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ECONOMIC OUTPUT AND THE USE OF WATER: A STUDY OF THREE LOCATIONS IN THE RIO BRAVO BASIN

**Julio Goicoechea
Department of Economics
Universidad Autónoma Metropolitana
Unidad Iztapalapa, Mexico**

Rio Bravo Basin



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OBJECTIVES

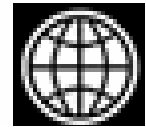


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- ⊗ Provide a means to evaluate various uses of water for locations in the Rio Bravo Basin.
- ⊗ Express, in money units, the value added impact derived from the use of water among various sectors of economic activity.
- ⊗ Establish key policy issues for the locations derived from the use of water.
- ⊗ Propose alternative solutions introducing equity, productivity and efficiency criteria, towards a sustainable economic growth and development.



A METHOD FOR WATER USE EVALUATION



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$$EVW_i = \frac{\text{Value Added}_i (\$)}{\text{Volume of Water}_i (m^3)}$$

where i represents the sector of economic activity, i.e. production of goods or services.

Value added. Estimation of the local output at market prices, the municipality being the data collection unit.

Volume of water. Directly observed for surface crops (deducting ground returns), and benefit transfer for the rest of economic activities.



RIO BRAVO



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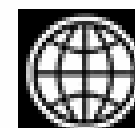
Volume of Water Granted in Concessions, 2003

	<u>TOTAL</u>		<u>Surface</u>		<u>Groundwater</u>	
	Mm ³	%	Mm ³	%	Mm ³	%
Agriculture & Livestock	6 689	87.5%	3 627	93.6%	3 062	81.2%
Public Water Supply	671	8.8%	185	4.8%	486	12.9%
Self-supplied Industry	282	3.7%	61	1.6%	221	5.9%
SUM	7 642	100.0%	3 873	100.0%	3 769	100.0%

Source: CNA, SAGARPA



POPULATION, WATER USE AND VALUE ADDED, 2003



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	<u>Population</u>	<u>Water Use</u>		<u>Value Added</u>	
	('000)	Irrigated crops (%)	Rest (%)	Irrigated crops (%)	Rest (%)
Bajo San Juan	486	80.6%	19.4%	0.5%	99.5%
Juarez	1 274	32.6%	67.4%	0.2%	99.8%
Saltillo	640	45.4%	54.6%	1.0%	99.0%

Source: CNA, FIRA, INEGI and SAGARPA



IRRIGATED CROPS:



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Area, Net Water, Value Added and Water Evaluation, 2003

	Area ('000 ha)	Net Water (Mm ³)	Value Added (US\$ 000)	Value Added / Ha (US\$/Ha)	Value Added / Net Water Used (US\$/m ³)
Bajo San Juan	66 826	210	24 317	364	0.12
Juarez	10 523	75	9 984	949	0.13
Saltillo	6 070	33	14 087	2 321	0.42

Source: CNA, FIRA, INEGI and SAGARPA



CONCENTRATION OF IRRIGATED CROPS:



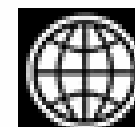
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Share of Value Added by Location, 2003 (%)

	Bajo San Juan	Juarez	Saltillo
Leading crop	Sorghum (77.2%)	Cotton (41.4%)	Pasture (26.6%)
Second crop	Corn (16.3%)	Alfalfa (34.3%)	Nuts (24.0%)
Third crop	Cotton (3.5%)	Oats for silage (5.6%)	Potatoes (18.1%)
Sub-total	97.0%	81.3%	68.7%
All crops	100.0%	100.0%	100.0%

Source: CNA, FIRA and SAGARPA

WATER AND ITS ECONOMIC EVALUATION



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(Mm³ and Value Added / m³)

	Bajo San Juan		Juarez		Saltillo	
	Water	Value Added/Water	Water	Value Added/Water	Water	Value Added/Water
	(000 000 m ³)	(US\$/m ³)	(000 000 m ³)	(US\$/m ³)	(000 000 m ³)	(US\$/m ³)
Irrigated crops	210.1230	0.12	75.0270	0.13	33.3740	0.42
Livestock	0.1616	43.52	0.1340	32.78	1.1144	15.35
Mining	0.0016	413 950.12	0.0002	7 831.88	0.0003	5 723.59
Manufacturing	0.1090	6 563.94	0.2600	8 392.16	0.0988	19 956.21
Construction	0.0808	1 107.88	0.0780	1 327.07	0.1054	539.12
Non Financial Services	1.2140	680.00	2.2440	948.00	1.1772	762.00
SUM	211.69	9.68	77.74	19.07	35.87	46.65

Source: Banco de Mexico, CNA, FIRA, INEGI and SAGARPA



FINDINGS AND POLICY ISSUES

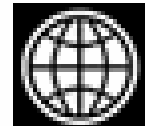


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- Overwhelming share of regional water demand by crops, alongside a scant value added
- Highly concentrated crop mix
- Traditional crop production techniques
- Downward long run trend in water use
- High value added impact of water outside crop production
- Plausible water transfers among sectors



EQUITY, PRODUCTIVITY AND EFFICIENCY



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- ✧ Innovation in crop production techniques for water saving and physical output increase
- ✧ Improvement, diversion or substitution of forage crops evaluating macro impacts
- ✧ Establishment of regular data collection in overexploited aquifers
- ✧ Regulation and transparency of water rights transfers
- ✧ Water supplies guarantee for enlargement, setting up industrial facilities, service provision and residential demand