

1.- BACKGROUND

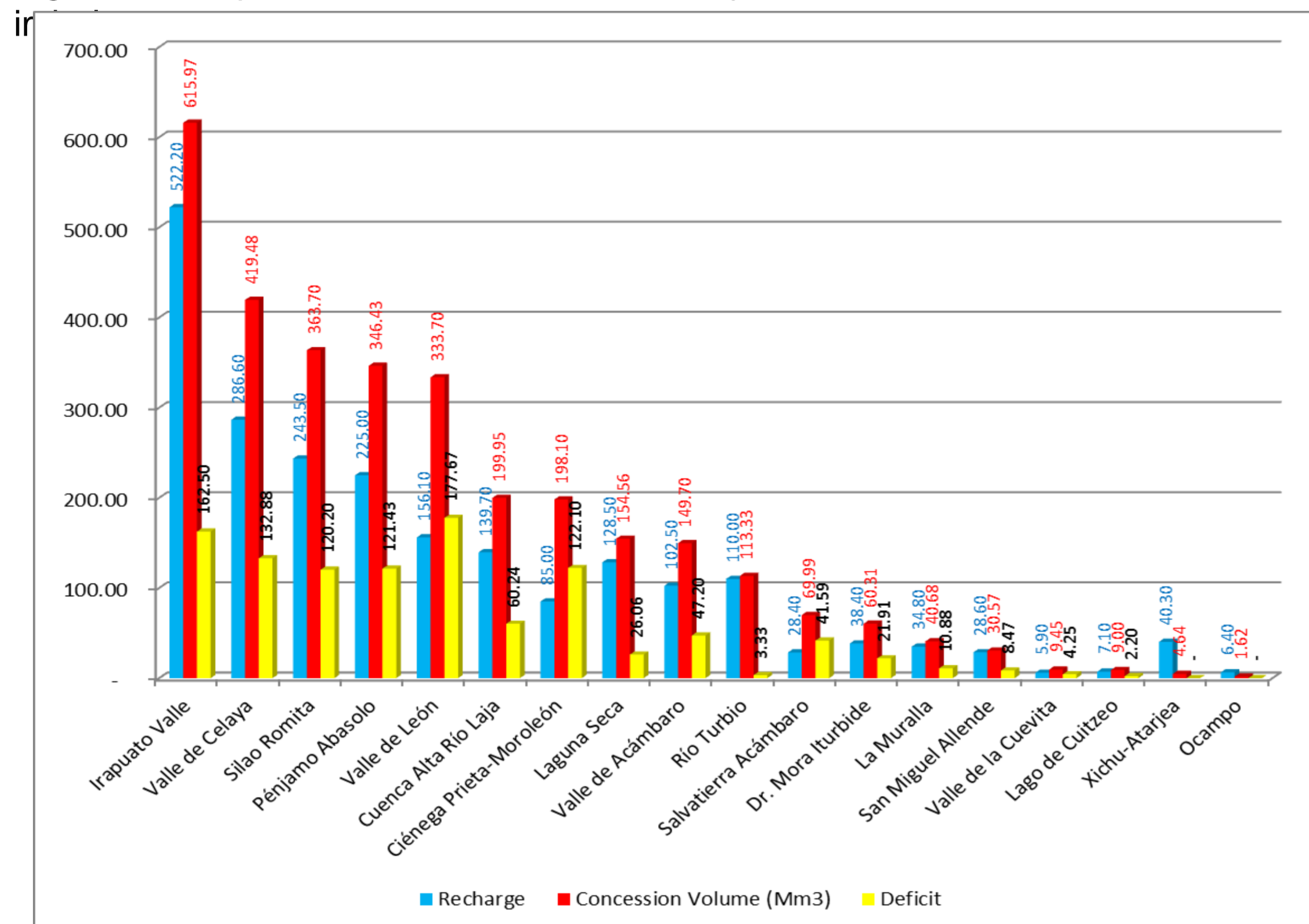
In Mexico agricultural areas with irrigation infrastructure are irrigation districts with 3.496 million hectares, where 12% are irrigated with groundwater, and the irrigation units are 3.2 million hectares and of these 50% are irrigated with groundwater extracted from 653 aquifers with an average volume of 28,000 cubic hectometers (hm³) of which 71% is for agriculture and the remaining 29% for urban and industrial uses.

2.- THE GOVERNANCE OF WATER RESOURCE.

At present, the CONAGUA takes constant effort to have an update of the Water Concession Titles; however, the main problem is the overconcession of volume in most aquifers. From a policy perspective, the governance of water incorporates principles which provide conditions required to make the best decisions to achieve sustainability of groundwater resources. Under this scheme, governance represents a new public management between the State and society, a scheme that allows to reach common goals, this does not mean that the State is weakened, but rather, it becomes leader to establish new participatory schemes with society and achieve a balance in decision-making on issues that require greater integration of wills, rather than multiple disagreements.

Mexico has states like Guanajuato (See Fig. 1), where 16 aquifers of a total of 18 aquifers are overexploited, this indicates the severity of the water imbalance, so it is necessary to establish models of economic development, prevailing the growth based on the availability of resources and governance, where state authorities are leaders and invite the different water users.

Figure 1.- Aquifers in the state of Guanajuato, concession volumes, extraction and



Public policy considers the alliance of state institutions such as the Secretariat of Agricultural and Rural Development in Guanajuato, Mexico (SDAyR), the National Water Commission (CONAGUA), the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) and the Federal Electricity Commission (CFE) to promote and strengthen sustainable extraction control based on the existing supply of water in each aquifer, implementing the indirect measurement of volumes pumped, considering the Agricultural Pumping Energy Index (KWH/m³) as an efficient and effective tool to counteracts the overexploitation of aquifers. A new term that must be introduced in the underground water management in the Concession Titles is "Sustainable Water Volume" defined as annual average volume available (quantity and quality) in each aquifer, according to the annual average water recharge that can be distributed and used as maximum volume for the purpose of extraction and use of users.

This public policy is planned for the benefit of all participants, i.e. "Win-Win" situation, because institutions like SAGARPA will save the country thousands of millions of pesos by not allowing unnecessary energy in support of groundwater extraction, the CFE supports the not over-exploitation of aquifers and entry of huge amounts of money to the Mexican treasury, the CONAGUA will promote the stabilization of aquifers and the sustainable use of water, and finally users under a scheme of modernization of the field will raise the productivity of land and water and will ensure better income for their families.

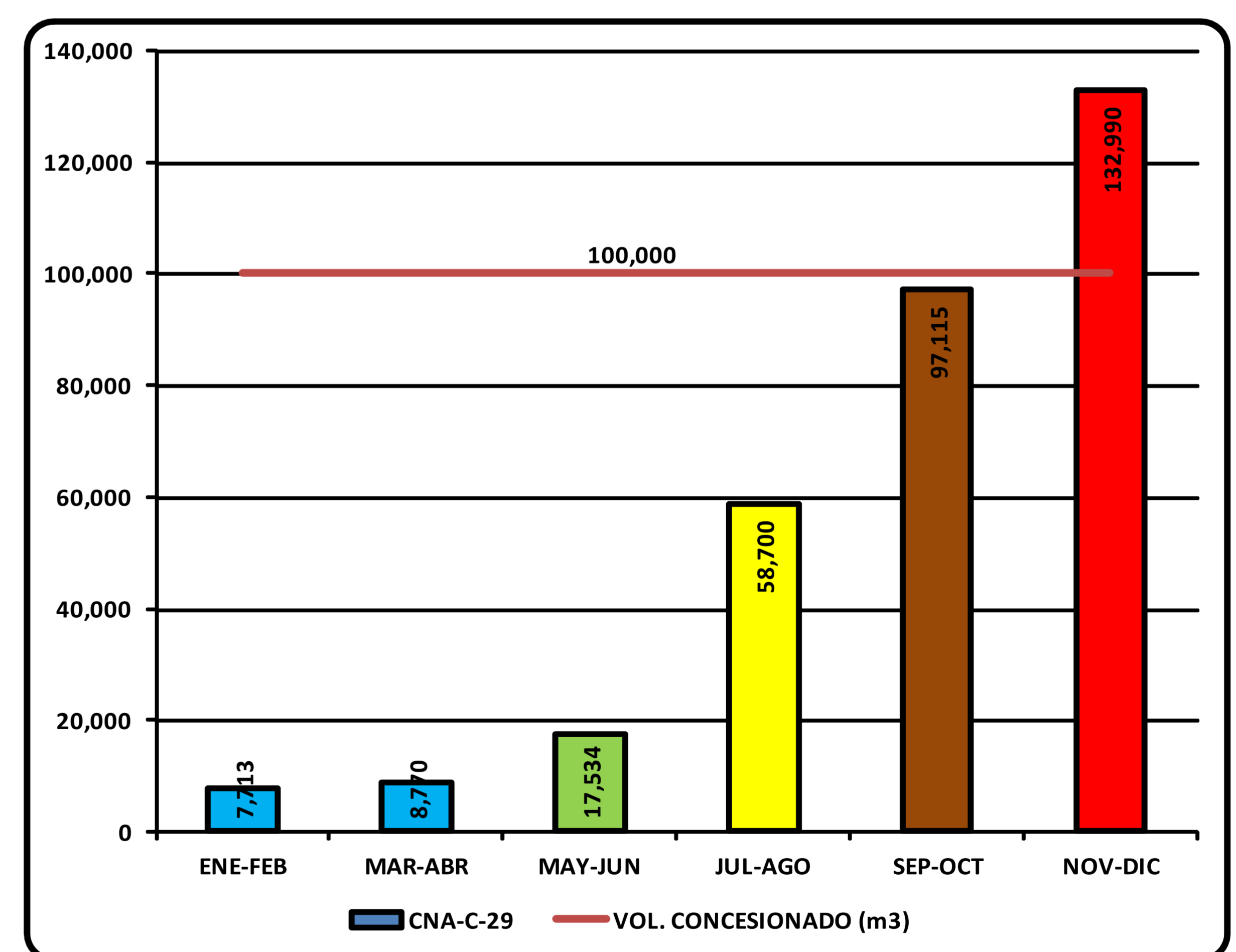
3.- REGULATION, SUPERVISION AND MONITORING OF GROUNDWATER RESOURCES.

- 1.- Formalize Civil Associations of Users (ACU) of each aquifer, geographically delimited by the basin of each aquifer,
- 2.- Geographic location and monitoring of all equipment and pumping systems of each aquifer, determine the Sustainable Water Volume and Energy Index (kWh / m³) for each equipment and pumping system.
- 3.- Structure and develop the General Regulation of the Aquifer
- 4.- Supervise and monitor the ACU and SRL established, developing and training technical bodies

4.- THE TECHNOLOGY OF THE SOCRATEX SYSTEM AND ITS OPERATIONAL PLATFORM.

The large amount of information representing the data of the volume extracted by the extraction equipment, supervision and monitoring cumulative volumes and its comparison with the Sustainable Water Volume of each Concession Title, involves a system of permanent and reliable monitoring, requiring a software platform that integrates, structures, develops databases and analyze in a transparent manner, the information collected from all pumping systems, either monthly or quarterly volumes provided by the users and the support information indirectly obtained each month by means of the energy indexes, see Figure 2. The platform tested already is known as Operational System of Regulatory Control of Extractions "SOCRATEX"

Fig. 2.- Functional graphic of the SOCRATEX system



5.- CONCLUSIONS.

The proposal of sustainable management of aquifers in Mexico represents a new prospective of rational use of groundwater (available and biddable), which must be considered in the new schemes of use of water resources. The requirements in this proposal involves the proactive participation of institutions such as SAGARPA, CFE and the National Water Commission (CONAGUA), as main figure in the water sector, where a public policy be enhanced for the sustainable management of water resources in aquifers, in which governance is viewed as scheme of collaboration between institutions and society, providing solutions to the multiple problems in the use of water of each aquifer, especially the Sustainable Water Volume.