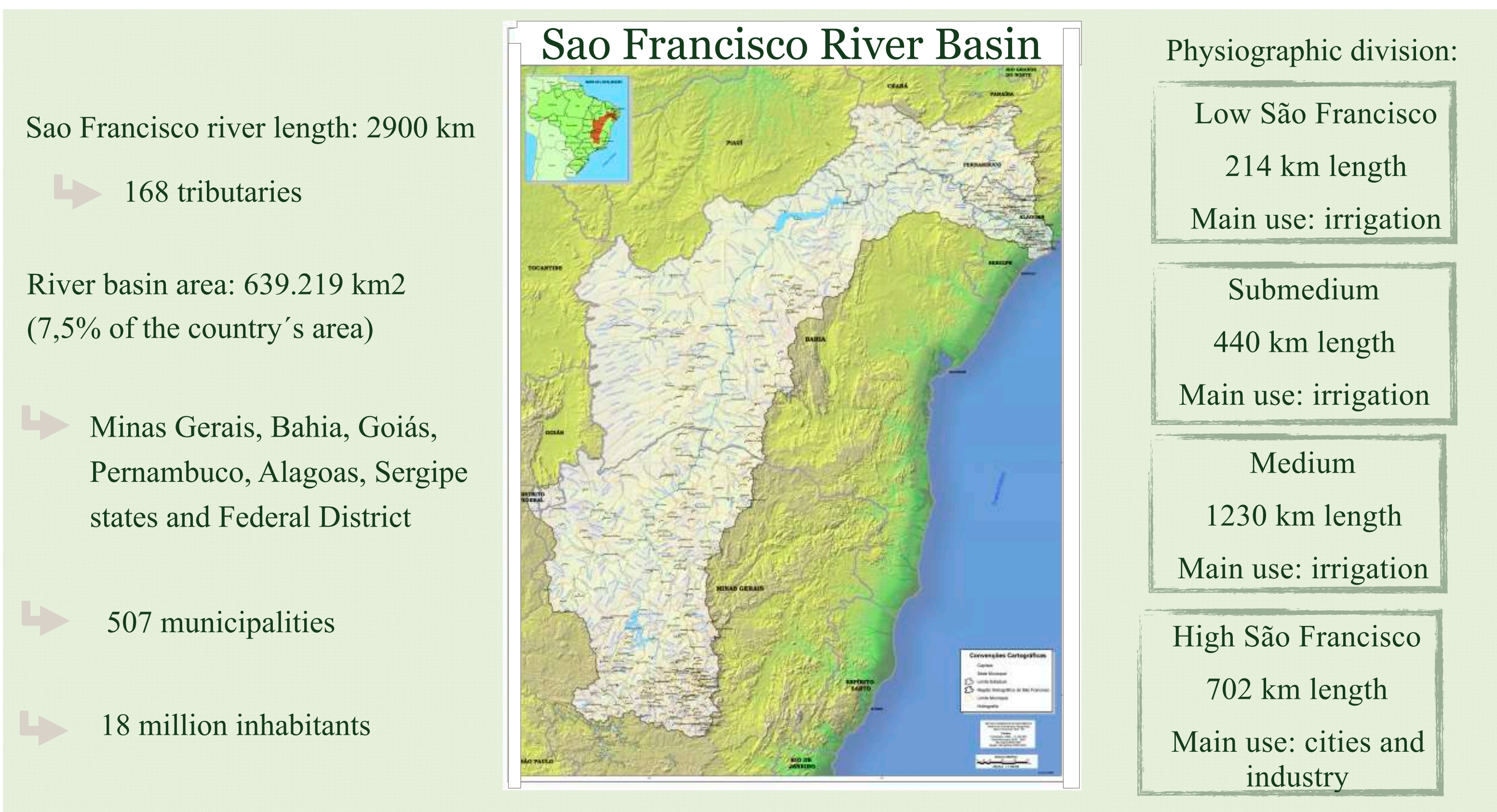


Introduction

The growing demand for water has triggered an alert. It is estimated that the freshwater withdrawals have increased globally by 1% per year since the 1980s (WWAT, 2016). Population growth, agriculture expansion, increased demand for energy and for industry are the main factors behind this scenario. Reduced water availability is likely to intensify competition among users, affect water, energy and food security prompting geopolitical conflicts and affecting the economy. In addition, climate change poses risks to the availability of freshwater resources. In Brazil, important river basins shall suffer different impacts related to changes in temperature and precipitation patterns (IPCC, 2014; PMBC, 2014). In this context of crisis and scarcity, emergency water management operations have been adopted worldwide. Water transfer projects have been considered as a strategy to minimize the impacts of extreme droughts or as a solution to water scarcity. In Brazil, the Sao Francisco Water Transfer project is a large scale diversion scheme to transfer water from the Sao Francisco River Basin to semiarid areas of Brazilian Northeast region. It is the biggest water infrastructure project ever carried out in the country. Projections indicate an increase in temperature between 1.7°C and 6.7°C and approximately 22% reduction in the rainfall regime by the end of the century (IPCC, 2014).



The Sao Francisco water transfer project

The transposition project of the Sao Francisco River into the semi-arid watersheds of the Northeast region has been seen as a solution to the scarcity of water in the semi-arid for more than a century (MINISTÉRIO INTEGRAÇÃO NACIONAL, 2004). The project was first thought of in 1875, after a severe drought in the Northeast. It is believed that more than 1,7 million people have died of starvation. The current work, in its final fase of implementation, was released by the Brazilian government in 2004. It estimates an average transfer of 2,3% of the river flow to river basins in Ceará, Paraíba, Rio Grande do Norte and Pernambuco states. According to the project, the water withdrawal takes place between the Sobradinho and Itaparica dams in Pernambuco state. Water flows then through channels, pumping stations, small reservoirs and hydropower plants along two axes, called North and East. Six river basins shall benefit from the project: Jaguaribe river (Ceará), Piranhas-Açu river and Apodi river (Rio Grande do Norte), Paraíba, Moxotó and Brígida rivers (Pernambuco). According to the Brazilian Ministry of Integration, the São Francisco River integration project will assure the supply needs of municipalities in the semi-arid region, Agreste Pernambucano and Fortaleza Metropolitan region and would be the solution to the problems brought about by the scarcity of water and severe droughts. When there is enough water available, it will then be used for irrigation.

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Sao Francisco Water Transfer Project

North Axis: 260 km

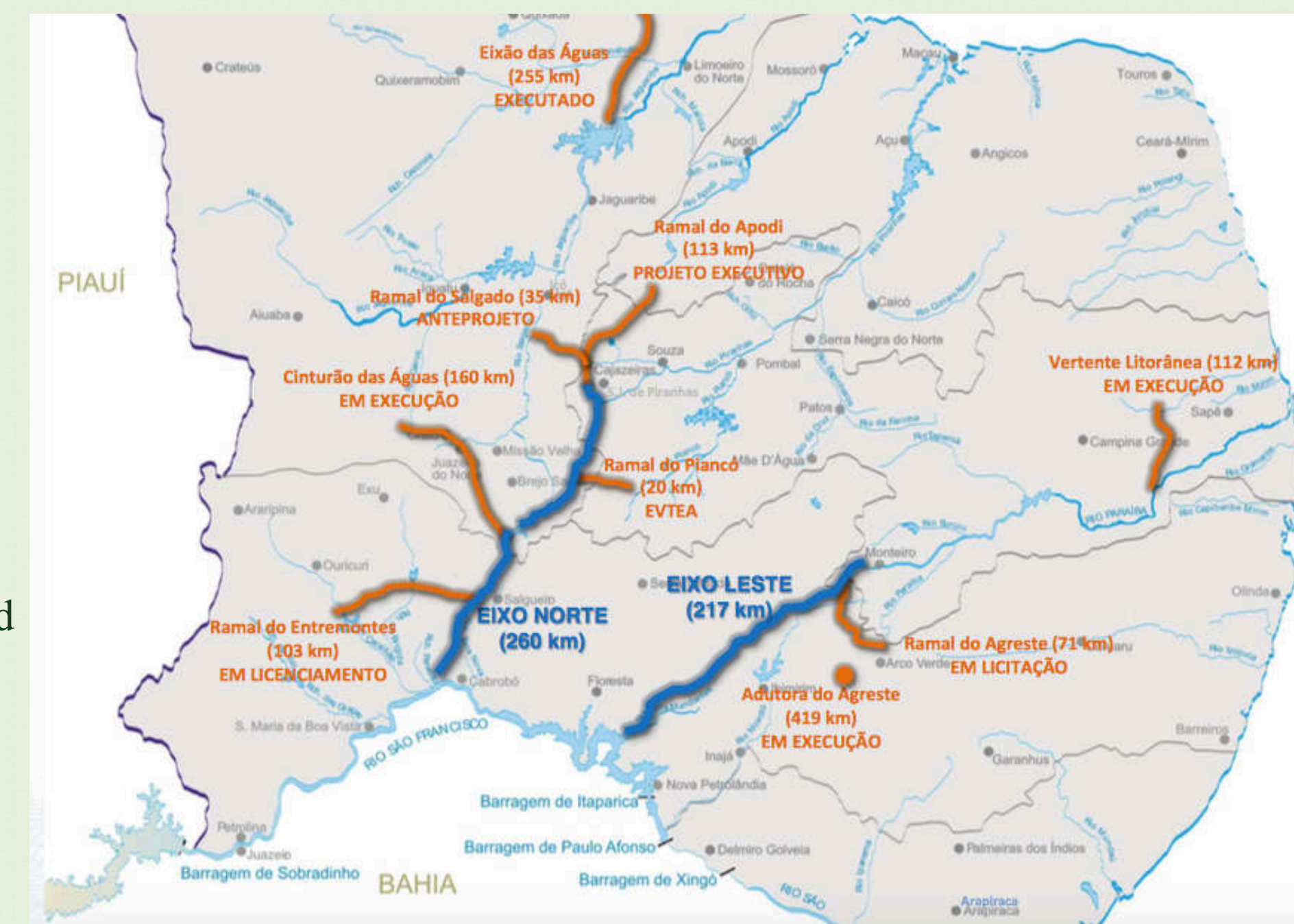
(expected to be completed in 2018)

East Axis: 220 km

(running since March 2017)

12 million inhabitants of the semi-arid to be supplied

390 municipalities



Challenges in the water management and governance and the Sao Francisco case

According to the Brazilian regulation, the river basin is considered as a regional unit of water use planning and management. Therefore, consultative and deliberative bodies called River Basin Committees (CBHs) were established across the country. The Sao Francisco River Basin Committee (CBHSF) was created in 2001 with members of the government, civil society and water users. They were against the water transfer project alleging different reasons such as misconception, lack of solid studies, haste planning and lack of discussion with those affected by the project (CBHSF, 2016). The management system of the São Francisco integration project was established by presidential decree. The National Water Agency, Management Council, the federal water operator São Francisco and Parnaíba Valley Development Company (Codevasf) and local operators are part of the system, which is coordinated by the Ministry of National Integration (BRASIL, 2006). Transposition projects impose an extra challenge on the management of the scarce natural resource. Castro (2007) describes there is a growing recognition that the water crisis goes beyond the natural causes, but may be associated with political, social and governance crisis. Rogers and Hall (2003) define water governance as a range of political, social, economic and administrative systems geared to developing and managing water resources, water supply services, at different levels of society. In practice, water governance is made through interaction among governments, the private sector, political parties, social and sectoral organizations, international agencies, nongovernmental organizations and other relevant actors (CASTRO, 2007).

Discussion

Many issues remain open after the start of the operation in the Eastern Axis. It is not yet clear how the Management Council will monitor the water grants, the distribution and the information system related to this distribution of water. International experiences indicate that the governance approach in these cases is complex. The analysis made by Xu, Ma and LV (2016) after an urgent water transfer operation for the regions affected by extreme drought in China highlights the conflicts and difficulties in managing the transposition of water from the donor regions to the recipient regions. The authors recommend the creation of a global decision-making body that would be crucial for the improvement of strategies for formulating and implementing emergency actions in the event of extreme drought, as it would take into account all the interests involved. In the case of the São Francisco project, it is evident that the governance system that ensures the distribution of water in an equitable and efficient way and with environmental sustainability, needs to be better planned and discussed. Scientific predictions of declining availability of water as a result of climate change increase the urgency of the debate.

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