

Modernization Process of the Water Sector: The Case of Brazil

Part I

Jerson Kelman

Former President of the Brazilian Water Agency (ANA)

WATER WEEK LATINOAMÉRICA, CHILE, 2013

Brazilian water resources at glance

- Area: 8.5 million km²
- Population: 190 million
- 36,000 m³/(capita.year) → huge but 53% of Chilean

Mean values don't mean much

ANA (2001-...)

The Brazilian main water problems

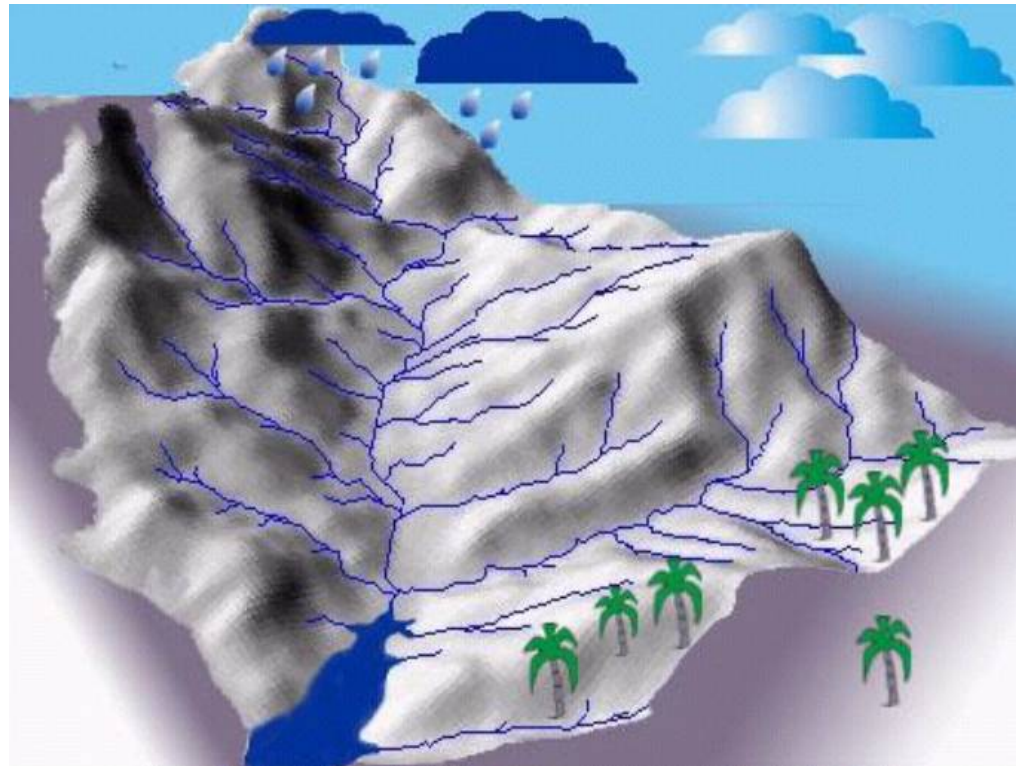
- Droughts in the Northeast
- Urban pollution
- Multiple use of the Amazonian rivers
(hydropower and navigation)

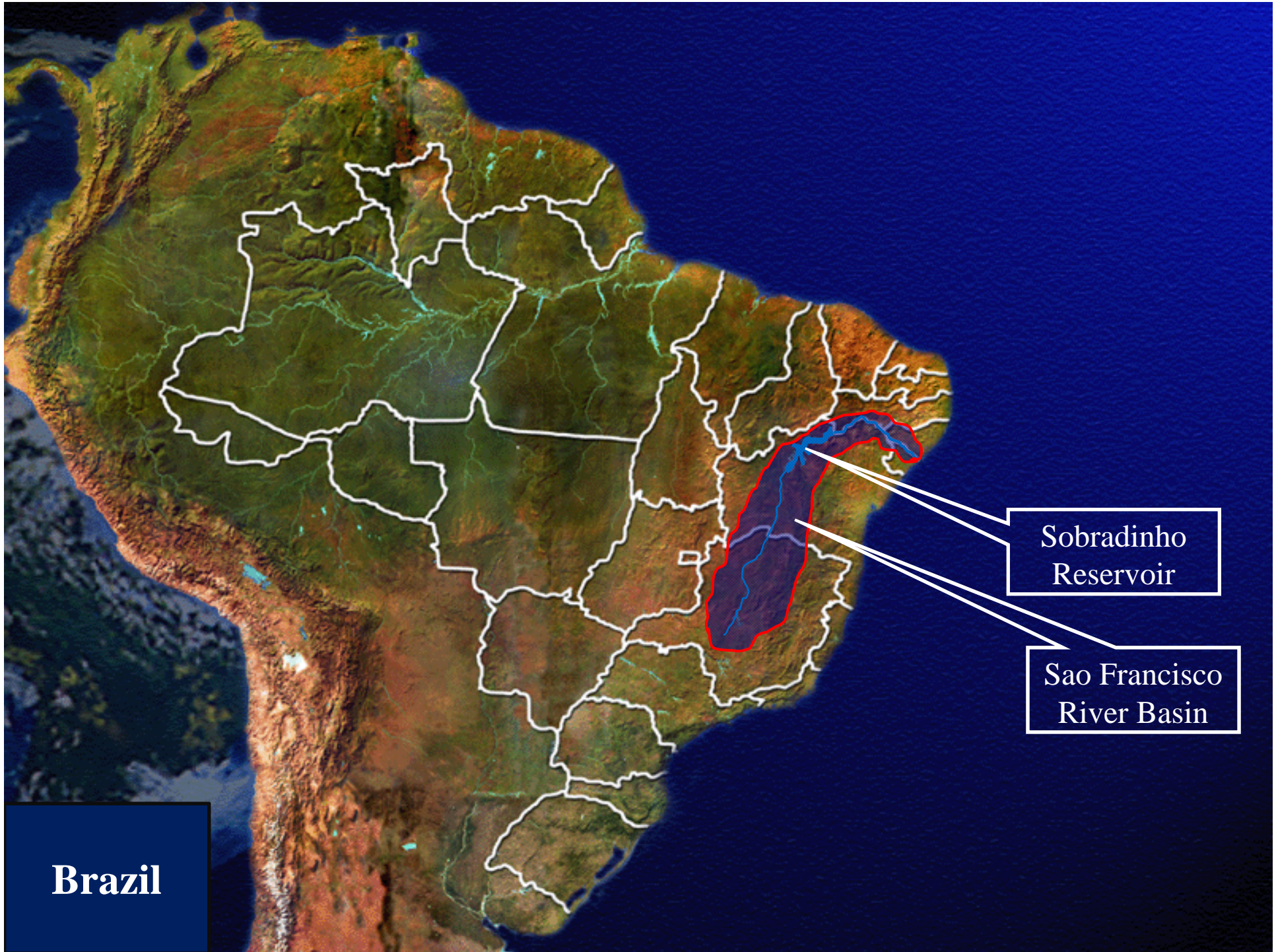
ANA's approach: IWRM

Planning and managing water resources at the scale of the river basin

Major decisions taken by river basin committees

Stakeholders participation





Sobradinho
Reservoir

Sao Francisco
River Basin

Brazil

Multiple uses of water

Urban supply



Hidroelectricity



Navigation



Industrial supply



Flood control



Irrigation



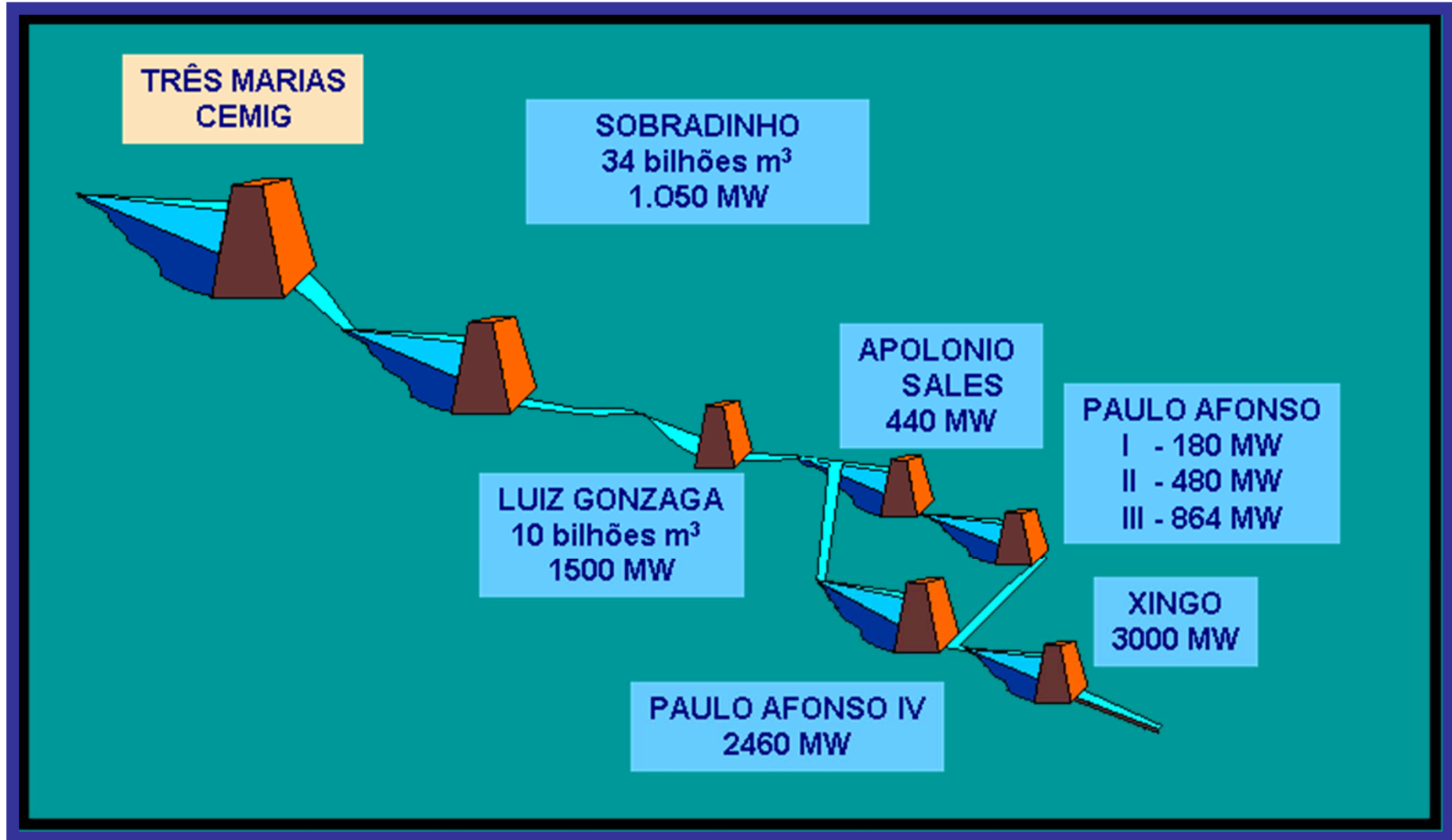
Tourism



Fishing

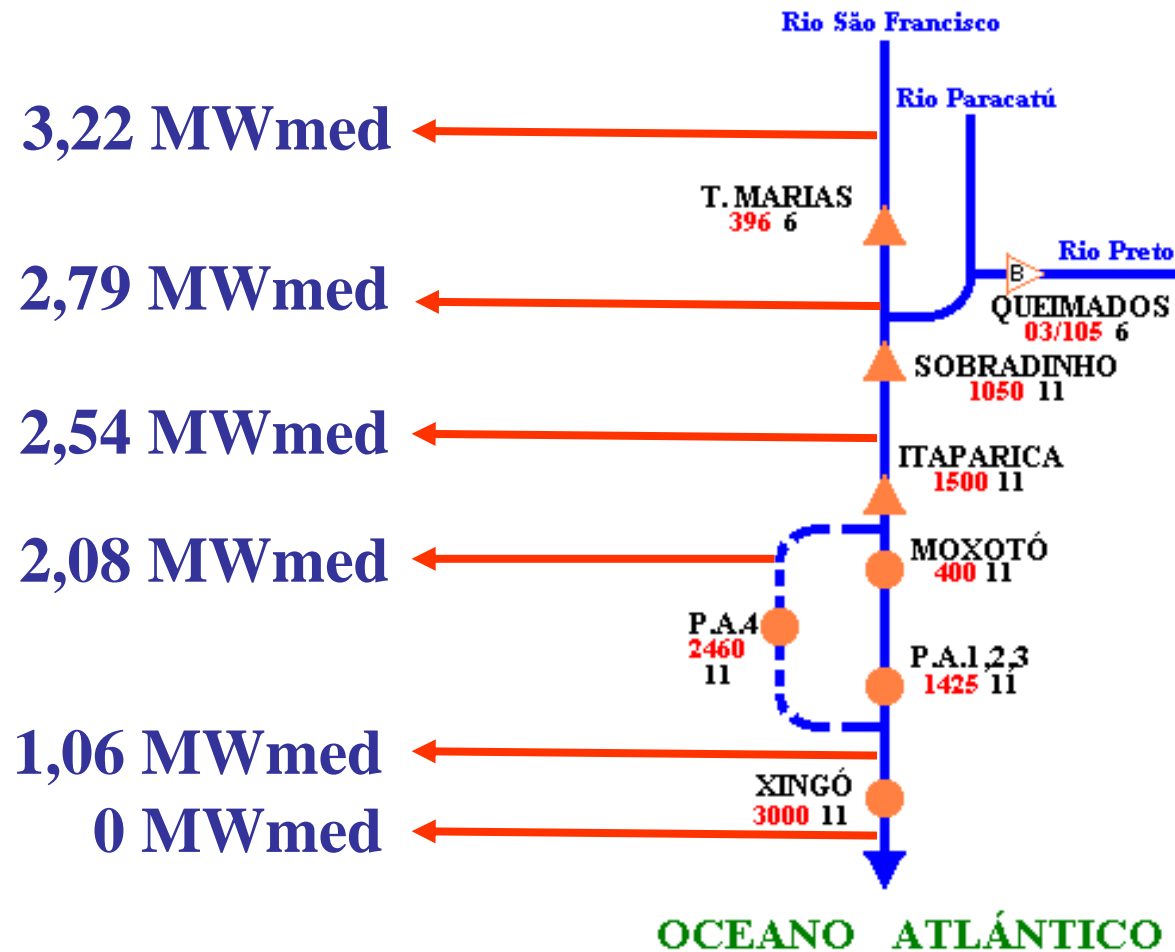


Hydropower



Potencial energético: 10.356 MW

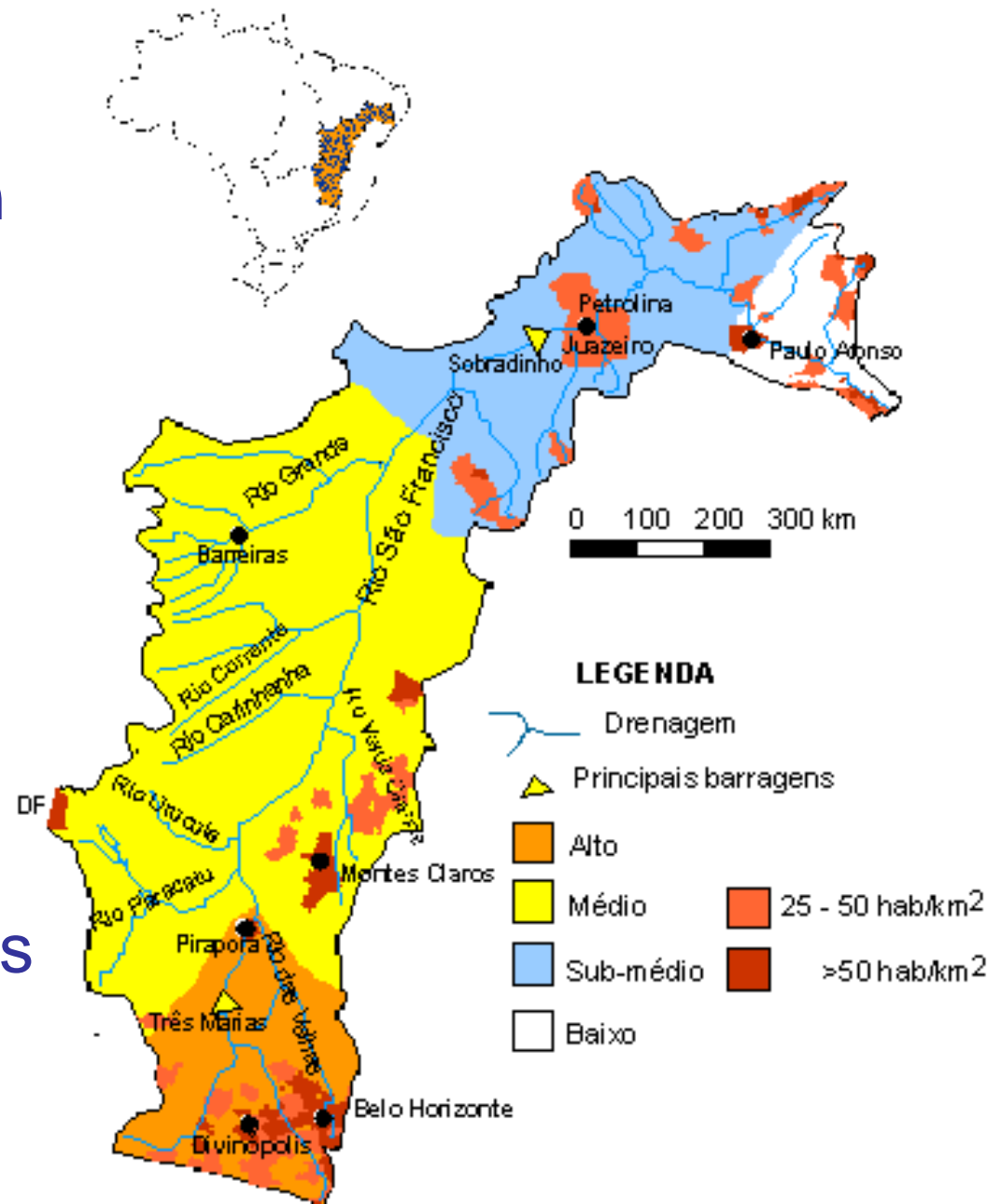
Conflito: Geração de Energia x Irrigação

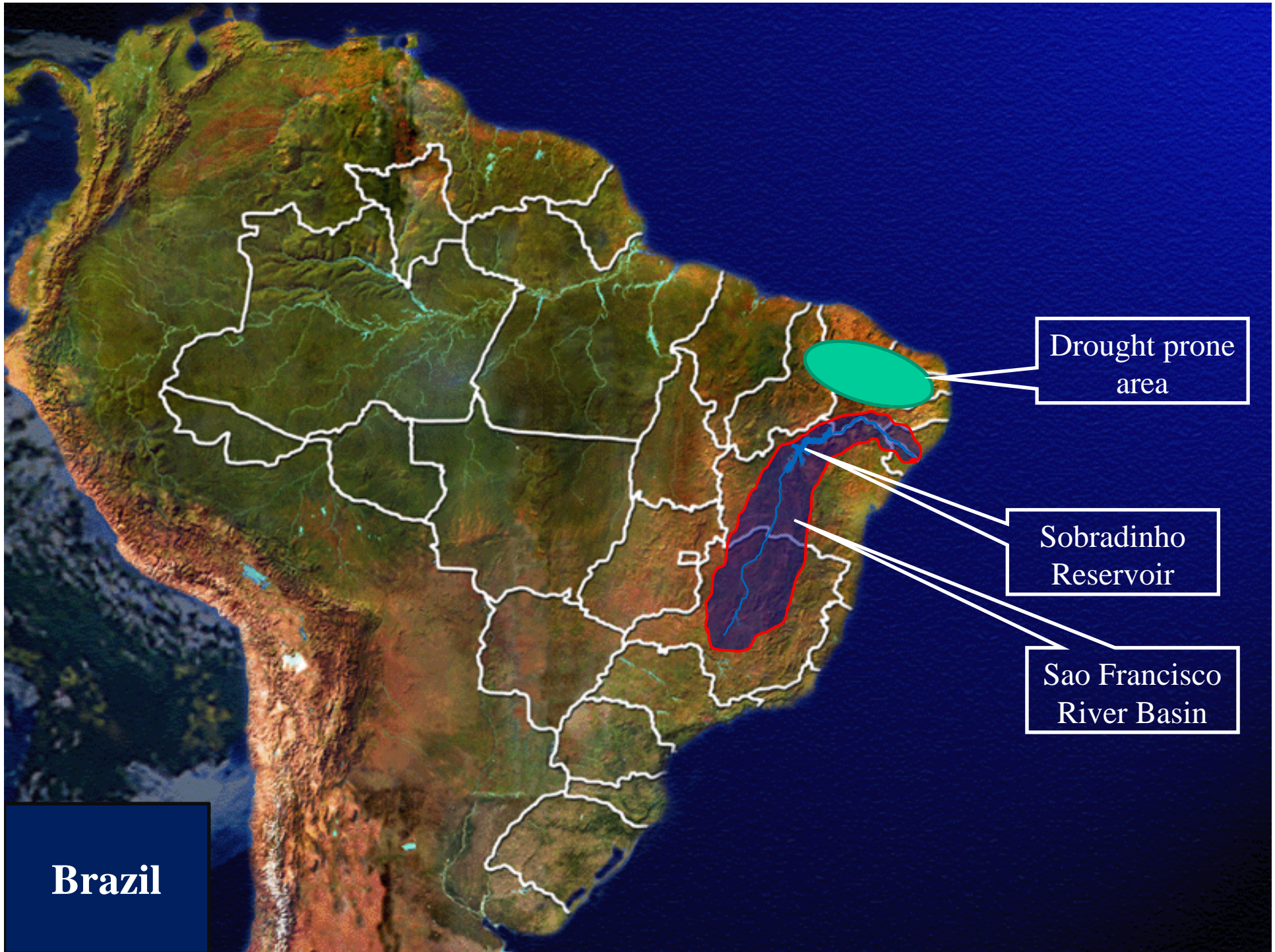


Perda de energia garantida em função da retirada de 1 m³/s para uso consuntivo

The San Francisco river basin plan was approved by the basin committee

- investment plan (sewage collection and treatment, storage, reforestation...)
- criteria for allocating non tradable water rights
- criteria for pricing water rights





Drought prone area

Sobradinho Reservoir

Sao Francisco River Basin

Brazil



During the 1887-89 drought, about one million people emigrated from the drought prone area

Countless died

Brazilian Semi-Arid

Intermittent rivers
Many small reservoirs that dry out during droughts

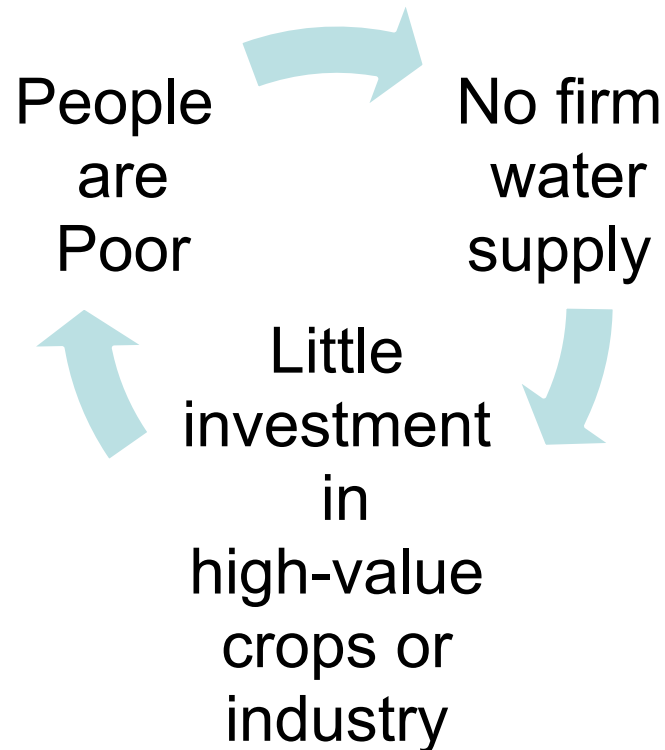
10 million people without reliable water supply



3 km average distance
to water sources



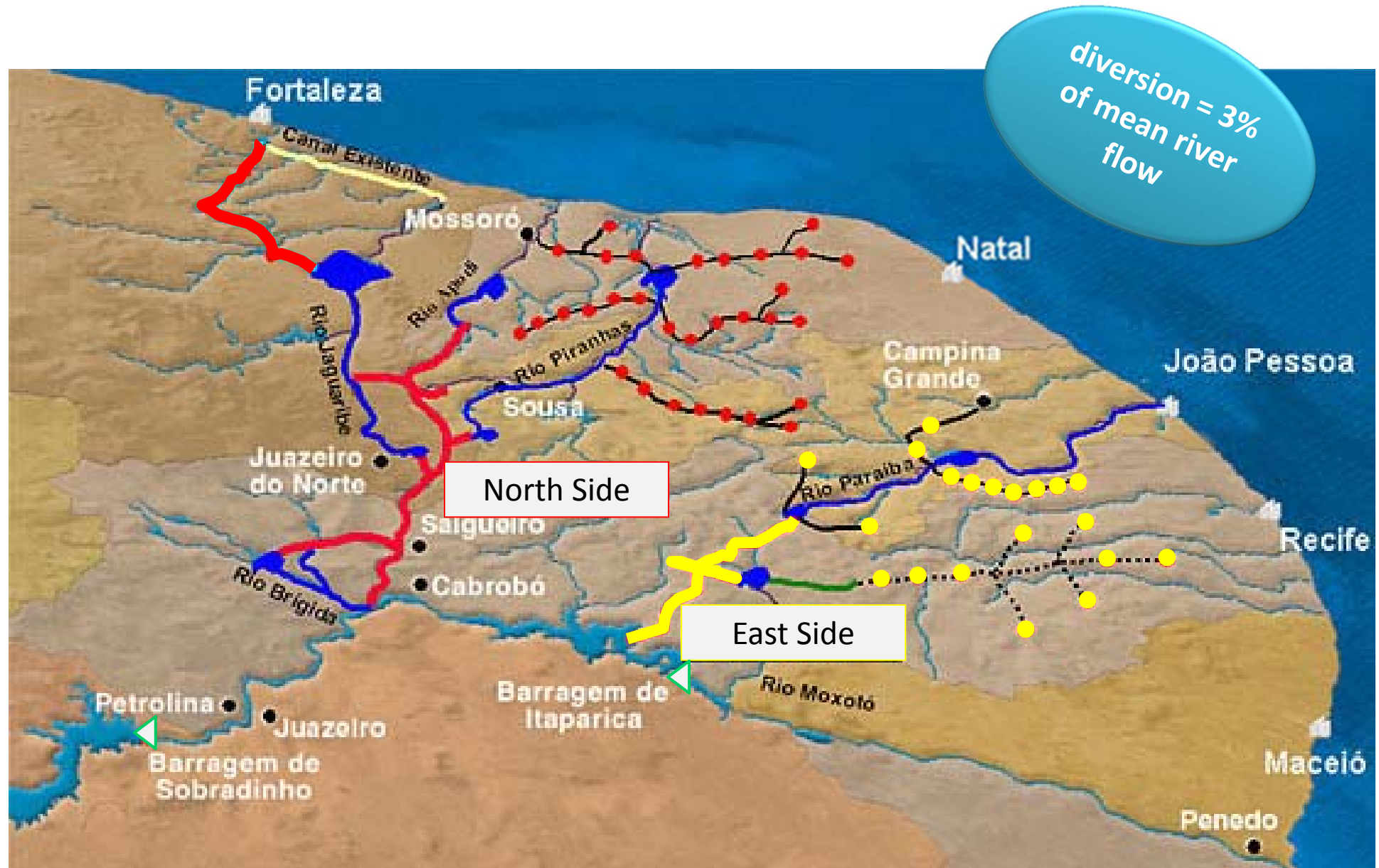
HYDROLOGICAL VICIOUS CYCLE

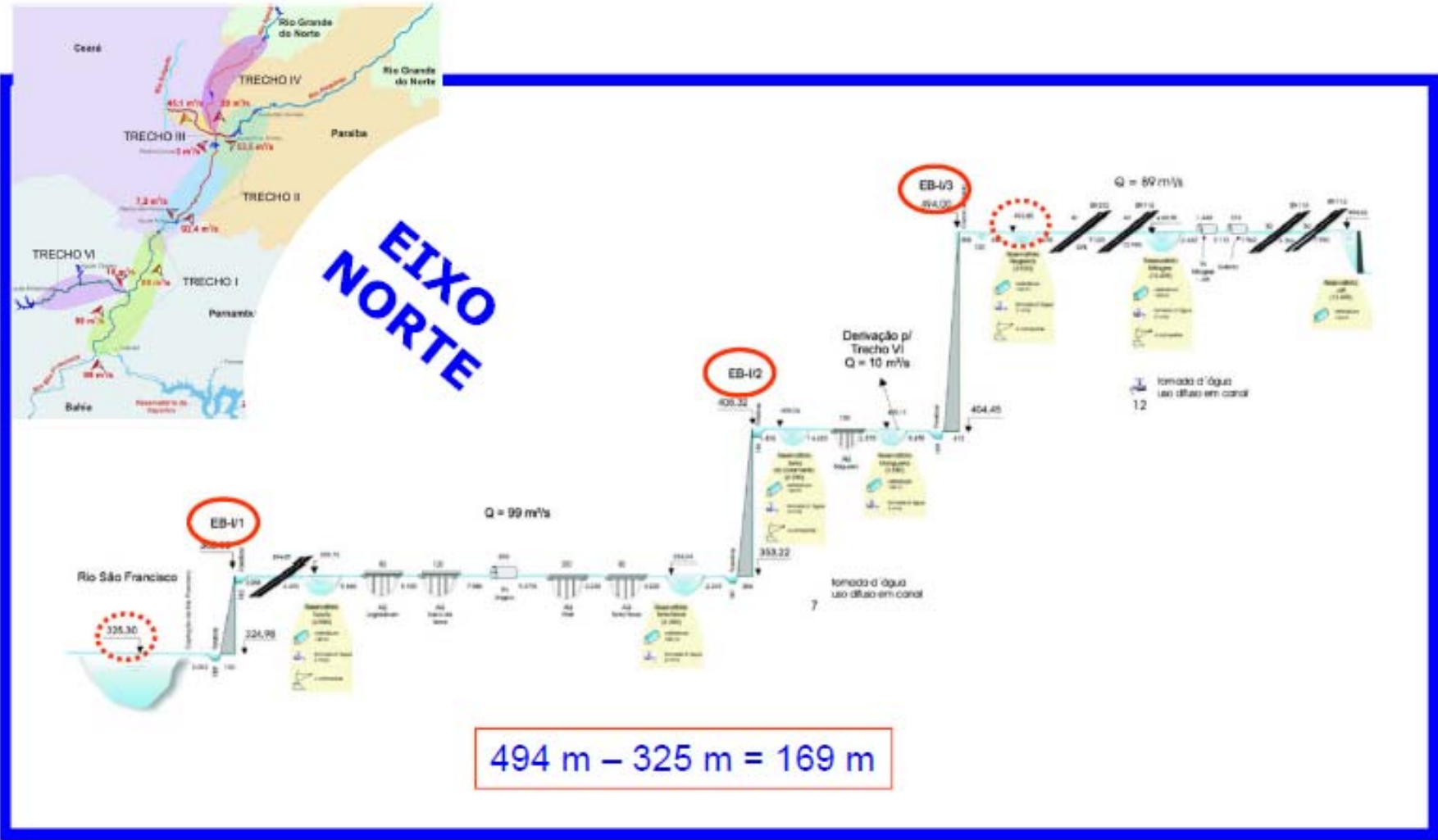


It is necessary an initial stock of investments on water infrastructure before reaching the “inflexion point... and then real progress starts

(David Grey and Claudia Sadoff, “Sink or Swim? Water security for growth and development”)

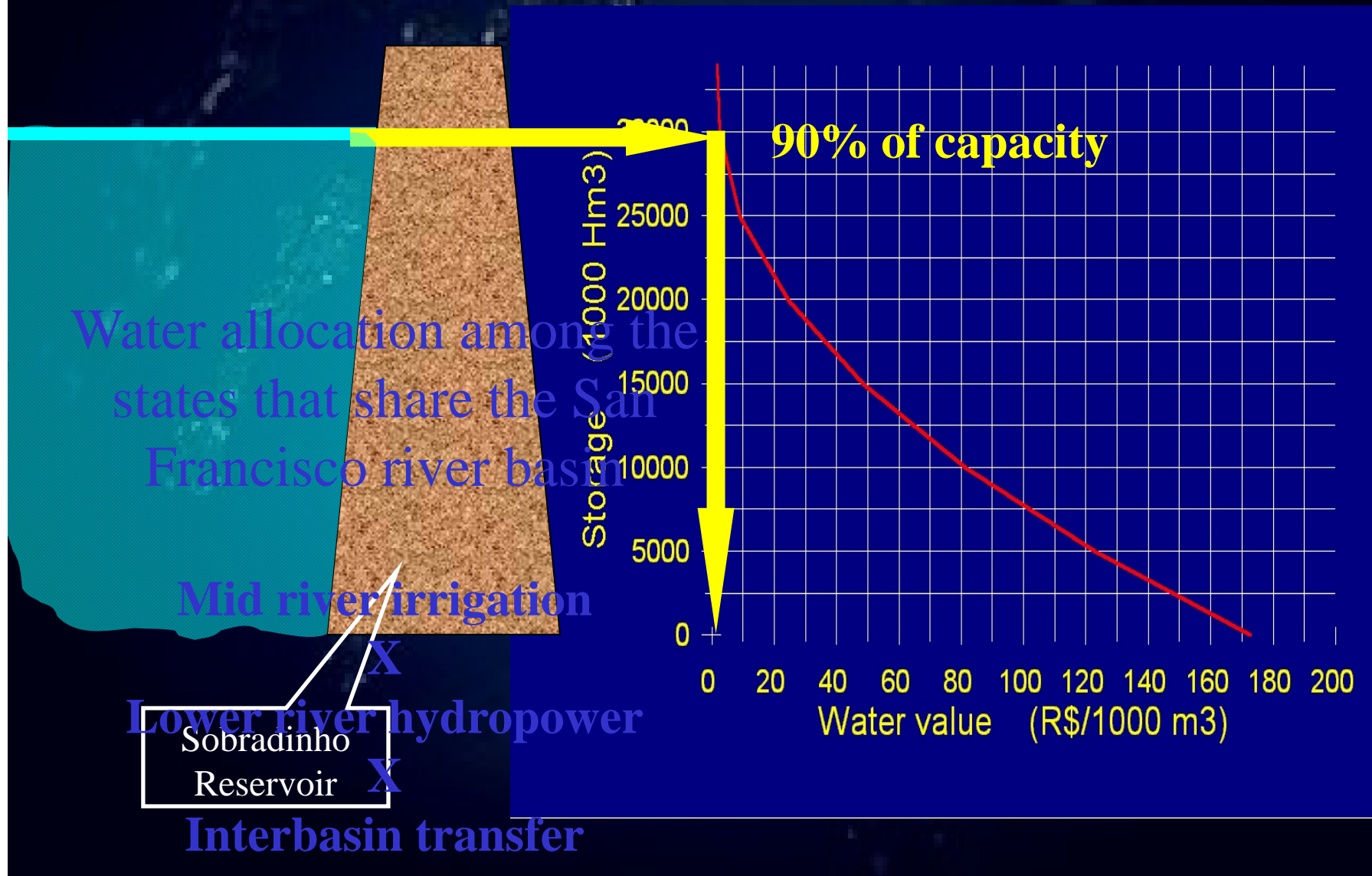
San Francisco River Water Diversion

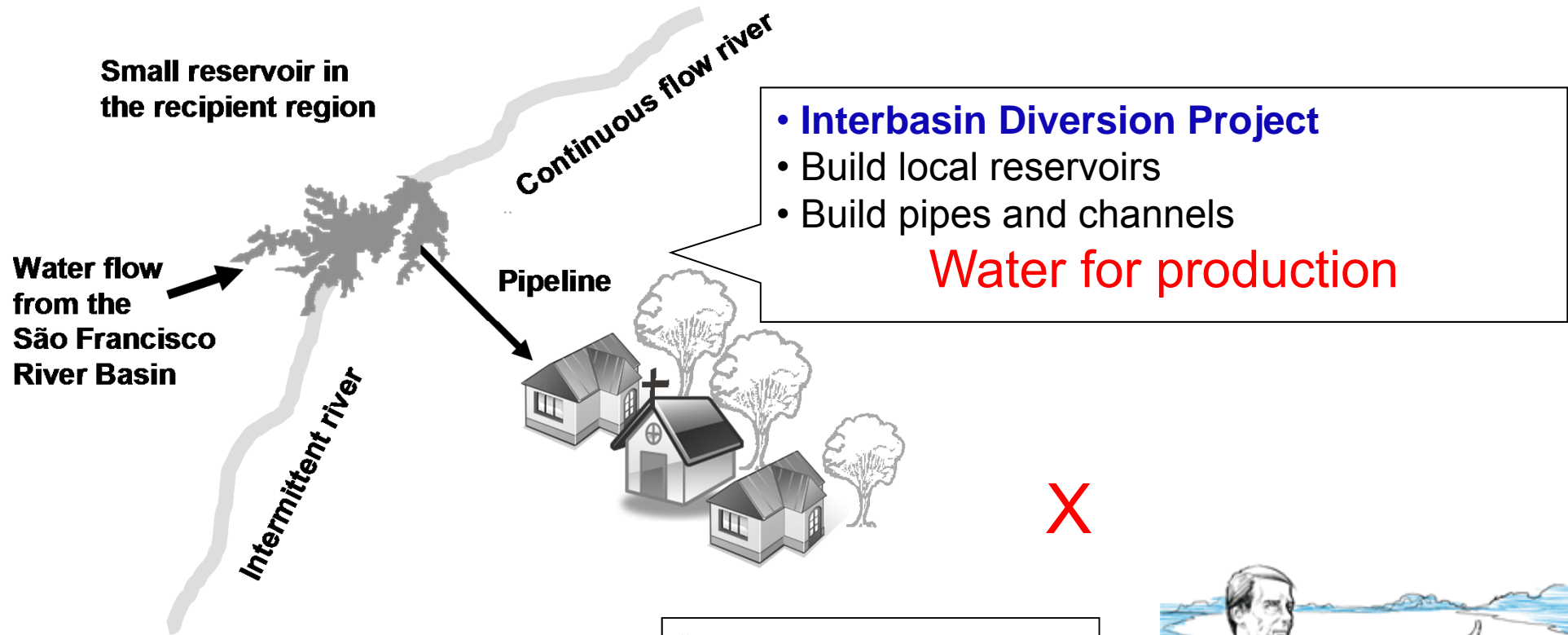




$$494 \text{ m} - 325 \text{ m} = 169 \text{ m}$$

Opportunity cost of water in the Sobradinho Reservoir



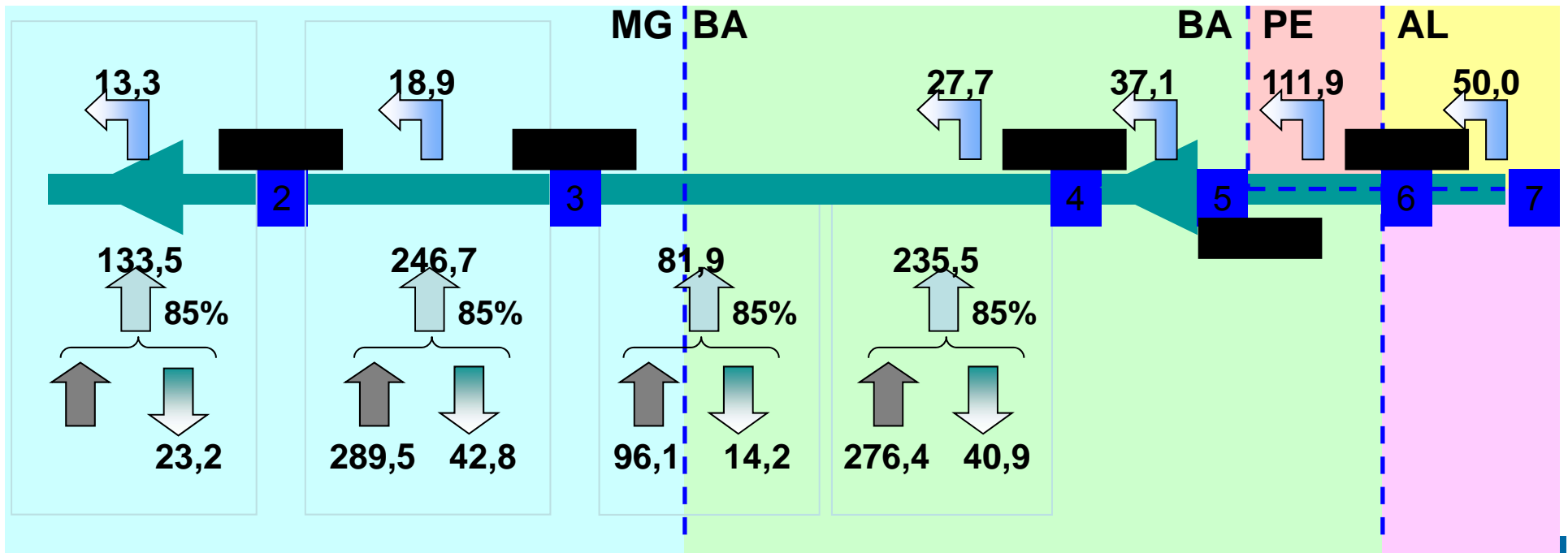


“I will sustain a hunger strike until Government cancels the Project”
(Bishop Dom Cappio)



- **No Interbasin Diversion Project**
- Build individual water tanks
- Store rain falling on the roofs

Water for survival



Water allocation among the states that share the San Francisco river basin

Mid river irrigation

X

Lower river hydropower

X

Interbasin transfer



Q_{mean} São Francisco River = 2600 m³ /s

$26 \text{ m}^3 / \text{s} \leq Q_{\text{diversion}} \leq 127 \text{ m}^3 / \text{s}$

$1\% \text{ of } Q_{\text{mean}} \leq Q_{\text{diversion}} \leq 5\% \text{ of } Q_{\text{mean}}$

600 Km of channels



Modernization Process of the Water Sector: The Case of Brazil Part II:

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Background

- 1934 - Water and electricity code
 - water resources management was a sub-sector of energy (90% of electricity is hydro)
- 1987 - Brazilian Water Resources Association (ABRH) message
 - five years before Dublin...the same principles
- 1988 - Constitution
 - citizens have many rights and almost no obligations
- 1997 - Water Law
 - deals with bulk water, not with water supply and sanitation
 - consensus on the “participatory” Dublin concept, but not so strong on “water as an economic good”
- 2001 - ANA (Water Agency)
 - implementation of IWRM – water rights

ANA

The agency is served by a team of stable and capable professionals \Rightarrow continuity

Directors have a 4 years mandate

Non tradable water rights system have been implemented in selected river basins

Difficult water allocation disputes among regions have been settled

Production and dissemination of hydrological information

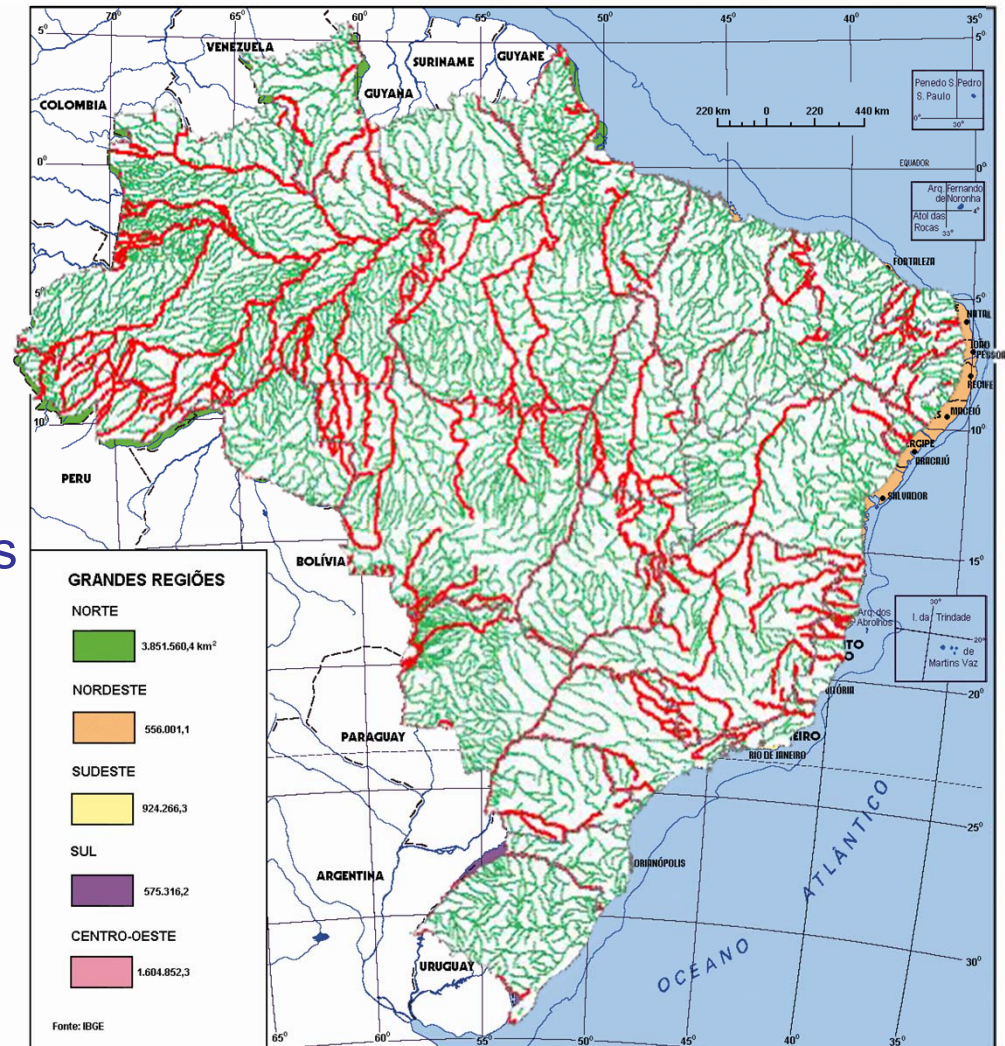
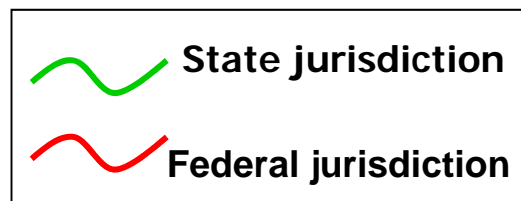
Integrated water resources information system countrywide

A challenge for federated countries

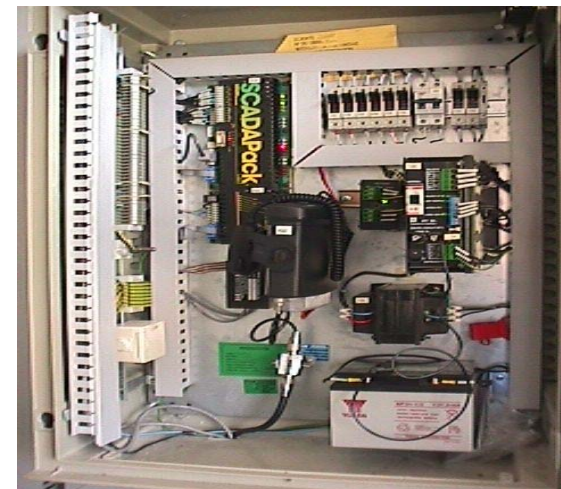
Brazil, a Federative Republic
One Federal Government
27 State Governments

12 % of freshwater available in the world

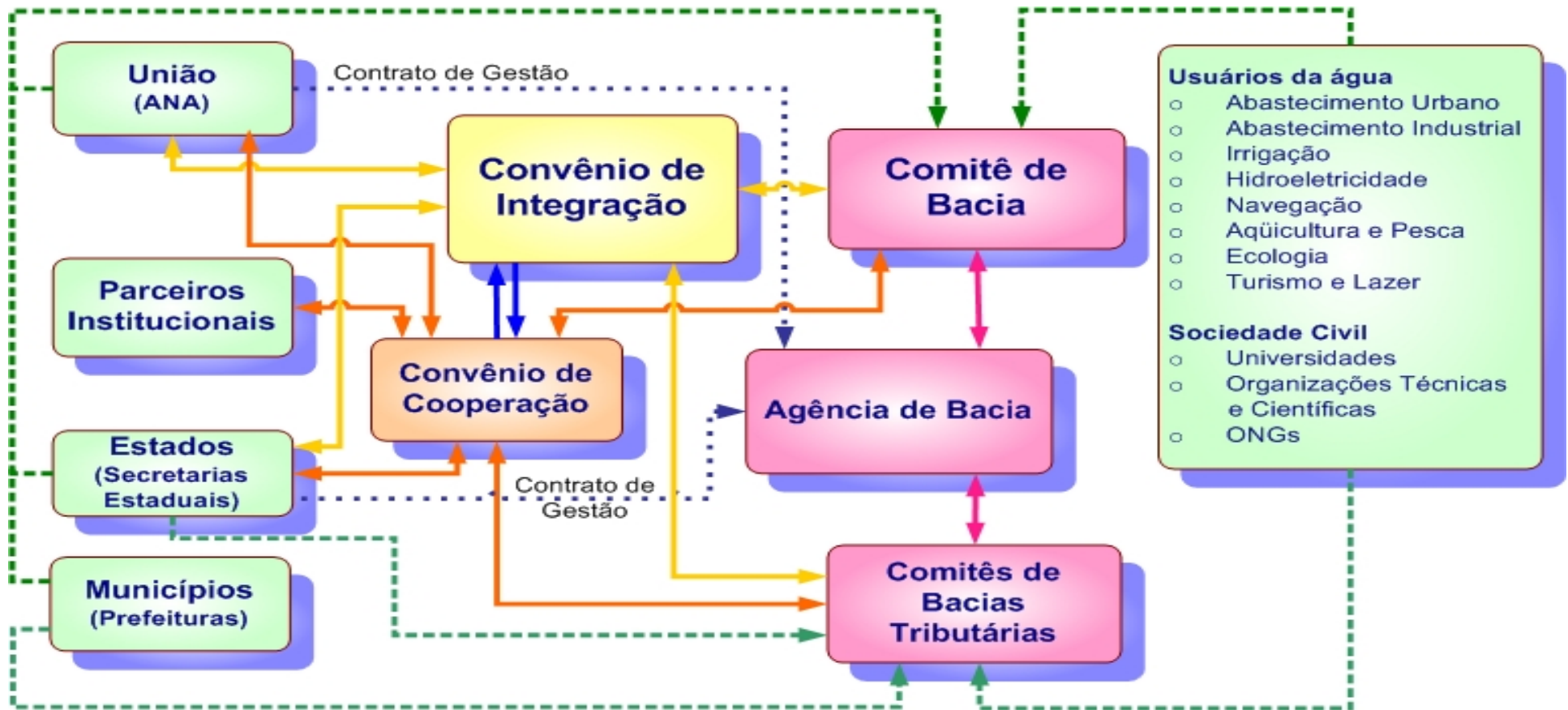
Water use and infrastructure permits are issued by the State Governments or by the Federal Government



One can only manage what is measured



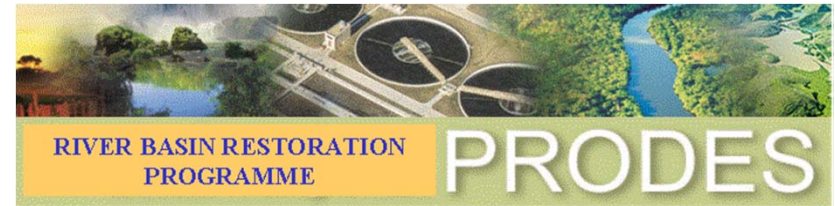
Institutional complexity



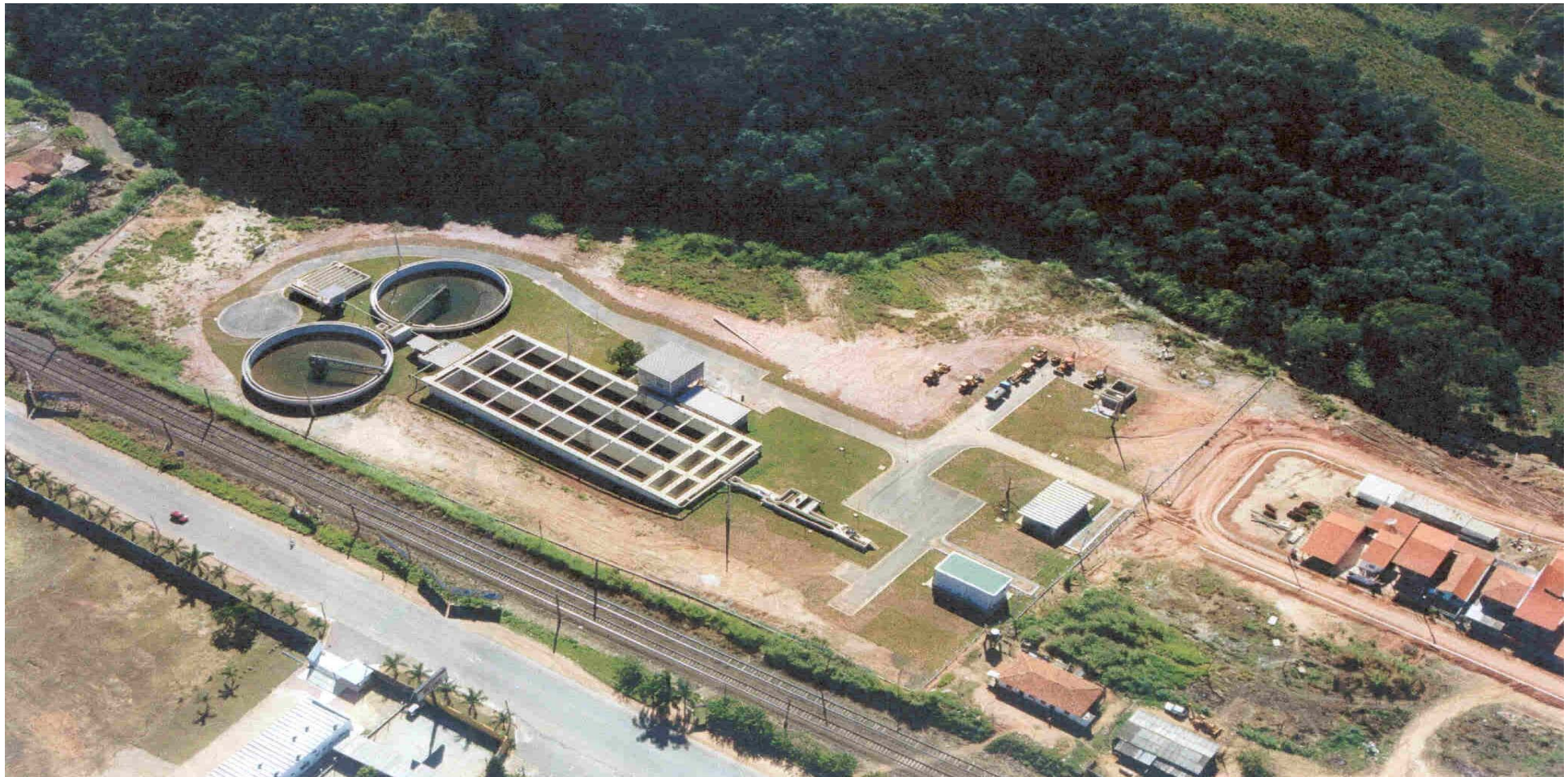
ANA (2001-...)

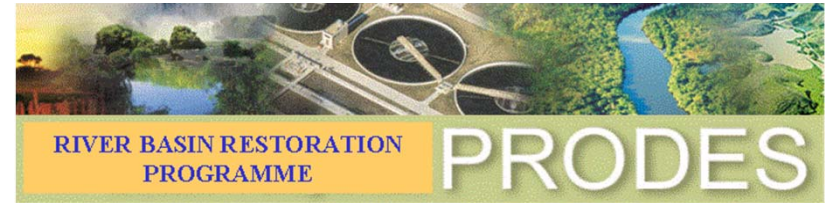
The Brazilian main water problems

- Droughts in the Northeast
- **Urban pollution**
- Multiple use of the Amazonian rivers
(hydropower and navigation)



We buy treated sewage...
(an Output Based Aid approach)

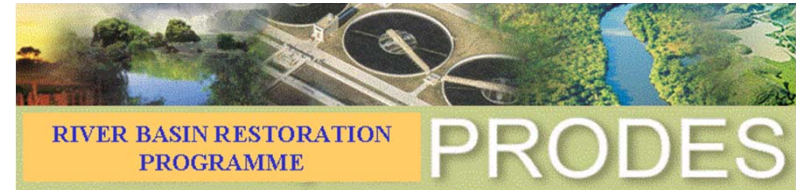




Basic Assumptions and Objectives:

Government does not pay for civil works or equipment. It pays for results.

Government does not pay service provider before the plant is in full operation.



Terms of the contract between Government and service provider

Government subsidy is 50% of the total ***estimated*** capital cost of the plant, according to a Reference Value Table

Payments are made quarterly on fixed amounts for a period varying from 5 to 7 years, provided sewage is treated according to quality standard set in contract

Government makes a bank deposit in favor of the service provider equivalent to present value of the cash flow

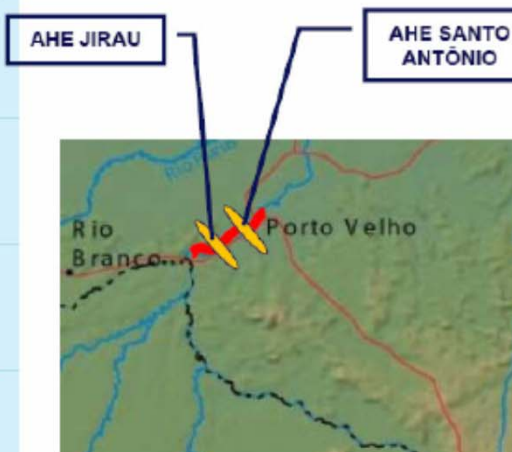
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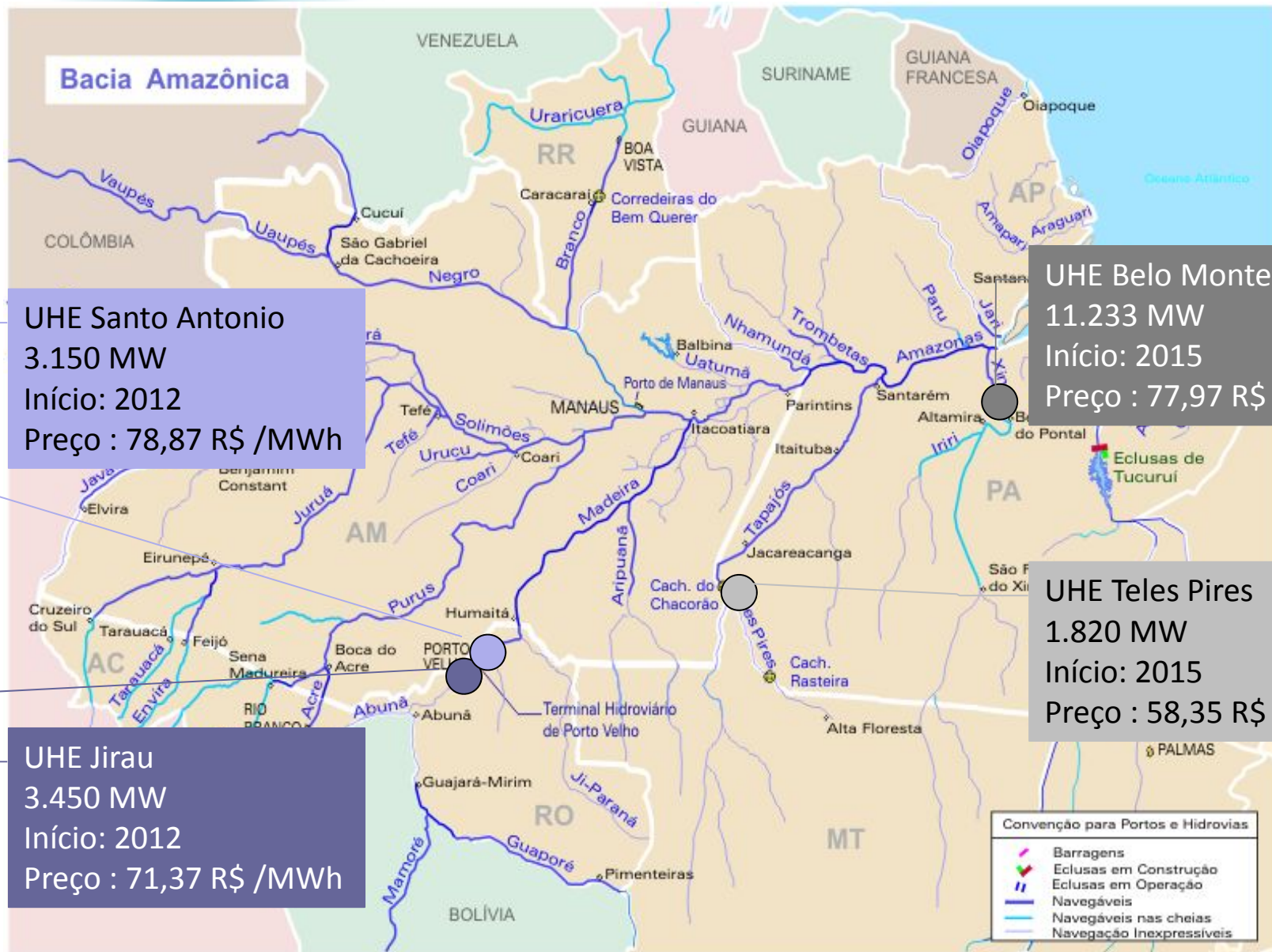
Does it make sense to build new hydro plants in the Amazon?

THE MADEIRA RIVER PROJECT



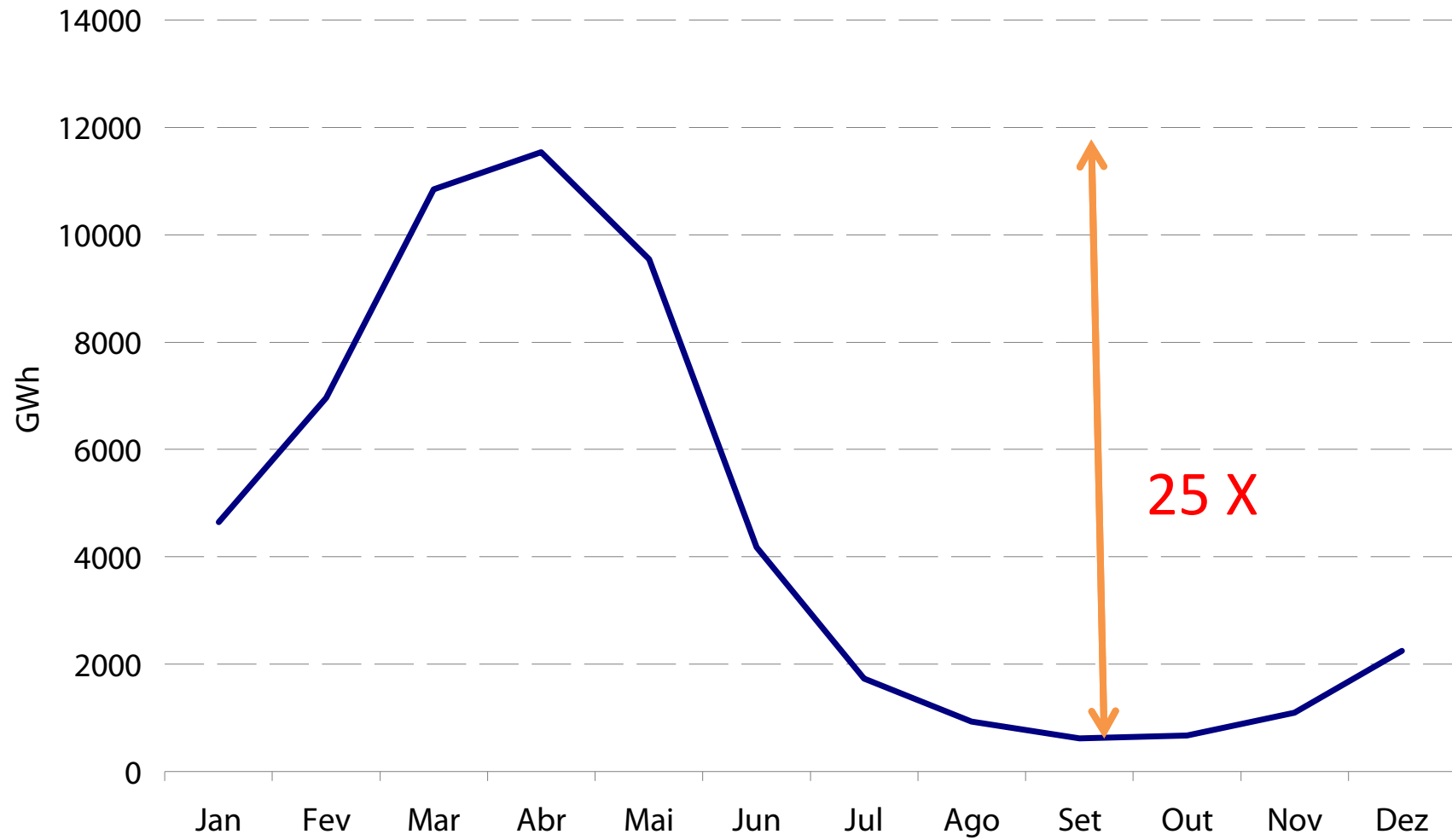
What would be the alternatives?

Hydroelectric power plants under construction in Amazon



Mapa elaborado no Banco de Informações e Mapas dos Transportes da Secretaria Executiva do Ministério dos Transportes

Streamflow variability of the future Belo Monte power plant

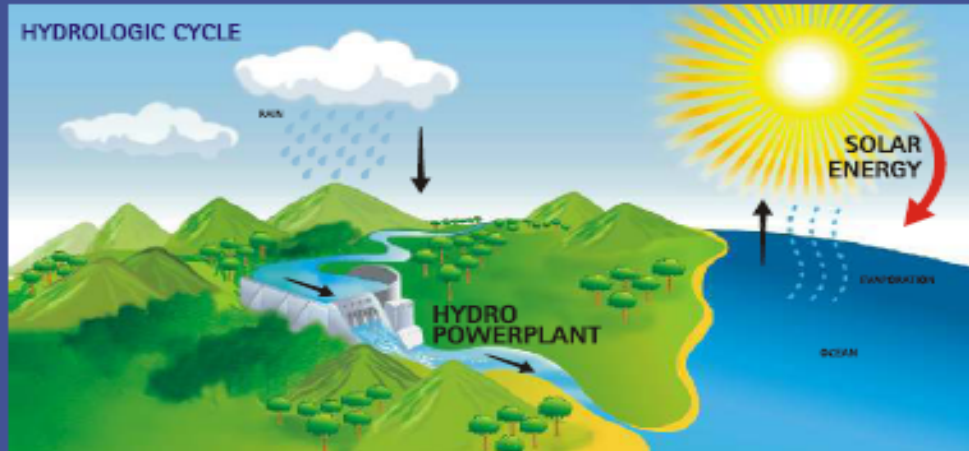


Relationship between storage and monthly consumption



Fonte: EPE.

WE HAVE BEEN PRODUCING ELECTRICITY FROM SOLAR ENERGY FOR MORE THAN A CENTURY



Light is a power company serving over 4 million consumers in Rio de Janeiro, with an installed capacity of 850 MW and annual gross revenues of US\$ 4.9 billion. We are committed to using renewable sources of energy, such as hydropower. We are a Brazilian company that was founded by Canadian entrepreneurs more than a century ago and are proud of the fact we are respected and admired equally by consumers and shareholders alike.

Light Esco and Light Com are two of the companies that belong to the group and provide customized solutions to meet the energy needs of our clients, including energy efficiency projects and consultant services. Both companies trade electricity from conventional and renewable sources, such as hydropower, windpower and biopower plants.



IWRM

Planning and managing water resources at the scale of the river basin

Major decisions taken by river basin committees, with stakeholders participation

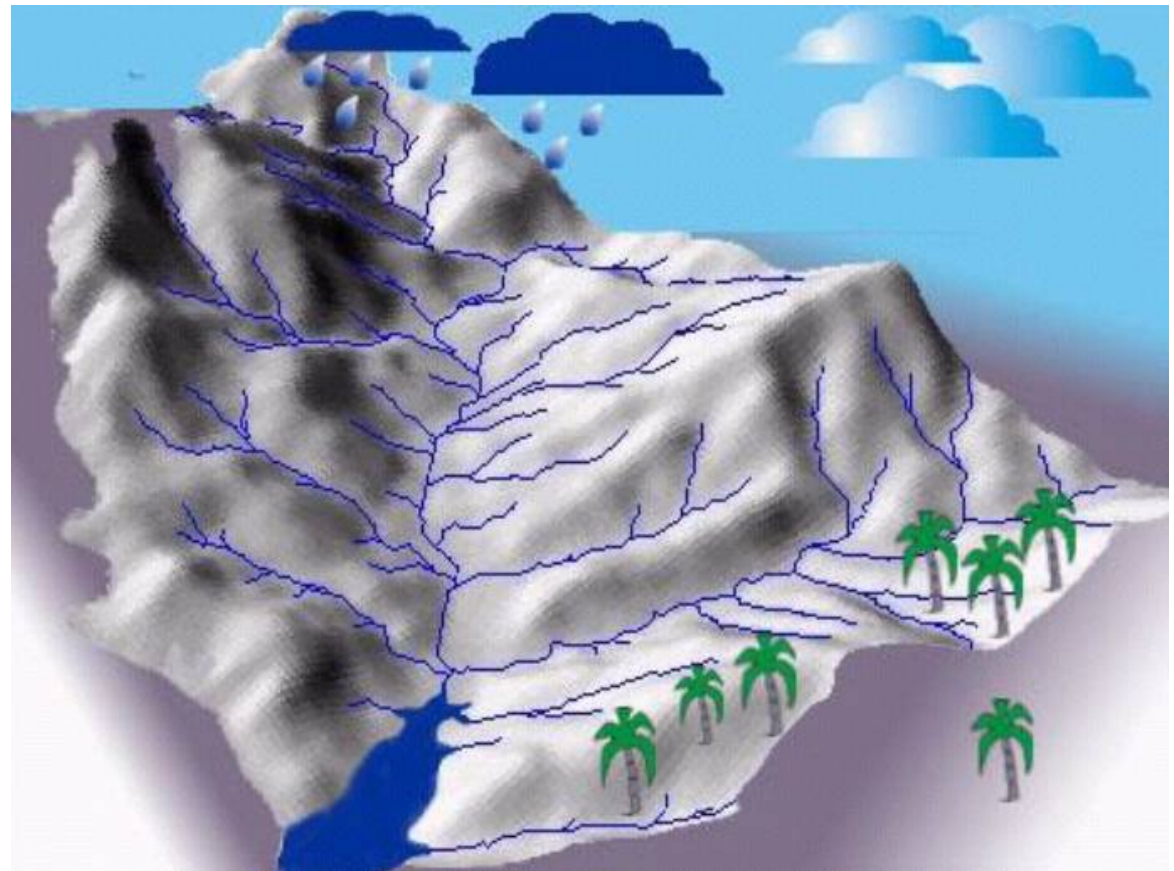
However...

IWRM is not an end in itself. Rather, it is a mean to solve real water problems

Transaction costs may be relevant

Who are the stakeholders?

Water rights are not tradable



“Water reform requires a complex mixture of impatience and patience.

Impatience is required to make paradigm shifts, but... progress is measured in decades, not years”

MAKING REFORM HAPPEN IN WATER POLICY:

Reflections from a practitioner*

John Briscoe

OECD Conference Centre, Paris, 2011

Thank you!

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