Water Management across Scales in the São Francisco River Basin:

Policy Options and Poverty Consequences

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Embrapa

Poverty and Water Management in the São Francisco River Basin: Preliminary Assessments and Issues to Consider

Of the approximately 17 million who inhabited the SFRB in 2003, about 3.7 million (approximately 21%) were poor by Brazilian standards (living on about one minimum salary or less). Just over four million people lived in rural areas of the SFRB and nearly one-third of them (about 1.2 million) were poor.

But the rural poor were not distributed evenly across the SFRB (see Figure 1). The proportion of the rural poor tended to be lower in the southern portion of the SFRB, primarily in the state of Minas Gerais, the mountainous zone where the São Francisco River begins. Rural poverty, by this measure, tended to be higher in the central and northern zones, with some municípios registering proportional rates of poverty well in excess of 50% of the rural population.

The depth of poverty matters greatly; Figure 2 depicts the spatial distribution within the SFRB of the extreme poverty, i.e., individuals belonging to households living on less than one-third of the Brazilian monthly minimum salary per person. These extremely poor households are located almost exclusively in the central and northern zones of the SFRB.

While poverty is central to our research, training, and outreach mandates, it is also interesting to focus attention on municípios that are less poor, in part because we may learn something from these less-poor municípios that may be useful to their more-poor counterparts. Reviewing Figures 1 and 2, it is easy to identify less-poor municípios in the central and northern zones of the SFRB where rural poverty was especially concentrated. One has to wonder what factors might cause neighboring municípios to have such different rural poverty rates; might water availability have something to do with this?

Water Availability in the SFRB

While water availability is difficult to define and even more challenging to measure, at any resolution, Figure 3 depicts estimated water availability for the SFRB, by município. Our measure of water availability considers annual precipitation, base evapotranspiration, catchment area upstream, and slope (how likely is rainfall or run-on likely to 'stay' on the receiving farm); municípios that appear in darker blue have more available water than those in green or yellow. No seasonal or other water storage, or artificial conveyance of water, is included in this measure of water availability; this measure of water availability may be most useful in areas where irrigated agriculture relies on precipitation as well as on local diversions of direct runoff from the upstream catchment.

Two important patterns emerge, one that we have been long familiar with and another that is somewhat surprising. The familiar pattern is that of generally higher measures of water availability in the southern and central zones of the SFRB than in the northern zone; this corresponds to known variations in annual rainfall, which ranges from a high of about 1,500 mm/year in the southern zone to a low of about 500 mm/year in some areas of the northern zone.

The surprising pattern is the presence of relatively water-scarce municípios in the high-rainfall southern zone, and some relatively water-rich municípios in the arid northern zone. Other variables in the water availability measure as well as scale of analysis (resolution) explain these differences.

Figure 1. São Francisco River Basin: Percent Rural Population that is Poor, 2003

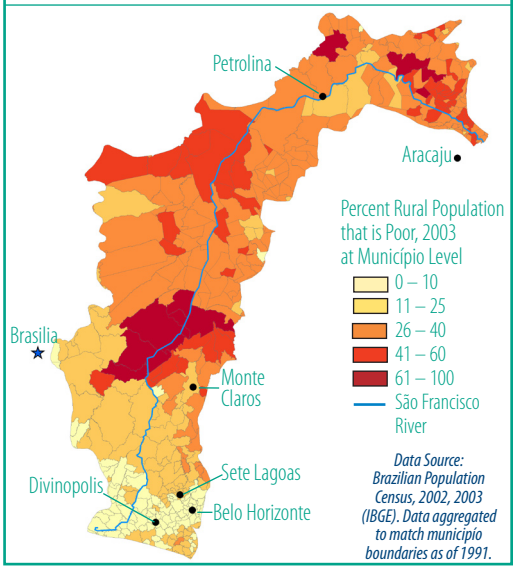


Figure 2. São Francisco River Basin: Percent Rural Population that is Indigent, 2003

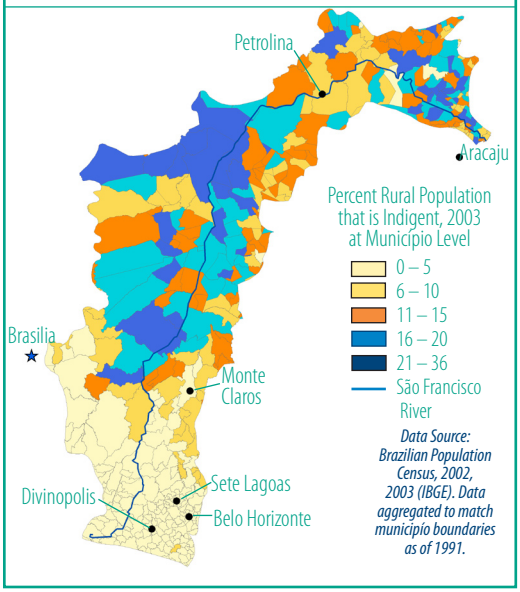
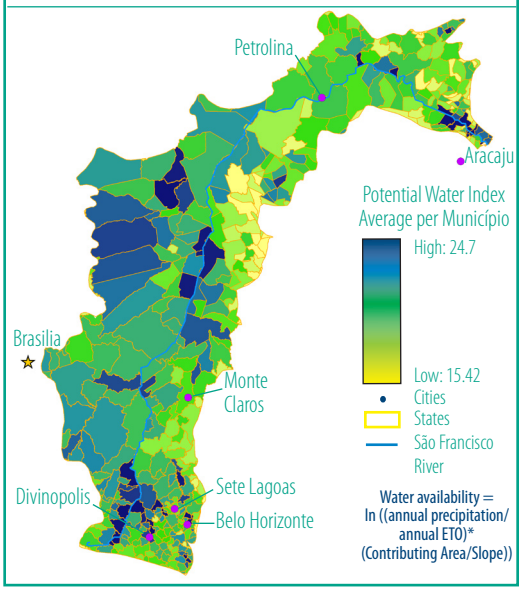


Figure 3. São Francisco River Basin: Município Averaged Potential Water Index, 2004



Water-Poverty Links in the SFRB

Might it be the case that the municípios with relatively more available water tend to be less poor? A visual comparison of Figure 2 and Figure 3 do not consistently suggest that such a relationship between water availability and rural poverty exists; some of the 'wettest' municípios have very high proportions of rural poor, and many relatively 'dry' municípios seem to have escaped rural poverty almost completely.

Analysis of water-poverty links in rural areas will help detect the links between this measure of water availability and rural poverty at the município scale of analysis. Might the links, or perhaps absence of links, identified at município level between water availability and poverty be different if the spatial resolution and quality of the data and analysis were higher?

The Bottom Line on Poverty in the SFRB

The rural poor need sustained increases in income. Increasing the availability and reducing the cost of water, a critical input to agricultural production, can help achieve this objective—directly via increases in on-farm productivity and profits, and indirectly via increases in the demand for and salaries paid to off-farm laborers.

But water is only one of several key inputs into agricultural production (capital, labor, and technology are also critical), and increases in agricultural production alone do not ensure increases in farm profits—the value of farm outputs must be greater than production costs, and the value of output is determined by distance to and access to markets, quality of infrastructure, product quality, etc. Given the diversity of product mix, distance to market, access to water, etc. across municípios in the very large SFRB, policy action for poverty alleviation in the SFRB will have to focus on an array of factors.

So where does this leave us in our efforts to reduce poverty in the SFRB? Should we abandon efforts to increase water availability to help reduce poverty? Probably not. While more research remains to be done to definitively address these issues, it may well be the case that increasing access to water may be the most effective and efficient means of reducing poverty in selected municípios or sub-zones within the SFRB, and public policy action combined with local private investments will likely be needed to make this happen. Our first task, then, is to identify municípios or groups of municípios for which this is the case. Our second task will be to specifically identify the policy actions required to increase access to water and hence reduce poverty. A third, and perhaps larger task, will be identifying effective and efficient poverty reduction strategies for areas where access to water is *not* the major constraint to poverty alleviation.

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