Global Water Partnership South America

Case Study for GWP South America Toolbox

Venezuela: Integrated management of watersheds in Carabobo State

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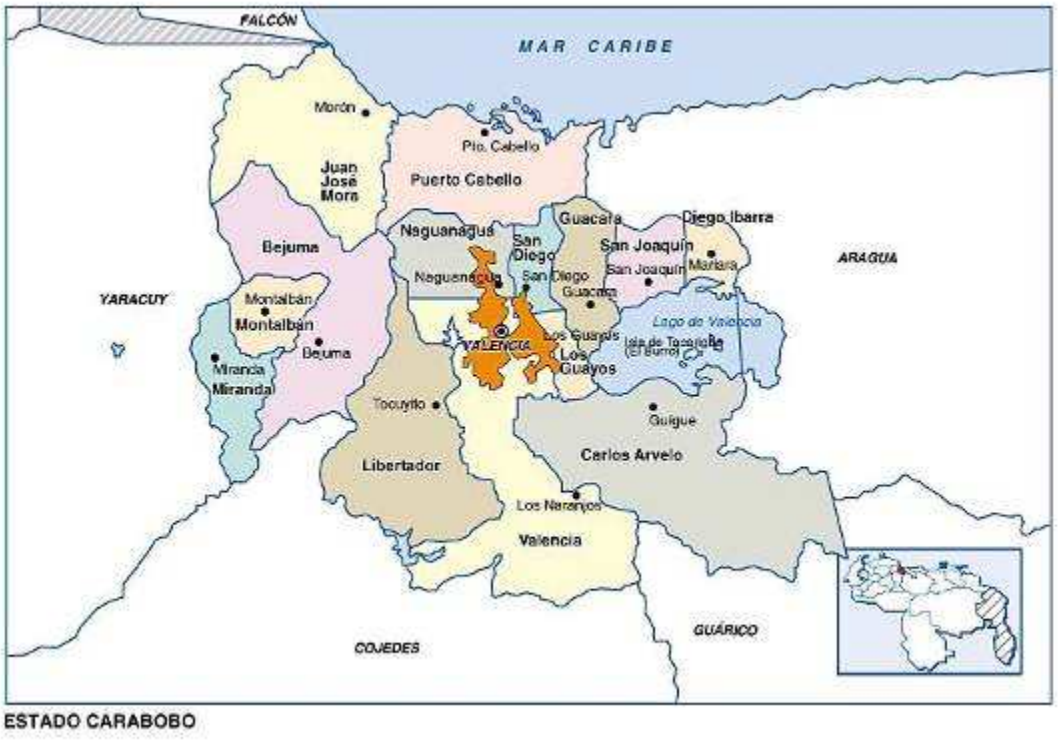
1. DESCRIPTION

Carabobo State is located in the north central region of Venezuela (figure 1) which is one of the states with the largest development in the country due to its population and industrial growth. It is the third state with less area (4,650 Km^2 = 0.51% of national area) and also the third state with more population (2,245,744 habitants = 8%] of the country's population according to the 2011 Census).

Figure 1

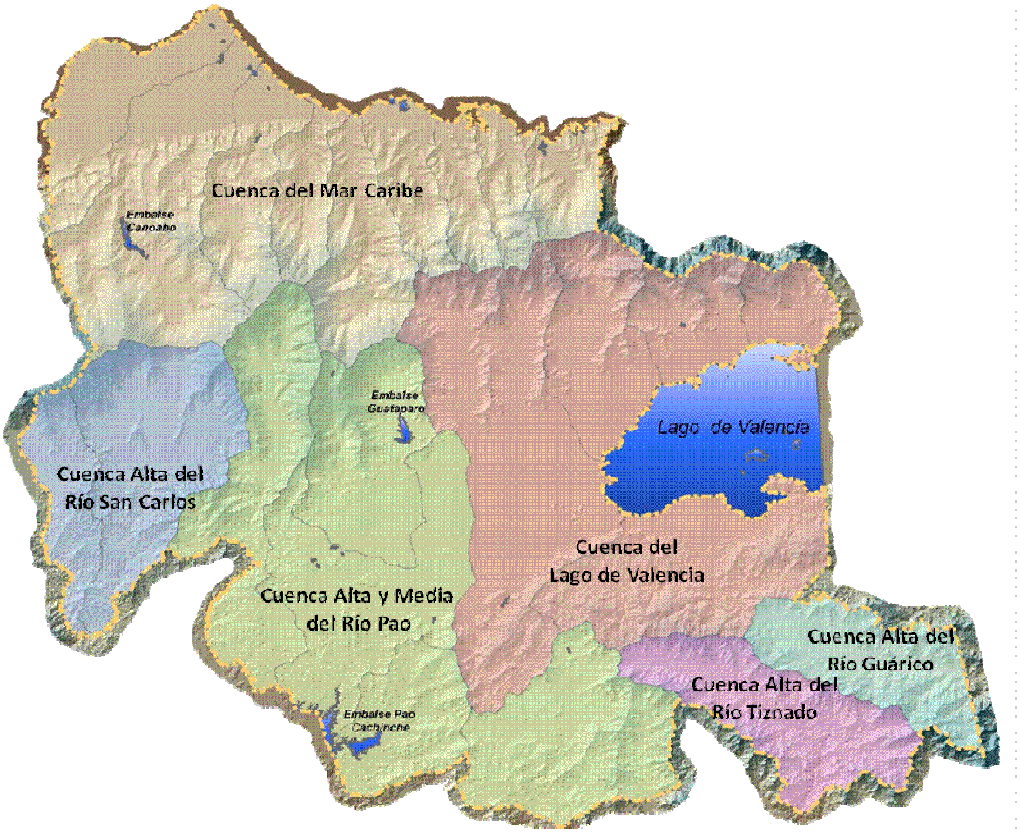


Two large mountain formations part of Cordillera de la Costa are in Carabobo State: Littoral Mountains in the north and Interior Mountains in the south which are separated by Lake Valencia depression. On the mountainous region there are deep valleys and high crests with up to 80% slopes, while in the depression there is a flat relief with slopes under 1%.

Temperature is uniform all year round with an average of 76.1ºF. Rainfall reaches 1,500 mm in mountainous regions, on the coast it shows a yearly average of 900 mm and on Lake Valencia depression it varies between 900 and 1,300 mm.

As a result of the combination of relief and weather, there is a dense hydrographic network of about 268 water courses i.e. Rivers, creeks, spouts and ravines of Carabobo State are divided on six watersheds (figure 2). Lake Valencia watershed is also known as Lake Tacarigua which is the only endorheic watershed of Venezuela. Of the total area of 375 Km^2, 281 Km^2 are in Carabobo State. This lake receives a large discharge of domestic, industrial and agricultural effluents, creating pollution and eutrophication problems that threaten the potable water supply for the people.

Figure 2



The high population density in the state is a result of the industrialization process of the capital Valencia and other cities such as Puerto Cabello and Guacara which began in the 50´s. In the recent years the urban and agricultural expansion is the main cause of watershed environmental problems, which are being degraded by deforestation, illegal logging and burning and inadequate management of solid waste, among other causes. The loss of vegetation cover increases erosion risk, desertification, soil loss and mudslides on rainy season.

Although there are several versions about the origin of Carabobo name, one of them suggests that it is an indigenous word that means "Ravine Savanna" (“Karau" = savanna, "bo" = water, that repeated functions as a superlative, meaning a lot of water or ravines). At present the challenge is to honour its name by achieving a sustainable water management in this region.

2. ACTIONS TAKEN

Since 2009 a Department for Integral Watershed Management (DMICH for its Spanish acronym) of the Carabobo State Governor´s Office works to “manage watershed conservation in Carabobo State. This is done through participatory public policies, focused on environmental education and sustainable development, to ensure water availability for present and future generations”. The Department is part of the Secretary of Land Use Planning, Environment and Natural Resources (SOTARN for its name in

Spanish) together with other four Divisions: Environmental Sanitation, Land Use Planning, Mining and Legal Support. The integrated watershed management at Carabobo State has been developed by DMICH through the following actions:

a. PLANNING

For each project carried out by DMICH there is a technical file in which its relationship with development plans at a global (Millenium Goals), national (Economic and Social Plan of the Nation 2007-2013) and regional level (Development Plan of Carabobo State 2009-2013) is explained. It is important to highlight that the regional plan was built together with the community, through 3.530 polls to community leaders and 18 communal forums in the 14 Carabobo State municipalities.

b. MONITORING

Through environmental monitoring of watersheds there is a permanent record of natural (water, weather, geographic location, altitude, natural perturbations, biodiversity) and socioeconomic (roads, economic activity, land use) data on each of the six Carabobo State watersheds.

Technical information is captured in the field through inspections (figure 3), gathering specific data with systematic sampling on the high, middle and low sections of each river, during rainy and dry season. Portable equipment is used to evaluate water quality on each basin by analyzing variables such as odour, colour, presence of large solids, turbidity, channel width and depth, water mirror width, caudal, temperature, pH, conductivity and dissolved oxygen.

Figure 3

The information is incorporated to the Carabobo State Geographic Information System, using ArcGis® software and the cartographic and thematic base SIGCARABOBO, built with the cartography of the Simón Bolívar Geographic Institute of Venezuela (IGVSB for its name in spanish). As a result there are two types of products: Technical files of each inspection and annual reports of the natural conditions of Carabobo State watersheds.

c. REFORESTATION

Figure 4

The degraded areas identified during field inspections are reforested with the active involvement of communities (figure 4). The DMICH has its own nursery beds in the Fernando Peñalver Park at Valencia City, capital of Carabobo State (figure 5). Seeds that are grown by communities and state schools also come from there. The species that are planted on each area are chosen based on the evaluation made during field monitoring.

Figure 5

d. EDUCATION

DMICH actions related to environmental education can be grouped in four projects, consolidated in 2011:

- Camoruco Project: A permanent program of environmental education on the 320 state schools, with the support of the Education and Sport Secretary.
- Carabobo Environment Education Guide: Edited to support teachers, students and community leaders on its environmental awareness activities. Seven topics are developed in this guide: Environmental education, water and watersheds, biological diversity, climate change, solid waste, agroecology, health and environment.
- Carabobo Environmental Teachers Group: A permanent communication channel with the activities that each state school carries out, through social network and email.
- Forums: Three forums of environmental topics are carried out annually as a capacity building activity for teachers and to inform the general public.

e. COMMUNICATION

Since 2009, the News section of the Governor´s Office website has been a permanent communication channel to inform people about DMICH activities and achievements. Since 2011, DMICH also distributes press releases to inform media and other allies about its activities and achievements. In addition, DMICH has taken advantage of three global environmental dates (World Water Day, Earth Day and World Environment Day) as a framework to develop its activities.

Figure 6

3. OUTCOMES

Although other Governor´s Offices in Venezuela have a section dedicated to environment conservation, the existence of DMICH in Carabobo is an important achievement. It is the only case of a Direction specifically dedicated to integral watershed management within a Governor´s Office. In the Water Law (2007) decentralization for watershed management was planned through the creation of Regional and Watershed Councils. Nevertheless, these actions have not been taken by the Ministry of the Popular Power for the Environment, which has a Direction of Watersheds.

a. PLANIFICATION

Projects included in Carabobo State Development Plan 2009-2013 have been funded by Interterritorial Compensation Fund (described on article 22 of the Organic Law of the Government Federal Council). Through this way, DMICH has received funds to carry out its three programs: 1) Research and Monitoring, 2) Soil and Water Conservation and 3) Environmental Education.

The current political polarization in Venezuela has limited the work of Carabobo Governor´s Office for having a different political ideology than the one of the national government. Each year it has been necessary to restructure the Governor´s Office budget because central government has always assigned fewer funds than required.

b. MONITORING

Up to date, DMICH has produced three annual reports of the Research and Monitoring Program where natural and socioeconomic conditions of Carabobo watersheds are shown. Reports are of public use and are available to anyone interested on them. We recommend that these reports are available on Carabobo Governor´s Office website or SOTARN website, because they were planned as tools both for decision making to national, regional and municipal authorities and for information to the general public, students and teachers at different levels.

Between 2009 and 2011, 129 inspections to Carabobo microbasins and sub-basins have been carried out. Among them, the following rivers are highlighted: Miranda, Aguirre, Bejuma, Canoabo, Aguas Calientes, Yaracuy–Urama, Alpargatón, Patanemo, San Esteban, Guacara, Los Guayos, Mariara, Ereigüe, Guárico, Cabriales, Chirgua, Torito, Paíto and Manuare. After each inspection, the technical information on natural variables is compared to the current environmental norms.

Motivation and capacity building of the personnel, equipment acquisition and process systematization were important challenges during the first year of DMICH. Nevertheless, the applicability of results has been the main stimulus to keep up with the job without interruptions.

In 2011, an increase in pollution on almost all watercourses was observed if compared to the previous years. This situation was a consequence of solid waste on watercourses, direct sewage discharges to rivers from rural and urban places, discharges from pork and chicken farms, among others. Illegal connections and channel diversion to domestic

and agricultural use also increased. Additionally, houses and small agricultural plots were built within the security limits established for the protection of watercourses, according to current Water Law. This situation shows the magnitude of the challenge that means the integrated management of water resources. It would also be interesting to find out the impact of these activities on the aquifers of the region, because so far the monitoring has been carried out on superficial waters only.

c. REFORESTATION

Up to August 2012, 21,208 trees have been planted to restore 339,328 m^2. Diverse organizations have participated in reforestations, including children and youth from educative institutions (primary and secondary schools, universities), volunteers from civil society and some industries, as well as members of communal councils. Reforestations have been a very productive activity because it promotes collective involvement of diverse sectors in a concrete action to the benefit of all.

Thanks to the results of this project, Carabobo Governor´s Office won the National Prize Dr. Enrique Trejo and Elsa Tejera 2012, which is given annually by the Friends of the Trees Society (Sadarbol for its name in Spanish) since 28 years ago.

d. EDUCATION

- Camoruco Project: More than 655 teachers that reach 98,000 children from the 320 state schools have trained as Environmental Education Facilitators. In addition, 579 community leaders have been trained as Environmental Mediators to solve ecological problems and to promote the conservation of natural resources.

- Carabobo Environment Education Guide: Up to date, 2,500 guides have been distributed to 312 directors of state schools, 56 academic coordinators, 45 cultural promoters, 40 libraries and 25 environmental institutions (public and private).

- Carabobo Environmental Teachers Group: As communication mechanisms, an email account (educadores.ambientales.carabobo@gmail.com) and the social network accounts in Twitter (@EducAmbCarabobo, close to 100 followers) and Facebook (Educadores Ambientales Carabobo, more than 1.500 friends and more than 1.100 photos) have been created. In this way, each school develops its own ecological activities and shares ideas and results both with other schools and DMICH.

- Forums: Up to date, eight forums have been carried out on environmental topics such as climate change, biodiversity, water, forests and urban ecological corridors. More than 300 people have participated on each forum; the majority were teachers from Camoruco Project. In these forums have participated both Carabobo Governor´s Office personnel and diverse allies from academic institutions and nongovernmental organisations from Carabobo State and other regions.

The combination of permanent activities for capacity building for teachers and community leaders through workshops and forums, together with concrete tools such as the environmental education guide and the communication through social networks, have been the key to success of Camoruco Project. A pending task is to increase the

impact to other schools, which could be an opportunity to establish alliances with private industries and the central government.

e. COMMUNICATION

The main communication mechanism about DMICH activities and achievements has been the News section of the Governor´s Office website, with 37 articles. The regional press has also contributed to inform about of some of its activities, especially the Agencia Carabobeña de Noticias, Notitarde and Diario El Carabobeño. In the last one, it has been clear the importance to have a journalist specialized on environment in the region, because he has published 6 articles related to DMICH work since 2011. Again, the current political polarization in Venezuela has limited the communication of the achievements of Carabobo Governor´s Office on public media. A challenge for the future is that DMICH information will be known beyond the limits of Carabobo State.

4. **LESSONS LEARNED**

Information exchange and coordination with public and private organisations that support central government has been difficult in the current situation of political polarization. Nevertheless, the planning and the development of concrete activities in a professional and systematic way have allowed DMICH to have important achievements in the short term. The establishment of numerous alliances with diverse actors, inside and outside Carabobo State, has been a strength of this Direction.

On the other hand, transparency and political will to support environmental topics in Carabobo Governor´s Office have been important factors to the success of DMICH management. In 2011, this state was ranked as the second most transparent of Venezuela by Transparency International. Annually, DMICH prepares a balance of its management that is publicly presented by the Secretary of SOTARN together with the results of the other Directions. Later, a summary of that information is included each year on the Management Reports of the Governor, available at Carabobo Governor´s Office website. In addition, in words of the Secretary of SOTARN, there is a vision that “Carabobo is routed to be declared the environmentalist state by excellence”.

Although results of DMICH management are positive, the 2011 research and monitoring report shows that they are not enough to achieve the management needed to solve the threats to Carabobo watersheds. DMICH has accomplished the key aspects towards watershed integrated management within its responsibilities; but the difficulty to coordinate with other institutions because of political polarization is an obstacle that needs to be overcome. Monitoring, reforestation and education activities have to be accompanied by law enforcement actions described in the abundant environmental legal framework of Venezuela.

The creation and implementation of Hydrographic Region Councils for Carabobo State, could contribute to improve coordination among diverse institutions that work on watershed integrated management. On article 27 of Water Law these Councils are defined as “entities of consultation, concertation and decision making” that will be “plural, deliberant, analytic and proponent” to “promote better water management. To these effects, there will be coordination entities between National Government, Governor´s

Offices and municipalities and, at the same time, of concertation with communities and organized neighbourhood groups".

This case shows that the creation of an entity in charge of watershed integrated management is a successful experience with potential to be replicated in other Governor´s Offices of Venezuela. It could contribute to the decentralisation of water resources management, taking it to a closer level to the watershed, which is the basic territorial unit for the integrated water management according to Water Law.

5. CONTACT

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Graphic legends

Graphic 1: Municipalities and location of Carabobo State in Venezuela
Source: http://www.a-venezuela.com/mapas/map/html/estados/carabobo.html

Graphic 2: Watersheds of Carabobo State

Graphic 3: Caudal monitoring on an inspection of Carabobo State watersheds

Graphic 4: Reforestation activity carried out in Cerro La Cruz, El Trigal sector (Carabobo State)

Graphic 5: Plant nursery in the Fernando Peñalver Park (Valencia, Carabobo State)

Graphic 6: Capacity building of state schools teachers as environmental coordinators (Carabobo State)

Source from 2 to 6: Department of Integral Watershed Management, Secretary of Land Use Planning, Environment and Natural Resources, Carabobo State Government