Columbia Water Center

EARTH INSTITUTE | COLUMBIA UNIVERSITY



NTRODUCTION AND AIM OF STUDY Droughts are projected to intensify in semi-arid regions (Jiménez 2014), causing stress to the water supply. Optimal management of water resources and minimizing cost of vital to reduce strain on society and economy with limited water Precipitation and streamflow forecasts permit adaptation of wat are slowly becoming a part of the policy making process (Lemos The first objective of the research is to evaluate the resiliency an with providing water to municipalities with current infrastructure are met through trucks, and comparing it with future infrastruction source of water supply – Rio São Francisco – will cover some of The second objective of the study is to evaluate the value of clim by using streamflow scenarios using climate information, and co fixed release policy derived from historical data. PERNAMBUCO Second largest population in Northeast, seventh largest in Brazil al., 2014). Urban population at 81% in 2010 (IBGE, 2010). Population is expected to rise by 7.5% from 2016 to 2030 (IBGE, Both tropical, and semi-arid climate. Precipitation ranges from 400 mm/year to 2350 mm/year with n rainfall falling in the Eastern region (SRHE, 2016). CHALLENGES FOR PERNAMBUCO Droughts are expected to rise, and between 2071-2100, the pred estimated to reduce by 60% (Marengo, et. al., 2007). Total annual water demand from Capibaribe River Basin is expec 23% from 2010 to 2025 (SRHE, 2010). Total water demand from the Jucazinho system in Capibaribe Riv rise by 34% from 2010 to 2025 driven by urban demand (SRHE, **JUCAZINHO SYSTEM** One of the largest reservoirs in the state at 327 million m³ of max **Receives water from the Capibaribe River** At zero capacity as of January 26, 2017 30000000 250000000 200000000 15000000 10000000 5000000 1/4/10 7/4/10 7/4/10 0/4/10 0/4/11 1/4/11 1/4/11 1/4/12 1/4/12 1/4/13 1/4/14 1/4/15 1/4/15 1/4/15 1/4/15 1/4/15 1/4/15 1/4/16 1/4/16 1/4/16 1/4/16 1/4/16 1/4/16 1/4/16 1/4/16 1/4/16 1/4/16 —Maximum Storage Figure 1: Storage in Jucazinho reservoir from 2010 to 2017 Jucazinho system is a 5 reservoir system providing water to 19 m Three other reservoirs (Eng. Gercino Pontes, Machado, Poq Capibaribe River, and one reservoir, Prata, is in the Una rive **RIO GRANDE DO NORTE**

Figure 2: Location of Capibaribe and Una River Basin

SERGIPE

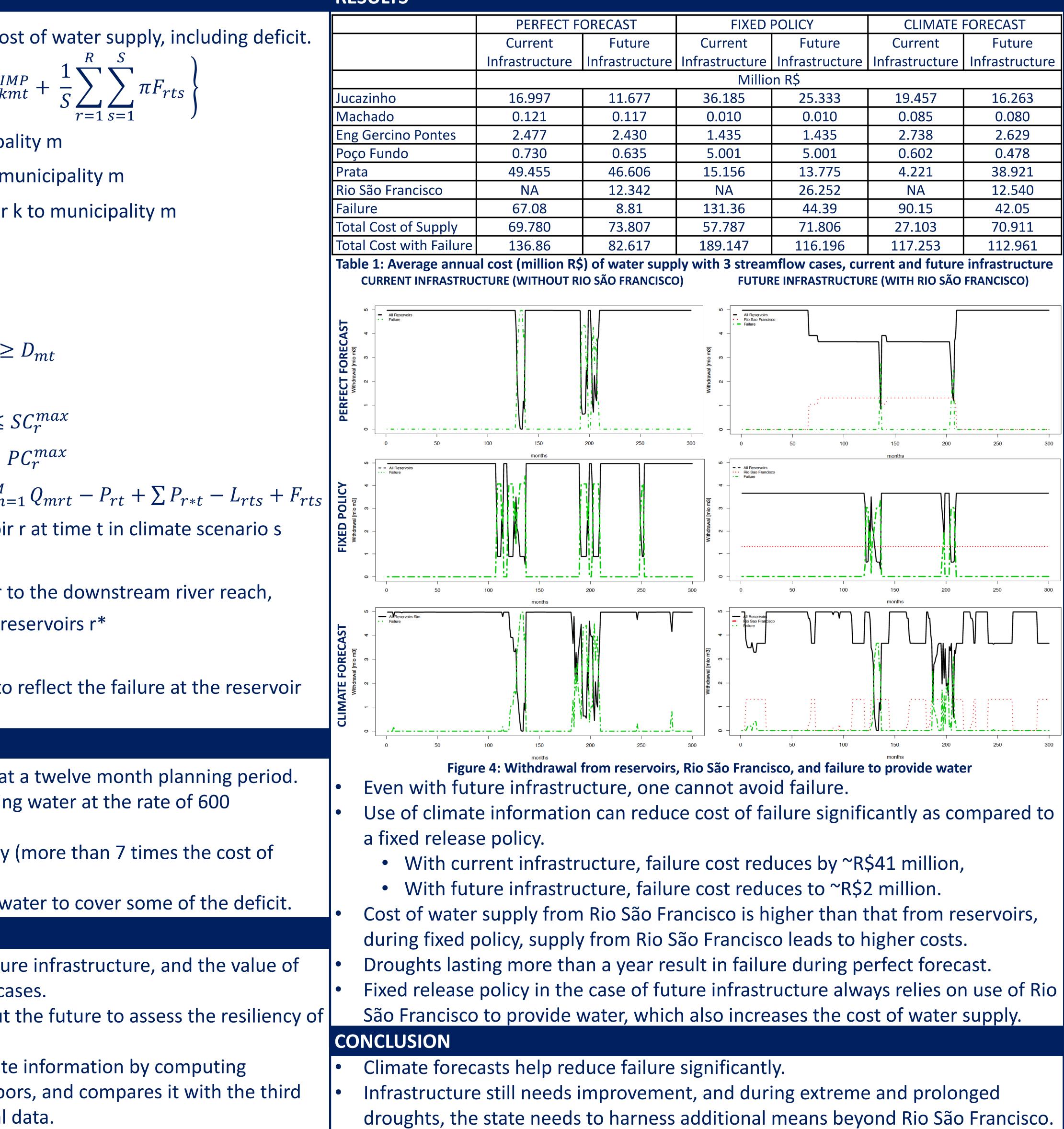
ALAGOAS

Figure 3: Location of Reservoir

Cost Optimization of Water Resources in Pernambuco, Brazil: Valuing Future Infrastructure and Climate Forecasts

Ipsita Kumar (1), Laureline Josset (1), Upmanu Lall (1), Erik Cavalcanti e Silva (2), José Marcelo Cordeiro Possas (2), and Marcelo Cauás Asfora (2) (1) Columbia Water Center, Columbia University, New York, United States (ik2350@columbia.edu), (2) Agência Pernambucana de Águas e Clima (APAC), Recife, Brazil RESULTS

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Iédia Annual Mapa de Situação. Laboratório de Meteorologia de Pernambuco – LAMEPE. Secretaria de Recursos Hidricos, Governo de Pernambuco. g/copyleft/fdl.html), CC-BY-SA-3.0 (http://creativecommons.org/licenses/by-sa/3.0/) or CC BY 2.5 (http://creativecommons.org/licenses/by/2.5)], via Wikimedia Commons.

ORECAST	FIXED POLICY		CLIMATE FORECAST			
Future	Current	Future	Current	Future		
Infrastructure	Infrastructure	Infrastructure	Infrastructure	Infrastructure		
Million R\$						
11.677	36.185	25.333	19.457	16.263		
0.117	0.010	0.010	0.085	0.080		
2.430	1.435	1.435	2.738	2.629		
0.635	5.001	5.001	0.602	0.478		
46.606	15.156	13.775	4.221	38.921		
12.342	NA	26.252	NA	12.540		
8.81	131.36	44.39	90.15	42.05		
73.807	57.787	71.806	27.103	70.911		
82.617	189.147	116.196	117.253	112.961		