Smallwat11
3rd INTERNATIONAL CONGRESS
WASTEWATER IN SMALL COMMUNITIES
TOWARDS THE WATER FRAMEWORK DIRECTIVE (WFD)
AND THE MILLENNIUM DEVELOPMENT GOALS (MDG)

FIFTEEN YEARS OF WATER SANITATION IN EASTERN ANTIOQUIA EVALUATION

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Where is Eastern Antioquia?

•It has 26 municipalities. 600,000 inhabitants, located at 30 km from Medellin city.

•The region has a strong economic development making important changes in the land uses.

• These changes have increased the pressure over natural resources and regional water quality.

Who did the project?

http://elpenol-antioquia.gov.co/

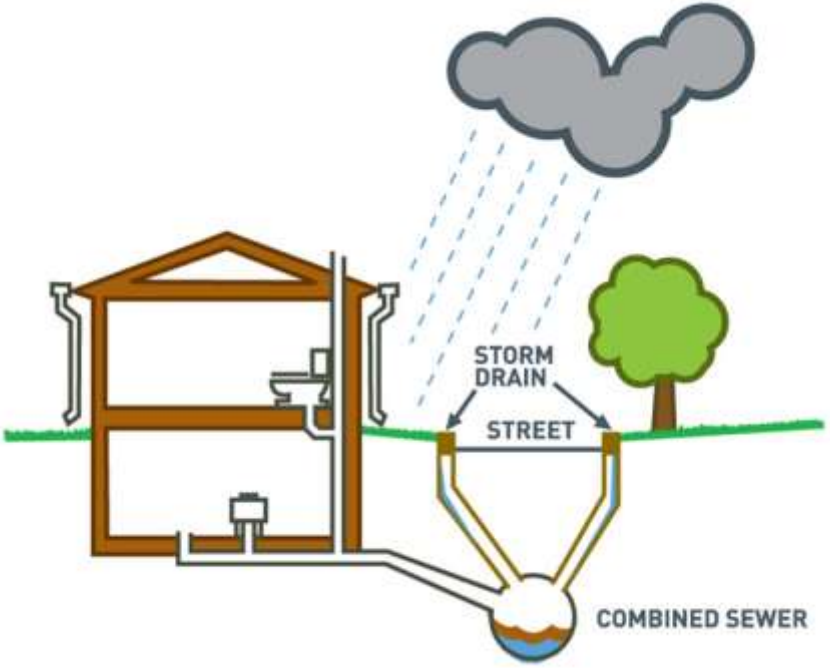
- CORNARE, the local environmental authority, developed a water sanitation program for the region that prioritizes sewage coverage and wastewater primary treatment.
- This work evaluates the water sanitation program application lasted 15 years (1995-2010) to identify its strengths and weaknesses.

http://elpenol-antioquia.gov.co/

http://www.gomezplata-antioquia.gov.co/

The strategy of gradualism and flexibility: first step

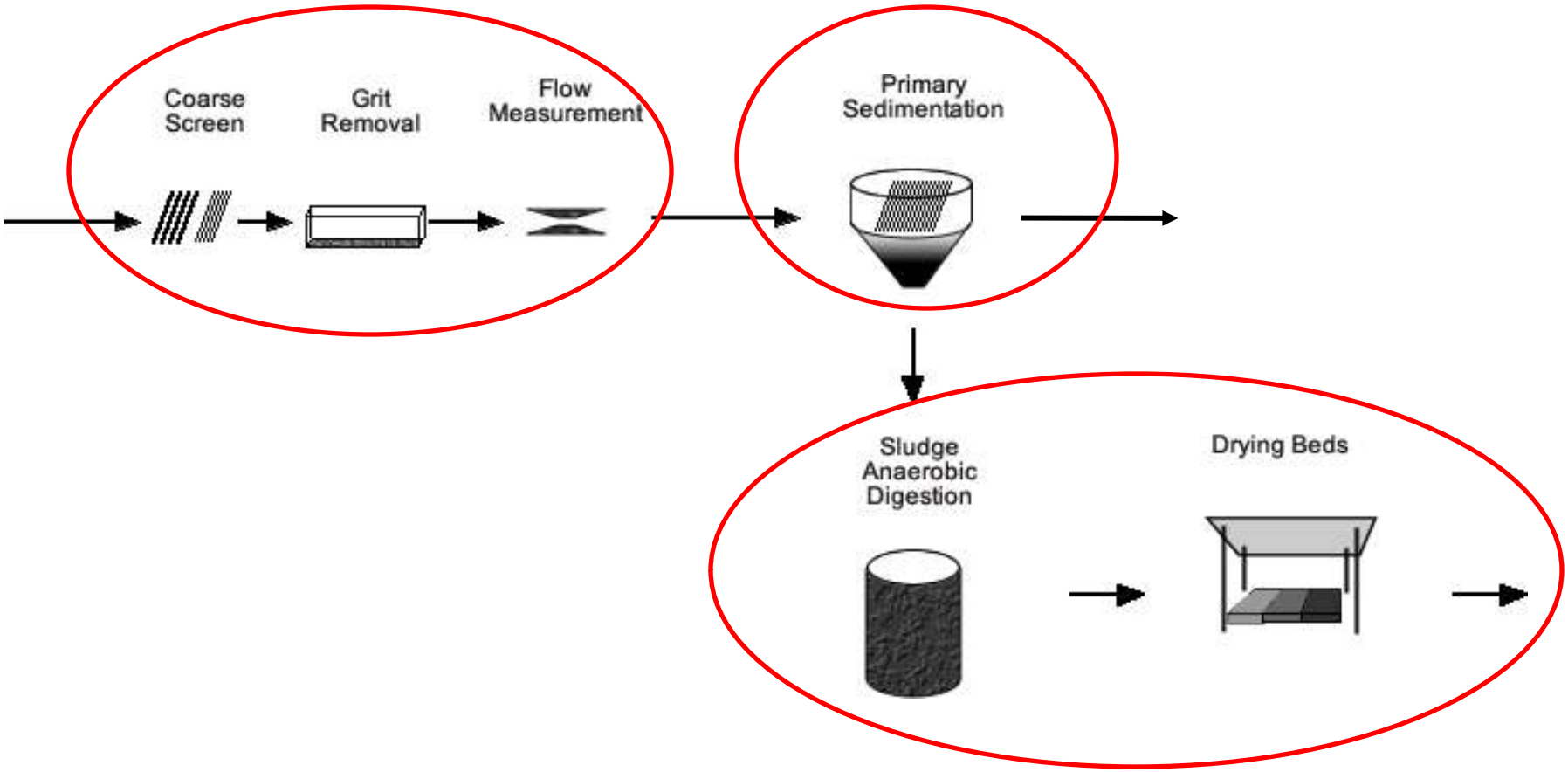
The program considers as the construction of combined sewer collectors as the result to integrate new systems with the one existed in order to optimize the resources.

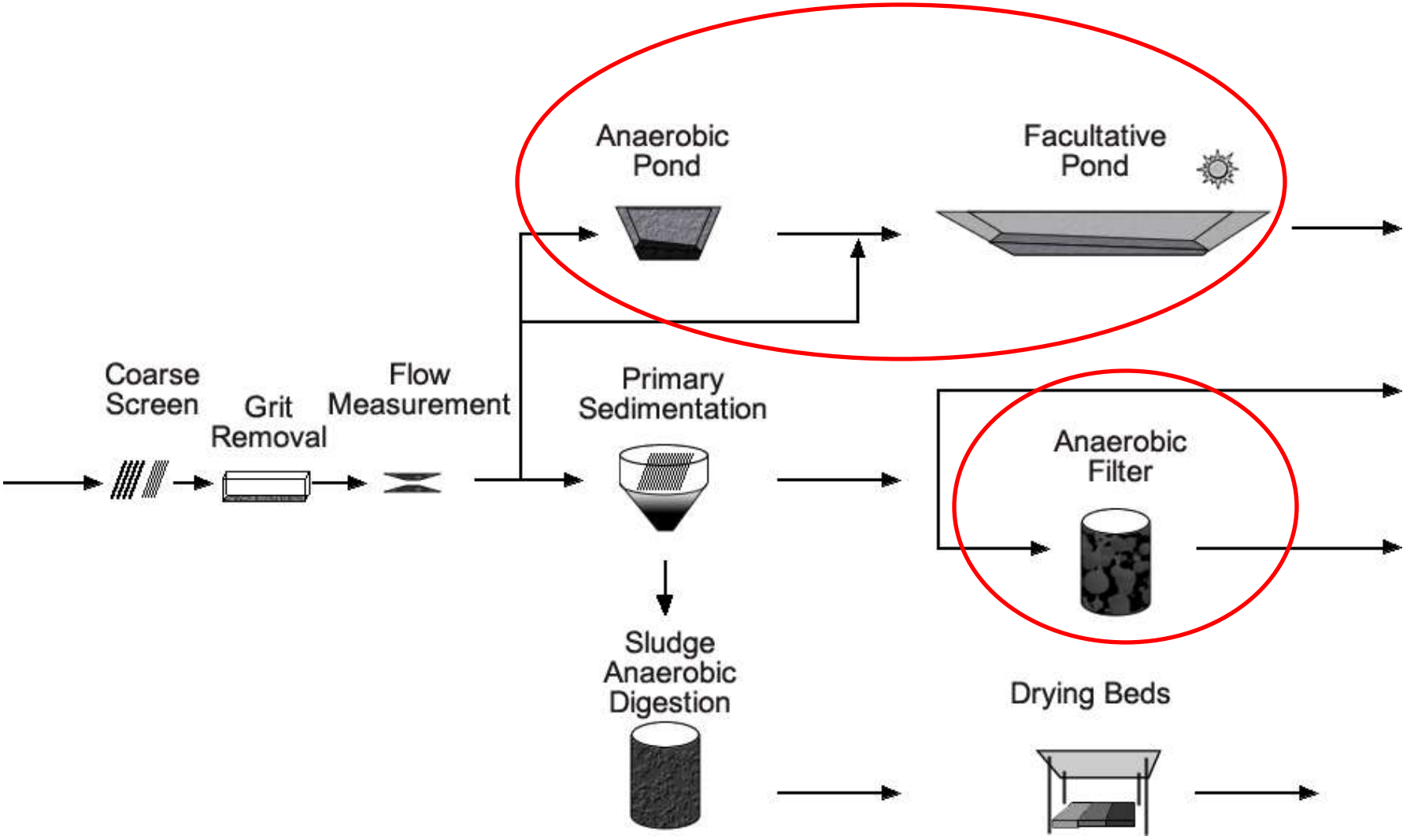


http://www.msdgc.org/wetweather/why_do_sewers_overflow.htm

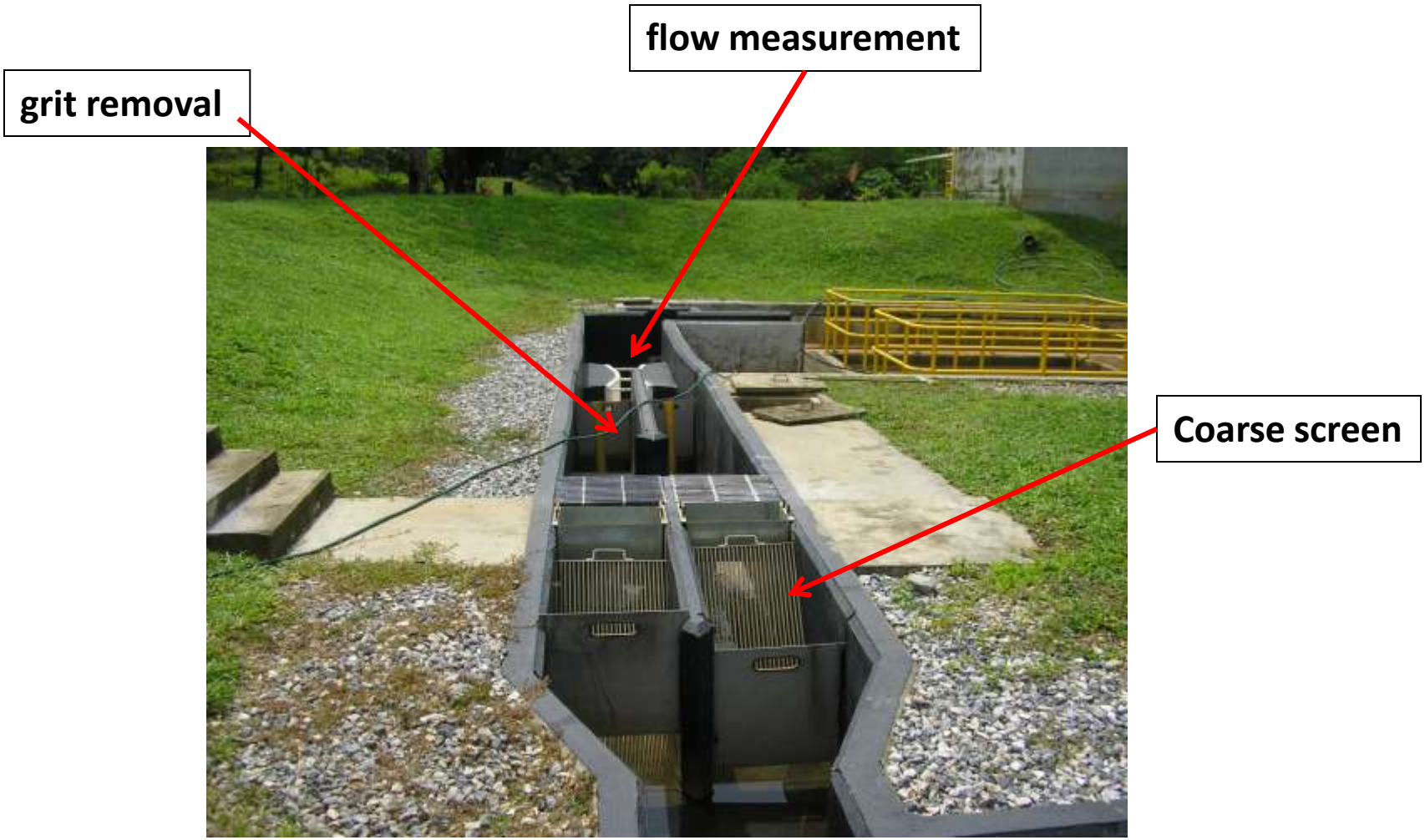
Next step: WWTP typical configuration

The program has promoted:




Anaerobic
Pond
Facultative
Pond
Coarse
Screen
Grit
Removal
Flow
Measurement
Primary
Sedimentation
Anaerobic
Filter
Sludge
Anaerobic
Digestion
Drying Beds

Preliminary treatment operation



The use of high-rate primary sedimentation

Parallel inclined plate separators

Primary sludge treatment with anaerobic digester

Sludge anaerobic digestion

Drying beds

Investment

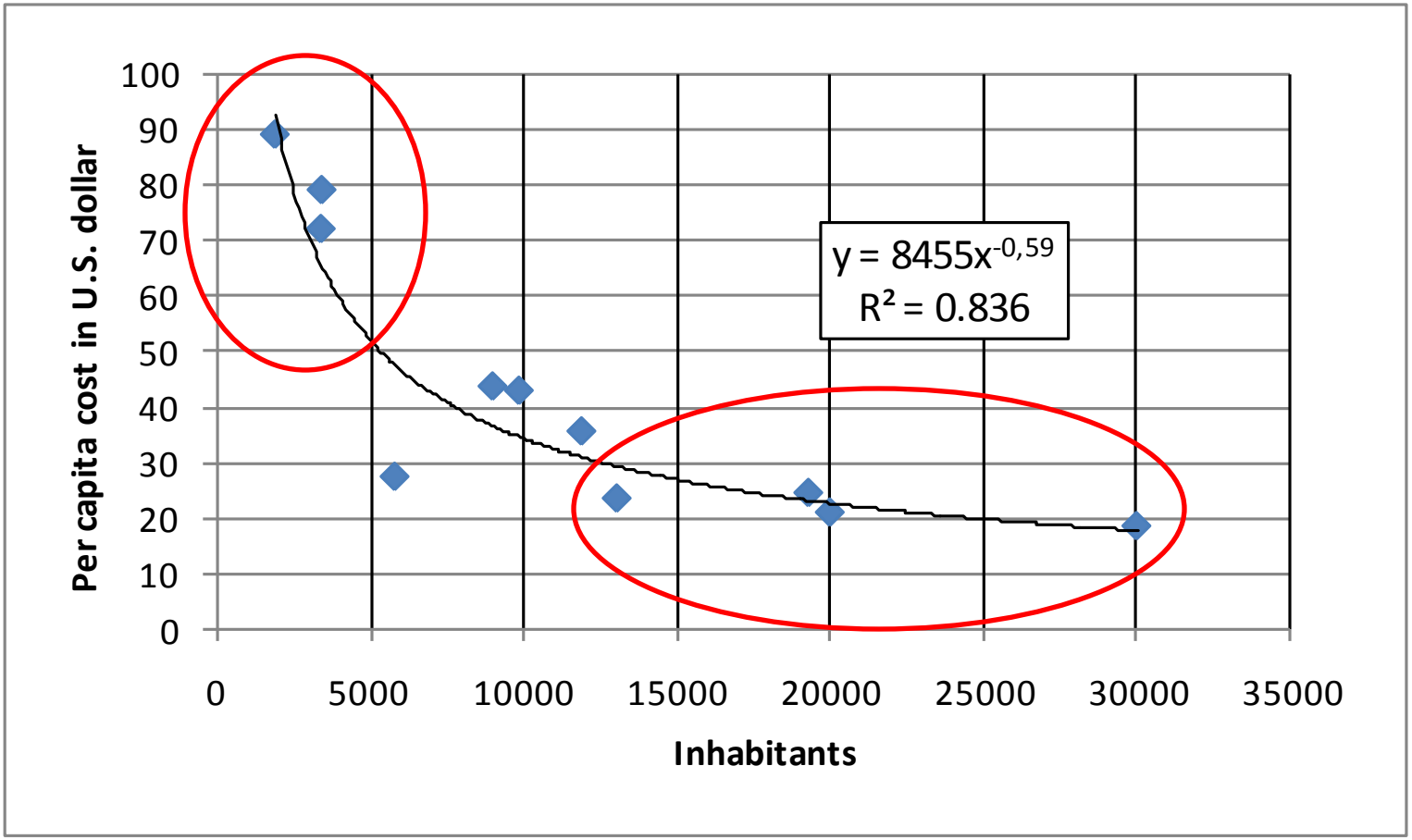
- 15 years = US$ 11 million.
- US$ 43 per capita / 255,000 inhabitants

Investment and performance

Municipality	Population	Cost (US dollar/ per capita)	Performance (%)	
			BDO_5	TSS
Carmen de V.	30,000	18.4	51	50
Marinilla	20,000	20.9	52	52
El Peñol	13,050	23.5	60	60
El Santuario	19,300	24.5	62	63
Cocorná	5,806	27.5	50	53
Guarne	11,900	35.6	67	64
San Luís	9,860	43.0	67	67
San Carlos	9,000	43.8	*	*
Alejandría	3,400	72.5	53	69
Puerto Triunfo	3,425	79.5	53	59
San Francisco	1,900	89.5	52	54

* In process of performance improvement

Economies of scale



What did we achieve?

- To develop a comprehensive model to improve the regional water's quality ; that include: sewage collection, preliminary treatment and primary treatment.
- To optimize the primary treatment performance using high rate sedimentation methods.
- To build up the technical an institutional support in the region.

Weaknesses

- Some treatment facilities were built in flooding areas.
- The sewer system can be clogged due to sand and sediment drag by rainwater.
- There are some municipalities which do not have technical and administrative capacities in order to keep the operation and maintenance of the systems in optimal conditions.

Final remarks

Primary treatment systems showed efficiencies of 50 to 60% in the removal of BOD and TSS.

The economies of scale for systems have an optimum value for populations over 10,000 inhabitants.

The design and construction of wastewater secondary treatments must be carefully planned in order to optimize resources and select the most appropriate technologies for the region.

Acknowledgments

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