalists from diverse sectors (12 experts total attended from public universities, national NGOs, environmentalist media, SINAC, ACOSA, private universities, etc.) was given the task to examine the potential combinations of development challenges that the ECOTICOS team chose as the most pressing today for the HNTS:

- 1- The approval of the management plan proposal for the HNTS;
- 2- The construction of the Diquís Hydro electrical Project;
- 3- The continued growth of the tourism and real estate activities in the region, and,
- 4- The construction of an international airport in a site near/in the TSWR.

Draft. September 2010.

Considering all the twenty four potential combinations of these scenarios, the EXPERTS were initially asked to rank them according to their feasibility. This had the purpose of selecting the 6 most probable scenarios to put them under the scrutiny of the communities.

The six scenarios chosen were:

- SCENARIO 1: The management plan for the TSWR will be approved and the Diquís Hydroelectrical Project built;
- SCENARIO 2: There will be an increase of the tourism and real estate activities at the rate that they have been increasing historically without the implementation of the management plan for the TSWR;
- SCENARIO 3: The Diquís Hydro electrical Project will be built, there will be a increase of the tourism and real estate activities at the rate that they have been increasing historically and the management plan for the TSWR will be approved;
- SCENARIO 4: The Diquís Hydro electrical Project will be built and there will be a increase of the tourism and real estate activities at a lower rate than it has been happening historically;
- SCENARIO 5: The tourism and real estate activities will increase at the rate that they have been increasing historically and the management plan for the TSWR will be approved;
- SCENARIO 6: The international airport in the region will be built and the tourism and real estate activities will increase at the rate that they have been increasing historically.

For each scenario, the potential social, economic and environmental consequences were suggested and qualitatively listed in terms of increases or decreases (eg. Increase in biodiversity, decrease in cultural value, etc.).

The participation of civil society organizations in this process was significant. It included, aside from the members of the organizing team (Earth Economics and Fundación Neotrópica), representatives from the University of Costa Rica's Environmental Kiosks, national and international NGOs (CEDARENA, Marviva, The Nature Conservancy, ASCONA, Fundación Prohumana 21, Fundación Corcovado, Fundación Opinión Ambiental, etc.).

B- Focus Group workshops in Osa with community stakeholders: The scenarios and their potential consequences were taken to the attention of the Focus Group workshop in Palmar Norte/Sur. The first Focus Group workshop had a participation of 26 people. Most of the participants were either youth or local and national NGOs, demonstrating the interest of civil society organizations in this process. Participants included, aside from the organizing NGOs, the Centro Socioambiental de Osa, Grupo Pro Riqueza de Osa, Friends of the Osa, ASOCOVIRENA and Fundación Prohumana 21, all groups with a well established record in the region. Yet, the desired representation of diverse interest groups in the sample for results to be credible at the policy level was not met. They did help refine the scenarios and potential consequences through their own opinion.

C- Community stakeholder visioning workshop: The final workshop of the week was in Palmar Norte/Sur. Attendance was similarly skewed in representation with strong presence of youth and NGOs. The group was asked first to subdivide and each subgroup to come up with a community vision which they would represent

Draft. September 2010.

in a drawing of their “ideal community” including/excluding the TSWR. Each of the visions was presented to the rest of the group.

After this exercise, the different scenarios (elements plus consequences) were also displayed on the walls of the meeting hall. Each attendant read each scenario and voted according to their preferences through secret ballot. The ballots were color coded so we would know the group from which each of the votes came from.

The votes were expressed according to the linguistic options defined by the MCA program NAIADE (Novel Approach to Imprecise Assessment and Decision Environments), whereby each alternative is evaluated with numbers from 1 to 9 being equivalent according to what is expressed in Table 1.

Table 1: NAIADE Linguistic Evaluation Options and Number Equivalence Used in Visioning Workshops for ECOTICOS

Number	Equivalence
1	Perfect
2	Very Good
3	Good
4	More or Less good
5	Moderate
6	More or Less Bad
7	Bad
8	Very Bad
9	Extremely Bad

After this round of workshops, the ECOTICOS team decided that it was worth repeating the exercise again in order to increase the representation of other sectors. A second round of workshops was planned. These took place between January 13 and 15, 2010. Three Focus Group workshops were done in different locations along the northeastern border of the TSWR. Unfortunately, time and resources prevented more workshops along the south and west sectors of the TSWR.

The total participation in the Focus Group workshops added 27 new people to the sample with a much more diverse representation including participants from local NGOs, producers, workers (dependent and independent), producers and local government employees. The Visioning workshop had an attendance of 17 new participants and a broader representation too than the October one. Both exercises included well recognized local civil society organizations such as ASDEASID, the community water management associations of Uvita, Punta Mala and ASADIQUIS; the local rice producers association, the Integral Development Association of Palmar Norte, ARTOSA, Coopemangle, SURCOOP and Prohumana 21. The same exact procedures were followed in these workshops.

The final data collection model is summarized in Figure 6. Final voting was done through secret ballot and was color coded in order to identify the stakeholder groups from which the different votes came. The different stakeholder groups that participated in the voting were grouped in eight: Local NGOs, Youth, Local

Draft. September 2010.

Government, Dependent and Independent Workers, National NGOs, Education Sector Employees, SINAC-MINAET and Central Government and Entrepreneur-Productive Sector.

Further data was acquired from the Environmental Service Valuation for the HNTS that was performed by Earth Economics initially in 2009 and with more refined data on May, 2010. The consequences of the Scenarios data was further refined with the help of a refined Delphi analysis done by the ECOTICOS collaborators from CIMAR-UCR and the Florida Institute of Technology (FIT). This additional refinement was sought due to the sense that these ECOTICOS team members had of the marine and earth-marine interface baseline data and therefore of the current environmental health of the TSWR.

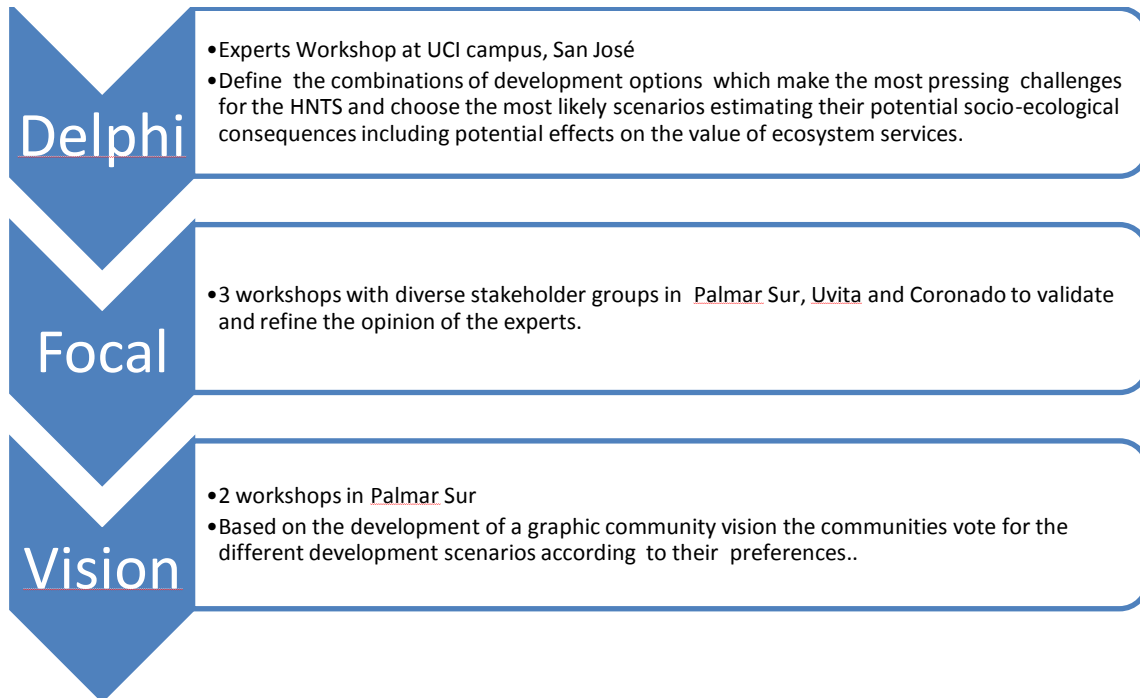


Figure 6- Final MCA Participatory Workshop Data Collection Model. Source: Authors elaboration.

C. Results and Discussion

The data from all the workshops was summarized and coded. The general trends from the visioning workshops were coded and summarized in bar and spider web graphs. These results were preliminarily used to indicate to diverse decision makers the expressed will of the community stakeholders regarding the development options that could affect the HNTS. Appendix 14 includes the coded data.

Results of the different groups indicated a certain diversity of opinions (Figure 7), yet coincided that the most highly ranked scenarios were those that included the management plan for the TSWR as an element (Figure 8). Estimates of this trend were done both by a general average and by an average of sector rankings in order to filter larger sector biases. The similarity in trends seems to indicate that this potential bias did not affect the estimates.

Further, the refined data from the Delphi-Focus Group and Visioning process (including the input of CIMAR and FIT) was coded to be used according to the qualitative variable treatment of NAIADE. This included the effects on environmental (such as water quality, sonic pollution, waste and the size of the wetland), social

(such as land tenure, social organization and community services) and economic (such as income and employment) variables expressed in qualitative evaluations of increasing or decreasing trends. Some of the variable estimates were also used to conservatively estimate increases or decreases (on a % per year scenario) of the value per hectare of environmental services that was estimated using the value transfer methodology by Earth Economics. This quantitative valuation was included in the impact matrices of NAIAD E for the six scenarios. The variables used for this estimation were not used further in order to avoid redundancy.

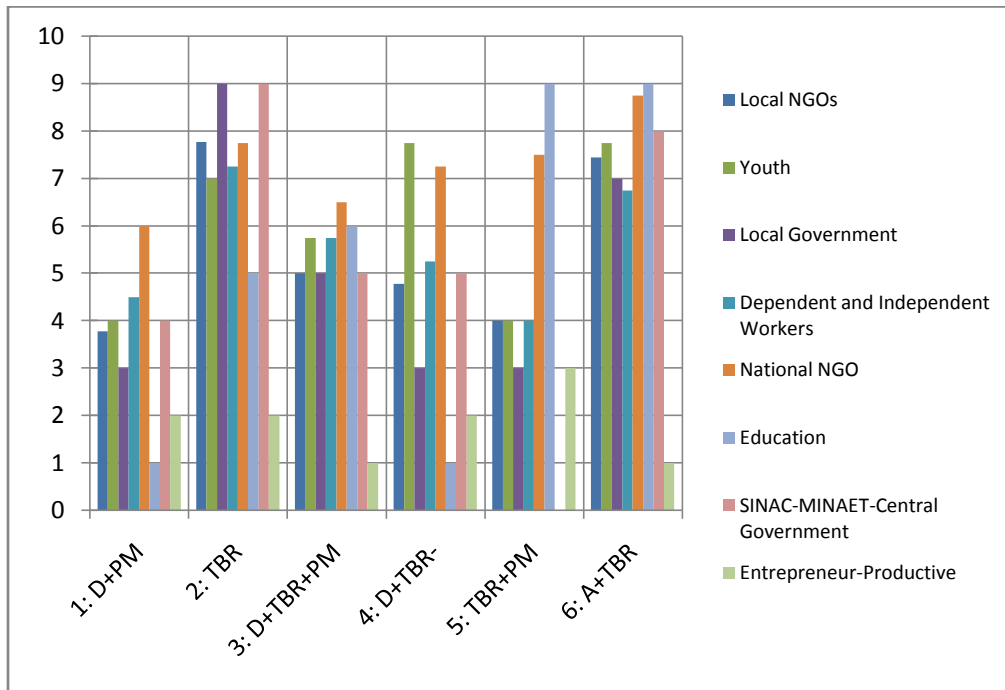


Figure 7- Individual Scenario Rankings per Group. Source: Authors elaboration.

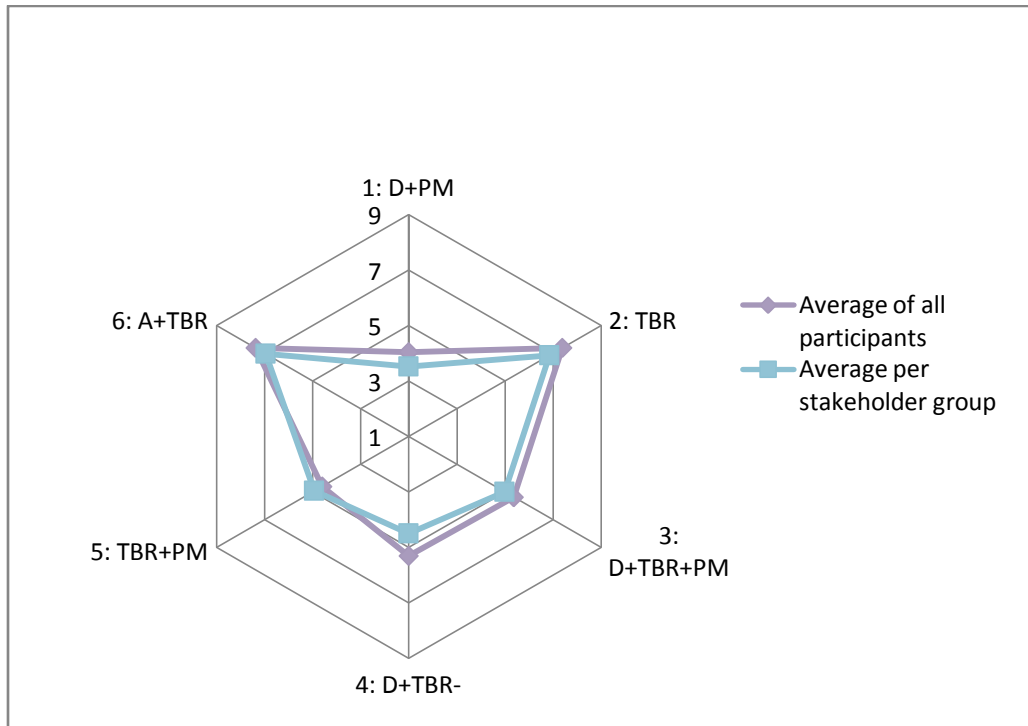


Figure 8- General Scenario Rankings (D: Diquís Hydro electrical Project; PM: Management Plan; TBR: Tourism and Real Estate; A: Airport). Source: Authors elaboration.

Results of the Multi-criteria Analysis confirm the trends above presented (Figure 9). The preferable scenarios were the three scenarios that include the management plan. The best scenario in terms of good rankings is 1. The best scenario in terms of negative consequences is scenario 5 and the intersection analysis shows the best to be number 1 (the construction of the Diquís Project and the approval of the management plan for the TSWR) followed by both 3 and 5 as second best scenarios.

The Dendrogram of Coalition Formation Process (Figure 10) shows that the easiest potential coalition of interests at a 0.76 confidence level would be between the interests of Local NGOs and SINAC-MINAET-Central government representatives. At a 0.73 level a coalition with the local government and the dependent and independent worker groups would be possible. At a 0.64 level it would be foreseeable to expect agreement to include Local Youth. Beyond this, the more difficult coalition would be with the representatives of the national/international NGO, education and productive sector interests.

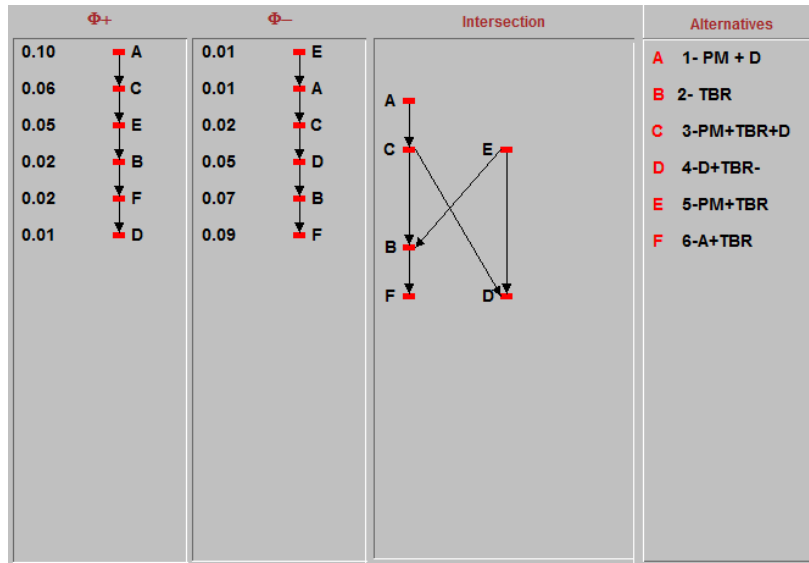


Figure 9- General Scenario Rankings by NAIAD Multi-criteria Analysis (D: Diquís Hydro electrical Project; PM: Management Plan; TBR: Tourism and Real Estate; A: Airport). Source: Authors elaboration.

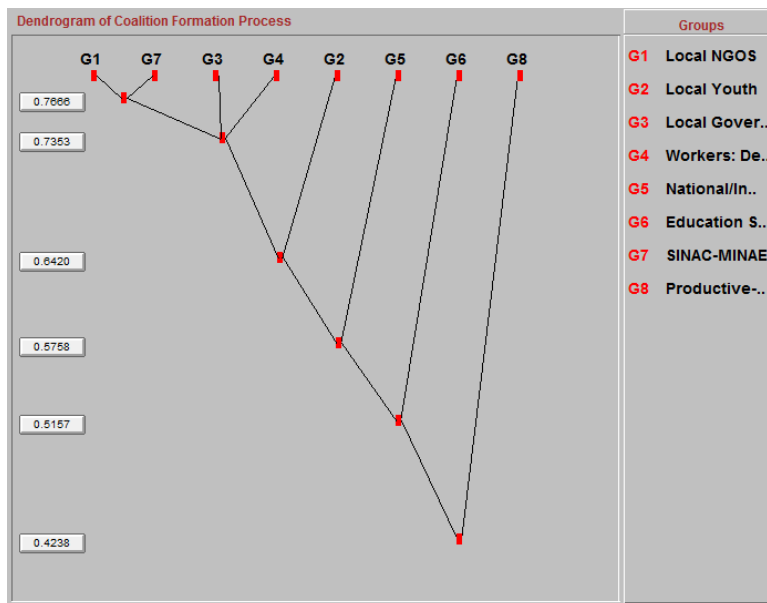


Figure 10- NAIAD Dendrogram of Coalition Formation Process. Source: Authors elaboration.

At this confidence level, according to the Veto Diagram generated by NAIAD, the two unacceptable alternatives would be scenarios 6 and 2 (Figure 11). The diagram also confirms what is suggested by the Coalition Dendrogram that the next group to potentially enter a coalition of interests would be National/International NGOs.



Figure 11- NAIAD E Veto Diagram at level 0.64. Source: Authors elaboration.

D. Opportunity of the Results: The Approval of the TWSR Management Plan.

As the process of MCA was being finalized, the regional council of the Osa Conservation Area (ACOSA) discussed the approval of the management plan for the TSWR. As members of the ECOTICOS group, having previously presented our results to the director of ACOSA, Fundación Neotrópica was called to give expert opinion. In the council (the main jurisdiction that can approve or reject the plan) some members argued, based on a report from a reputable environmentalist organization that not enough input from all members had been received in the process of elaborating the proposal for the management plan lead by UCI and therefore diverse local groups opposed the plan.

The meeting, held in Osa on April 22, 2010, was initially tense. Several groups were present and the director of ACOSA skillfully presented the proposal and evacuated doubts on it. The plan was finally approved. It was recognized in the meeting and thereafter that both the expert opinions of Conservation International (CI) and Fundación Neotrópica's were key in the approval of the plan. CI argued that the management plan was the best substrate to resolve the disputes at hand through the development of the yearly work plans that it all calls for. Further, our results on the stronger support by diverse stakeholder groups of the scenarios that included the management plan helped prove the need for approval. The general sense was that one of the advantages of the plan was that it allowed to determine what was allowable and what was not and to generate a menu of productive solutions that would not only be supported by the conservation authorities but be fundable.

IV. Brief Conclusions

Draft. September 2010.

The ECOTICOS methodology provided timely on the ground expertise that led to the approval of the TSWR's Management Plan. This is an important regulatory victory bolstered by the ECOTICOS project team's socio-ecological data from our Ecosystem Services Valuation and Multi-criteria Analysis work. Our team of experts was called upon to give official testimony to the Regional Council which subsequently recognized our contributions as critical in the approval of the management plan. This was confirmed by an independent stakeholder evaluation performed by our colleagues at Conservation International (Rivera, 2010). The ACOSA upper administrators and field personnel have also expressed their support for the ECOTICOS approach while actively participating in the project's exercises. Today, six draft management plans remain to complete the necessary legislative framework to protect all of the conservation areas of ACOSA. The ECOTICOS methodology is recognized as a proven approach for ensuring that these remaining plans are completed in the near future.

It is worth highlighting that this credibility was bolstered by the mix of members in the ECOTICOS team, including civil society representation from both the United States and Costa Rica aside the more technical expertise of research and education institutions. Not least, the significant and active participation of other civil society organizations at all levels of the MCA exercise undoubtedly contributed in this direction too. It has been already documented that the process of approval of this management plan was the result of a multistage social coalition forming around the problems highlighted by ECOTICOS (Uribe, 2010).

This is why it is important to highlight the results from the equity analysis (coalition dendrogram and veto diagram) as they show us potential inroads to implement the productive solutions and work plans that ACOSA will implement in the following years with a strong civil society support.

Also, this type of analysis, along with the MCA ranking method will be useful to monitor the success in implementation of the management plan and the effects of potential changes in ESV values on the perceptions of wellbeing and success of conservation by local, national and international stakeholders.

Following approval of the TSWR management plan we developed a mechanism for choosing future sustainable development projects. During these workshops on April 2010, these results were already used to introduce the participating stakeholders into the exercise of designing workable projects to be presented and potential supported by a phase 2 of ECOTICOS.

Therefore, we conclude this phase feeling that the evidence gathered from this case study illustrates an applied way of using the levers approach proposed by Donella Meadows through a participative valuation methodology with strong civil society participation and initiative to affect policy and start resolving the problems that cause environmental conflicts in the TSWR region. Future research and work in this area and potential replications will allow us to critically challenge this preliminary conclusion.

V. References

Aguilar-González, B., 2007. **REFLEXIONES Y ESTUDIOS DE CASO UTILIZANDO UNA TEORÍA MUTIDIMENSIONAL DEL VALOR: RECOMENDACIONES PARA CENTRO AMÉRICA**, in UICN-UNA. Valoración económica, ecológica y ambiental. Análisis de Casos en Iberoamérica. Heredia, Costa Rica: Editorial Universidad Nacional de Costa Rica.

Draft. September 2010.

Blake, B., 2001. **COMPARING THE ICT'S CERTIFICATION OF SUSTAINABLE TOURISM AND THE NEW KEY TO COSTA RICA'S SUSTAINABLE TOURISM RATING.** <http://www.planeta.com/planeta/01/0104costa.html> .

Dasenbrock, J., 2002. **THE PROS AND CONS OF ECOTOURISM IN COSTA RICA.** TED Case Studies, Number 648. Washington D.C.: American University. <http://www1.american.edu/ted/costa-rica-tourism.htm>.

Dobes, L. and Bennett, J. 2009. **MULTI-CRITERIA ANALYSIS: "GOOD ENOUGH" FOR GOVERNMENT WORK?** Agenda Vol. 16, N. 3: 7-29.

Evans, S., 1999. **THE GREEN REPUBLIC: A CONSERVATION HISTORY OF COSTA RICA.** Austin: University of Texas Press.

FUNPADEM (Fundación para la Paz y la Democracia), 2005. **INFORME SITUACION DEL ACCESO A LA INFORMACION Y PARTICIPACION CIUDADANA Y LA JUSTICIA EN ASUNTOS AMBIENTALES EN COSTA RICA.** San José, Costa Rica: FUNPADEM.

Giampietro, M., y Ramos-Martín, J., 2005. **MULTI-SCALE INTEGRATED ANALYSIS OF SUSTAINABILITY: A METHODOLOGICAL TOOL TO IMPROVE THE QUALITY OF NARRATIVES.** International Journal of Global Environmental Issues Vol. 5: 119-141.

Honey, M., Vargas, E, & Durham, W., 2010. **IMPACTO DEL TURISMO RELACIONADO CON EL DESARROLLO EN LA COSTA PACÍFICA DE COSTA RICA.** Washington D.C.: Center for Responsible Travel-Stanford University.

Kerchner, C., R. Boumans, and W. Boykin-Morris, unpublished. **THE VALUE OF KOL RIVER SALMON REFUGE'S ECOSYSTEM SERVICES.** Research conducted by University of Vermont's Department of Community Development & Applied Economics and Gund Institute for Ecological Economics. Report date: 2008.

Marozzi, M. and J.P. Solis, unpublished. **VALORACION ECONOMICA TOTAL DE LOS HUMEDALES GANDOCA MANZANILLO SAN SAN POND SACK EN EL CARIBE FRONTERIZO ENTRE COSTA RICA Y PANAMA.** Report for the Alianzas-UICN Project. Report date: 2008.

Meadows, D., 2009. **LEVERAGE POINTS: PLACES TO INTERVENE IN A SYSTEM.** Solutions for a sustainable and desirable future. Vol. 1, N. 1: 41-49. <http://www.thesolutionsjournal.com/node/419> .

Munda, G., 2004. **MÉTODOS Y PROCESOS MULTICRITERIO PARA LA EVALUACIÓN SOCIAL DE LAS POLÍTICAS PÚBLICAS.** Revista Iberoamericana de Economía Ecológica. Vol. 1: 31-45.

Pera, J.L., 2008. **TAMAGRINGO: CITIZENSHIP AND COMMUNITY CHANGE IN TAMARINDO, COSTA RICA.** Unpublished thesis. Oregon: Department of Geography, University of Oregon.

Rivera, J. O., 2010. **INTEGRACION DE INSUMOS DE LAS REUNIONES: VISITAS A ORGANIZACIONES RELACIONADAS CON LAS INICIATIVAS FINANCIADAS POR BLUE MOON.** Unpublished Report. San José, Costa Rica: Conservation International and Blue Moon.

Draft. September 2010.

Rodríguez, M., 2009. **TEMA AMBIENTAL ES CONSIDERADO PRIORITARIO POR VOTANTES DE PRÓXIMAS ELECCIONES.** Costa Rica Hoy. <http://costaricahoy.info/nacionales/tema-ambiental-es-considerado-prioritario-por-votantes-de-proximas-elecciones/36800/>.

Rogers, T., 2009. **COSTA RICA'S PRESIDENT: IT'S NOT EASY STAYING GREEN.** Time. Oct. 10, 2009. <http://www.time.com/time/world/article/0,8599,1927452,00.html>.

Sáenz, G. & M. Rivera, 2008. **VETAN LEY PARA FORTALECER PARTICIPACIÓN CIUDADANA.** Diario Extra, San José, Costa Rica. <http://www.diarioextra.com/2008/noviembre/25/nacionales06.php> .

Uribe, M., 2010. **TERRABA SIERPE WETLAND'S MANAGEMENT PLAN: STRUGGLING FOR POLICY CHANGE AND ITS IMPLEMENTATION.** Unpublished thesis. Amsterdam: Environment and Resource Management Program, Vrije Universiteit.