



Proposal of continuous water supply systems in urban Mexico

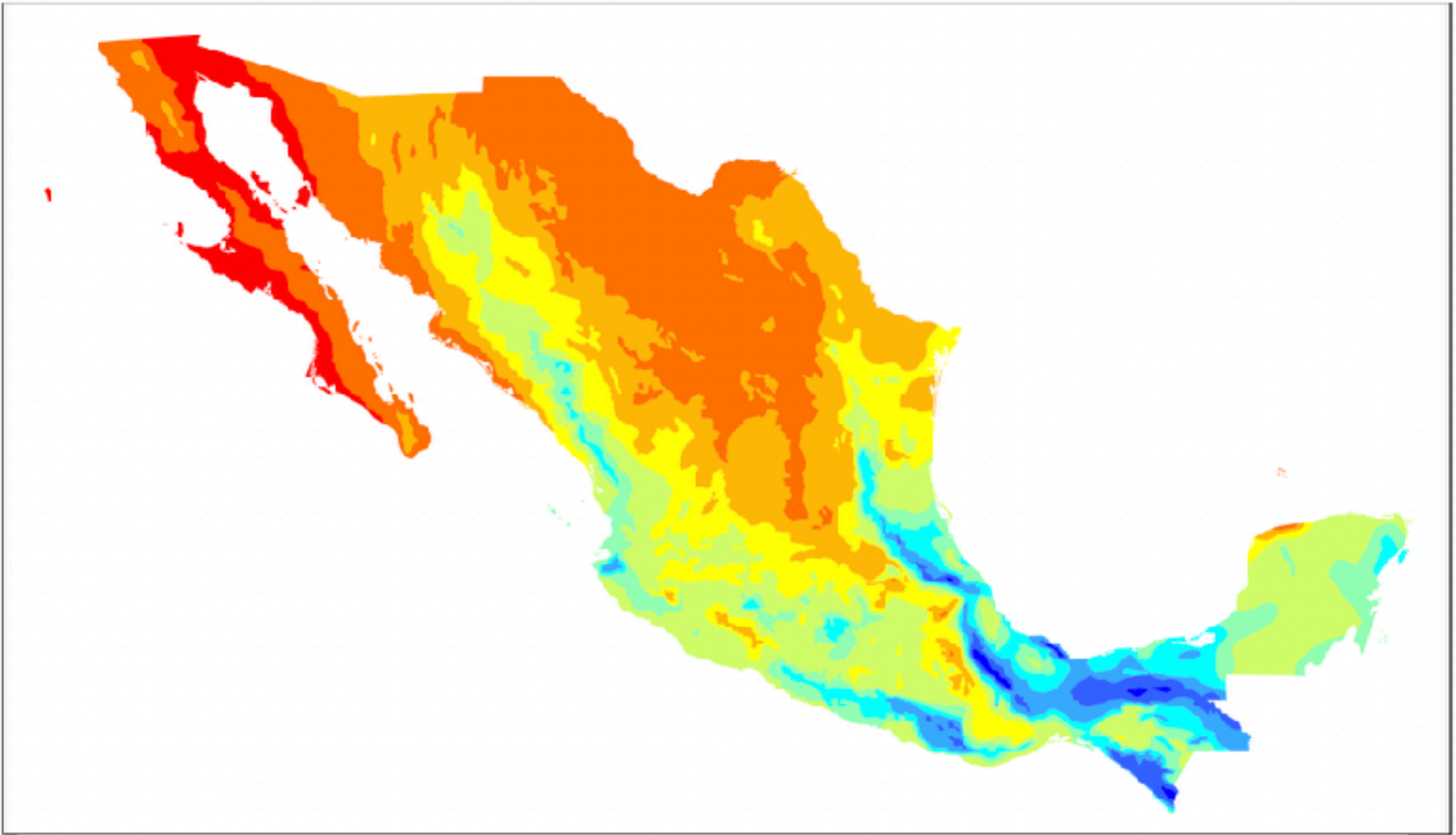
Willingness to pay for improved water services

Rodolfo Salvador Delgadillo

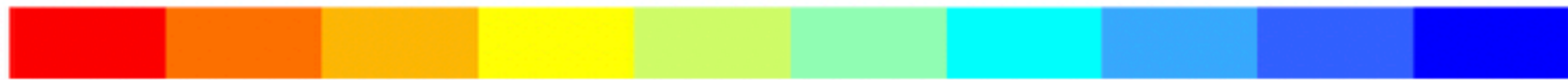
Mexico

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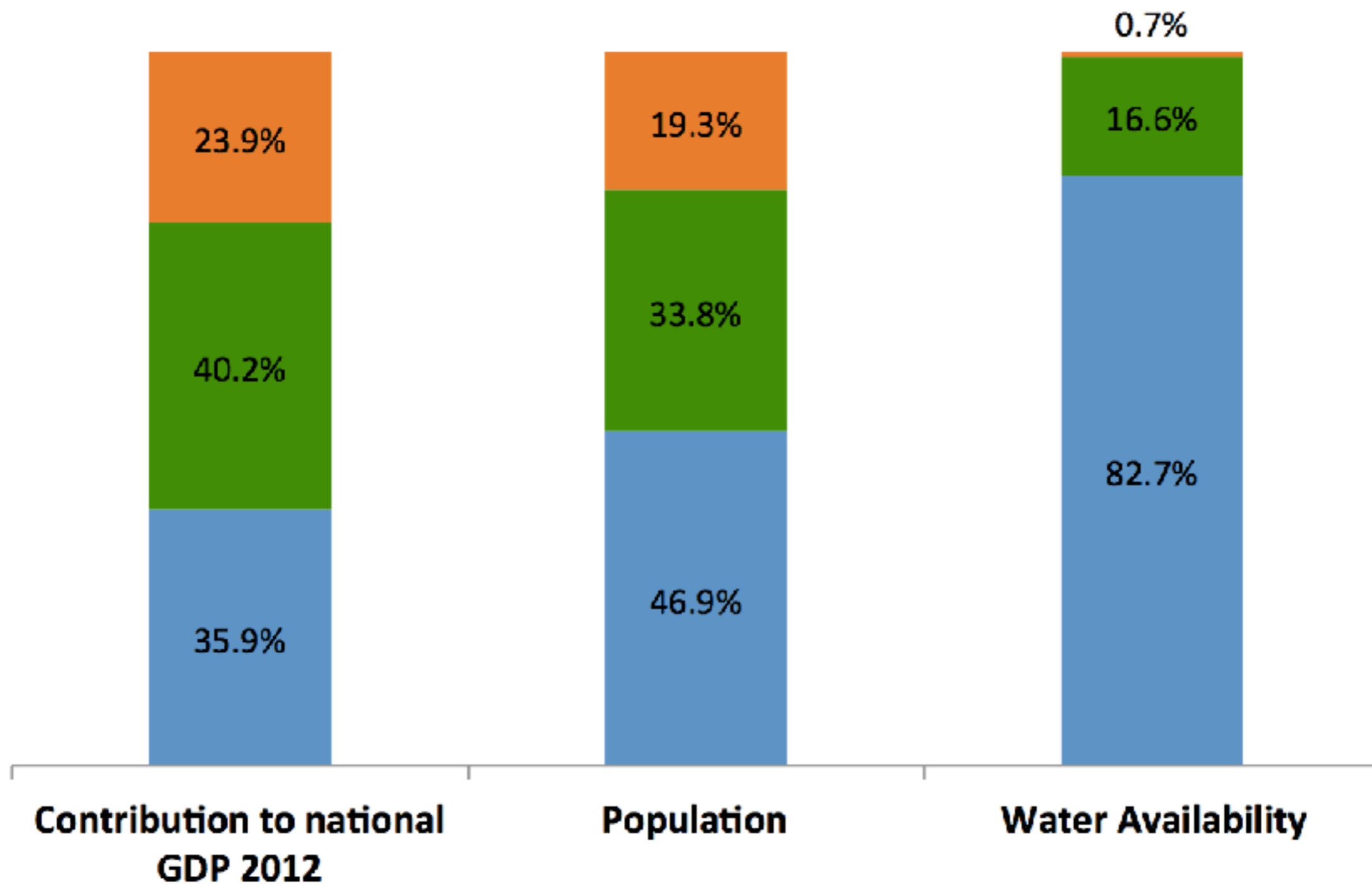
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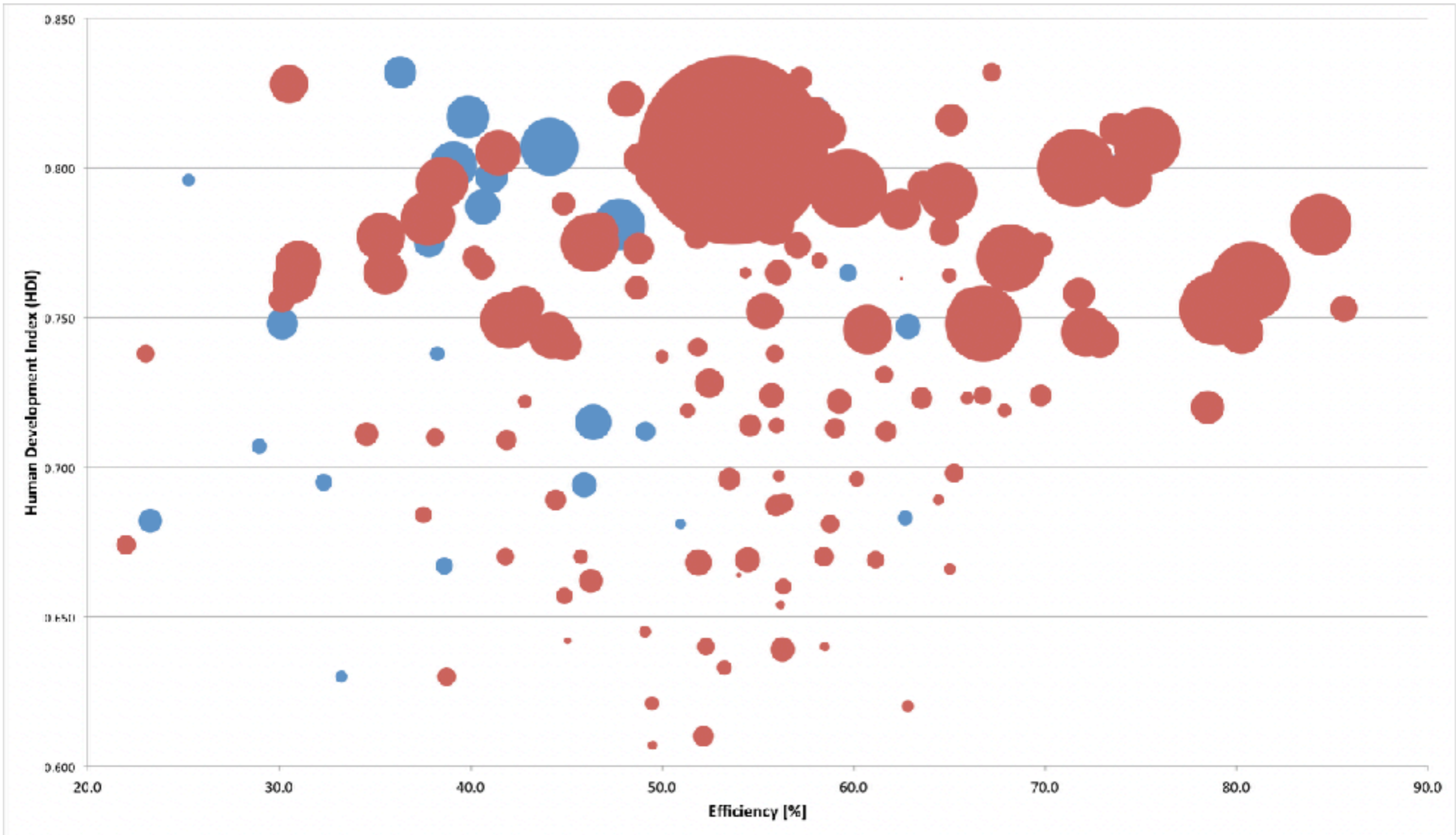


Precipitation [mm]



<125 400 600 800 1,200 1,500 2,000 2,500 4,000 >4,000





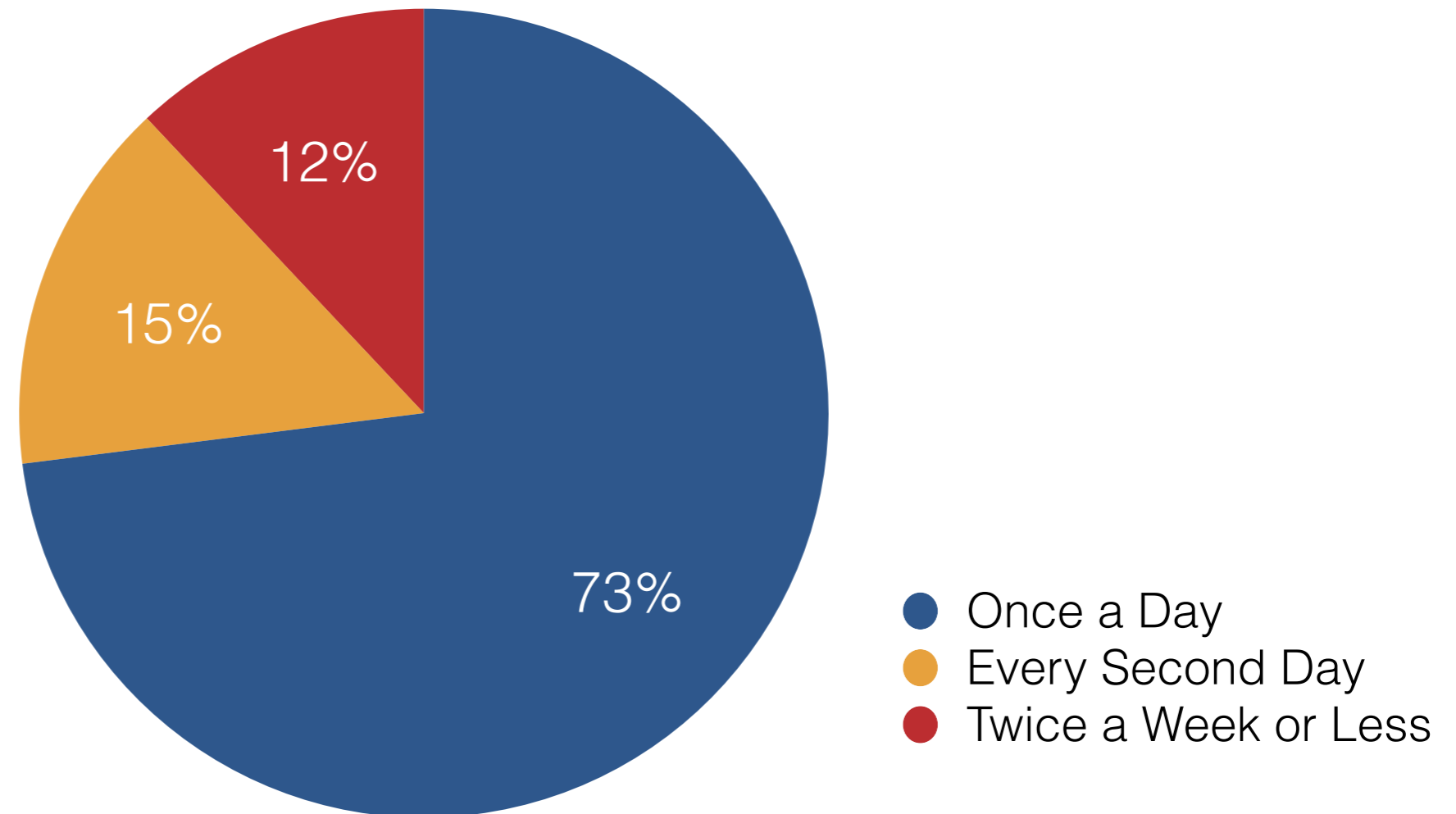
Water Stressed Region

Water Abundant Region

Population

Intermittent Water Supply

On average, Mexican households receive water service only 15.5 hours per day.

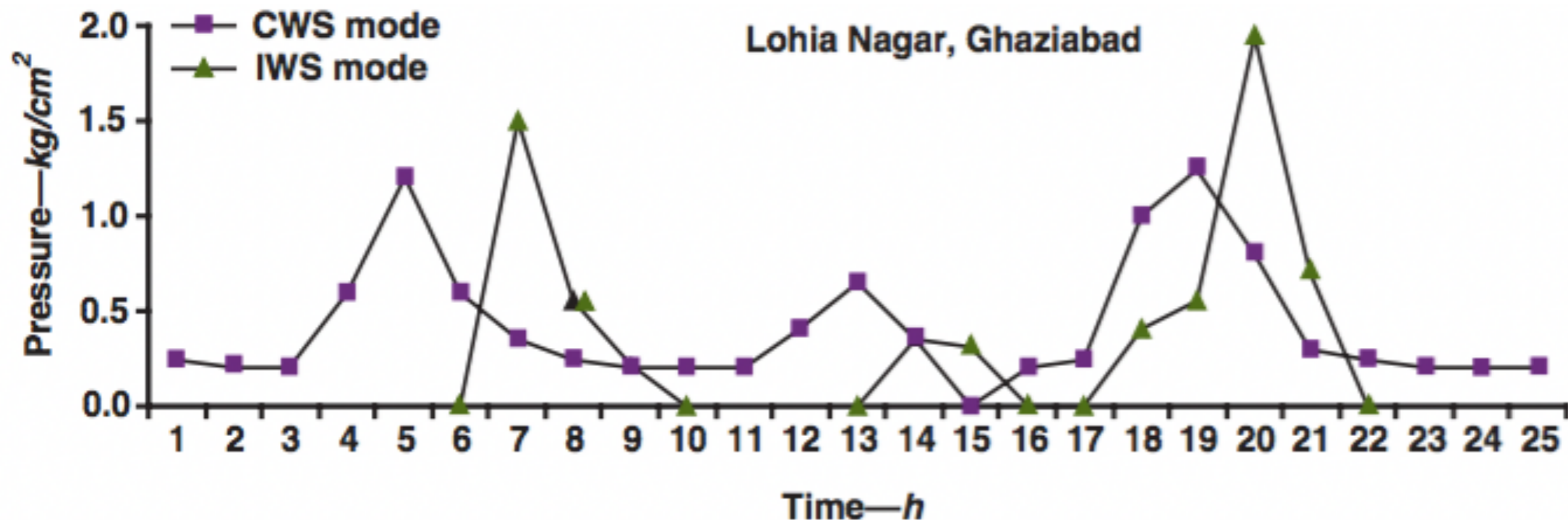


Mexico is **the highest consumer of bottled water** per capita worldwide. 30% higher than the second highest consumer (Italy).

Bottled water **is not considered an improved source** by the WHO since it is not sustainable.

Intermittent Water Supply

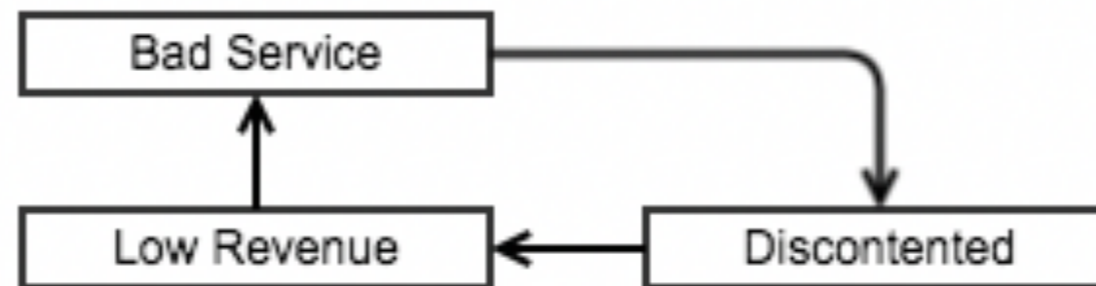
- Pressure peaks lead to mains damage.
- Higher losses due to leaks.
- Higher volume of water needed.
- Pollutant intrusion due to mains been damaged.
- Coping measures (rooftop tanks, bottled water for drinking).
- Management issues (inequity in distribution, low user satisfaction, inability to know the water balance of the utility).



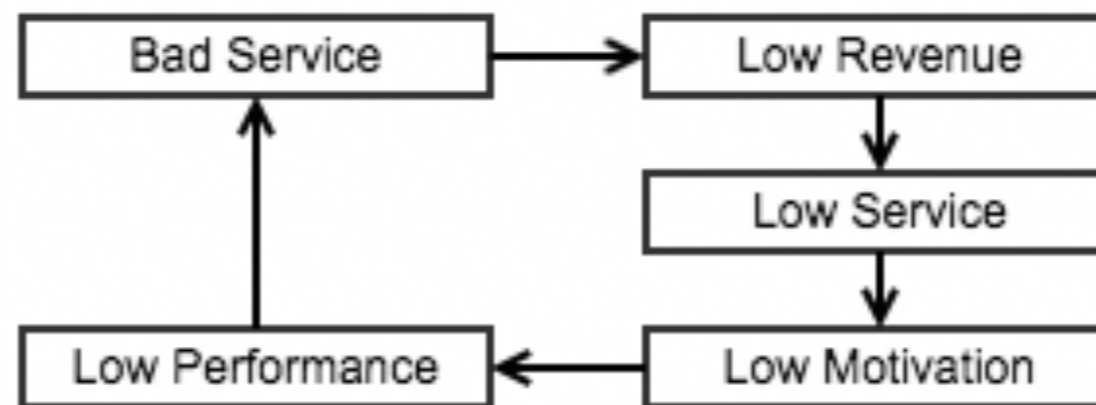
Water pressure during intermittent water supply and continuous water supply. (Andey, Kelkar 2007)

Downward Spirals of Water Service Decline

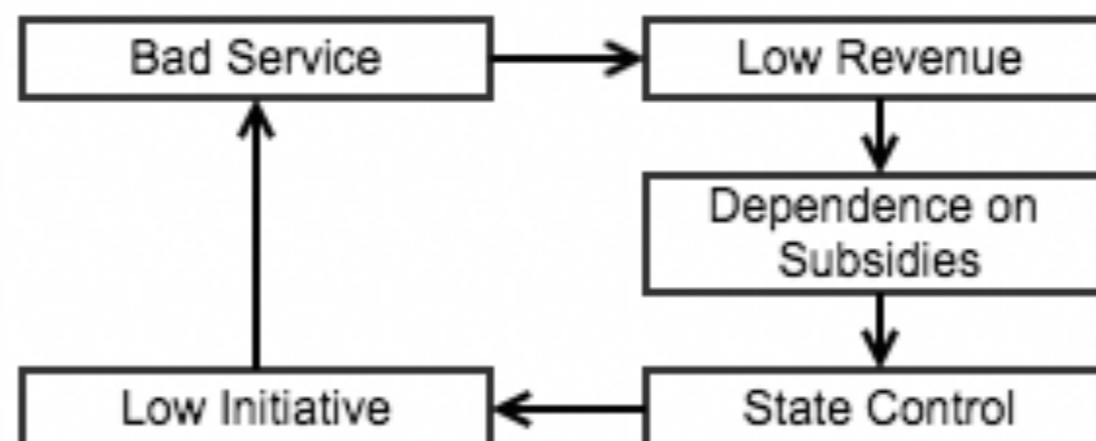
Consumer Circle



Salary Circle



Subsidy Circle



The Karnataka Case

Before	After
10 hours of service per week	24 hours per day, 7 days per week
16,400 connections	25,172 connections
664,000 m ³ /month of water distributed	589,000 m ³ /month of water distributed (13% decrease)
1.38 Million Rs/month revenue	7.1 Million Rs/month revenue (5.1x increase)



Site of Study Pachuca

Population

512,000

Mean annual temperature

14°C

Mean annual precipitation

412 mm

Aquifer exploitation

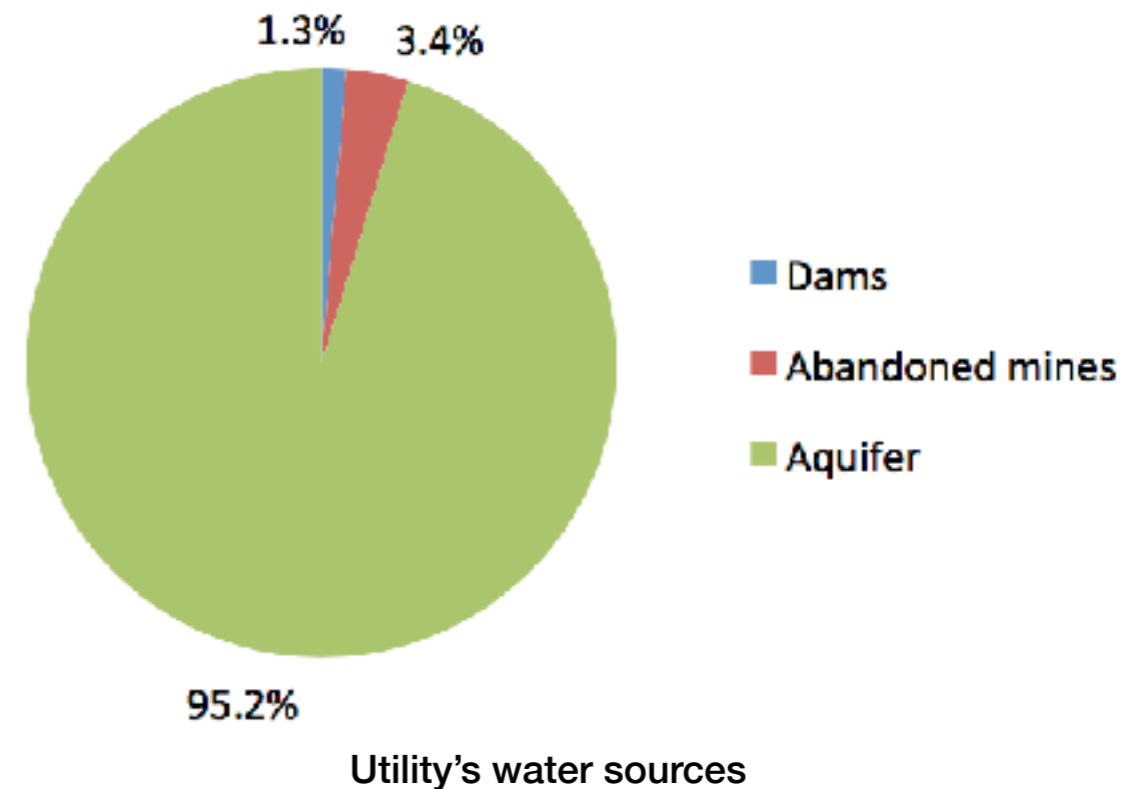
120%

Water utility

CAASIM (Inter-municipal)

Number of connections

184,122



Site of Study Pachuca

Number of connections

184,122

Productivity

4.6 emp. per 1000 connections

Continuity of service

42%

Physical efficiency

42.9%

Commercial efficiency

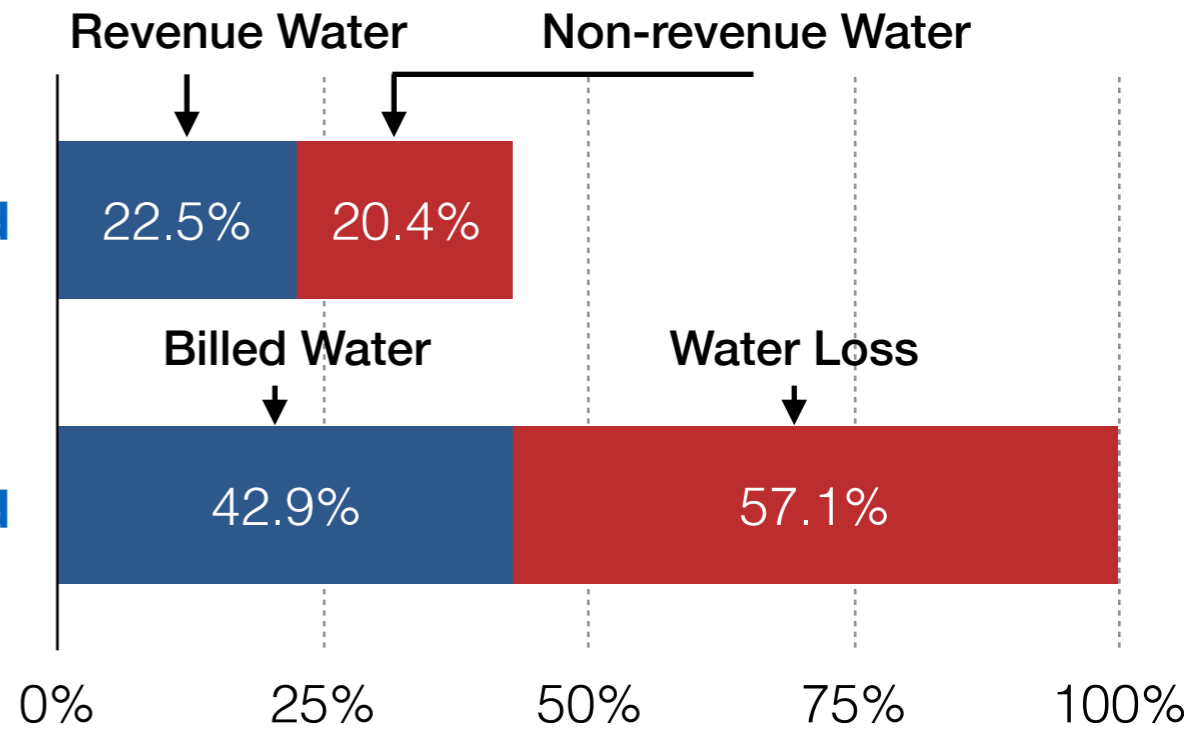
52.4%

Global efficiency

22.5%

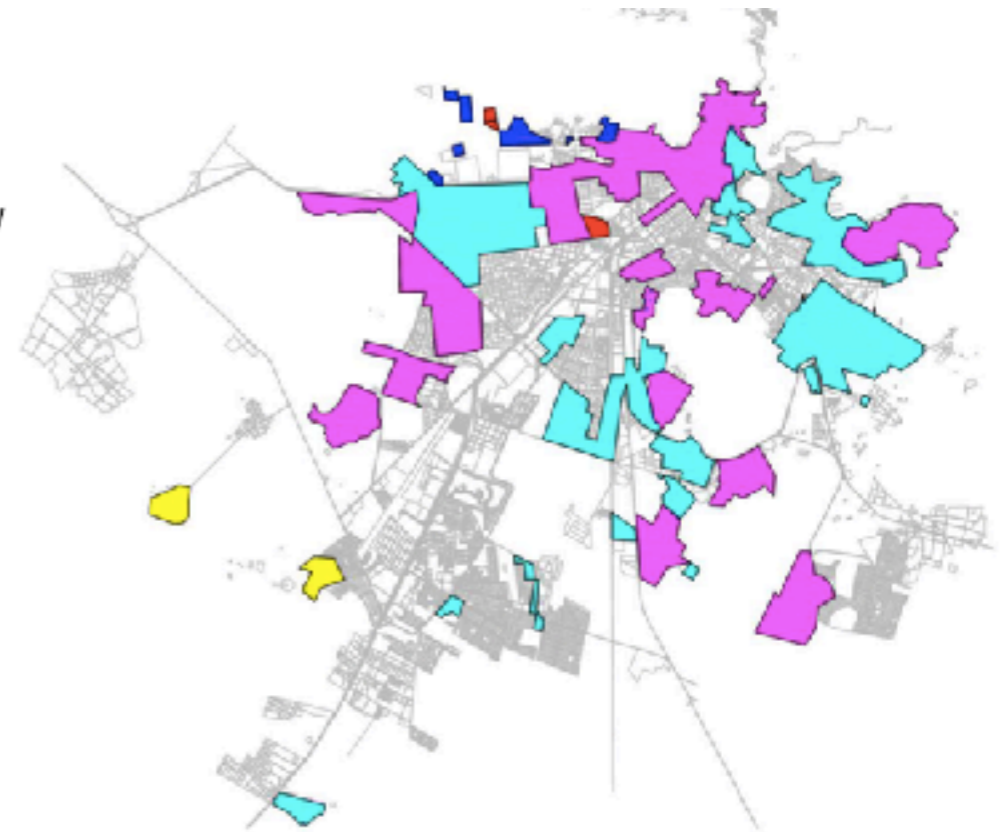
Water Billed

Water Produced



Intermittent Service

-  Some hours a day, everyday
-  Four days a week
-  3.5 days a week
-  Three days a week
-  Two days a week



Objective & Research Questions

Elicit willingness to pay for improved (continuous supply) water services in urban Mexico.

Research questions:

- Is the population in urban Mexico willing to pay enough to cover the costs of providing an improved, continuous water service?
- Does the current level of service, household income or other factors influence in their response?

Methodology

Surveying Method: **Personal interviews**

Given the descriptive nature and sample size for the survey applied, it was considered more valuable to have first hand perception of the respondents' point of view.

Contingent Scenario: **Maintenance and improvement scenarios**

Two contingent scenarios were proposed; one in which users had to pay for maintenance of current conditions of operation, only to prevent deterioration of service due to regular use and population growth. A second scenario was willingness to pay for the improvement of the system meaning a continuous supply with drinkable water quality.

As a baseline, the operation costs of three of the most efficient water utilities were used: \$169 pesos for 20 cubic meters of water, monthly.

Elicitation Method: **Bidding game**

A bidding game with a low starting point was used as the elicitation method.

Methodology

Maintenance Scenario

The government of the city is planning on starting a **maintenance scheme**; the plan is to improve the whole network, increasing leak repairs, overhauling some pumping equipment and substituting pipes when required; all of this **with the aim to be prepared for the next ten years of urban growth. This means ensuring that the service does not get any worse, but it would not get any better either.** In order to fund this program, the water authority would charge the all the consumers a monthly fee as part of their water bill.

Would you be willing to support this program?

1. **Yes.** I would support this program and would be willing to contribute by paying a higher monthly bill.
2. **No.** I would not support such a program and would not pay for it.

How much would you be able and want to pay for this program?

1. \$50, if not, what would be the maximum you would pay?_____
2. \$75
3. \$100
4. \$150
5. \$250
6. \$500
7. \$750
8. \$1000, if yes, what would be the maximum you would pay?_____

Methodology

Improvement Scenario

The government of Pachuca is considering carrying out a programme to face this problem of water scarcity in the future. The programme would include **improving the distribution network**, intensifying leak repairs, increasing the use of recycled water for commercial and irrigation uses, collecting rainwater in rural areas, bringing water from external sources, and implementing education campaigns. The objective is to use the available water more efficiently, ensure that water shortfalls become very rare and improving water quality. The outcome of this programme would be to avoid the spread of water shortages to the whole city for the next decade, to improve the service in the neighbourhoods that now have problems, and in general, **guarantee that the service would improve in terms of quantity and quality of water.**

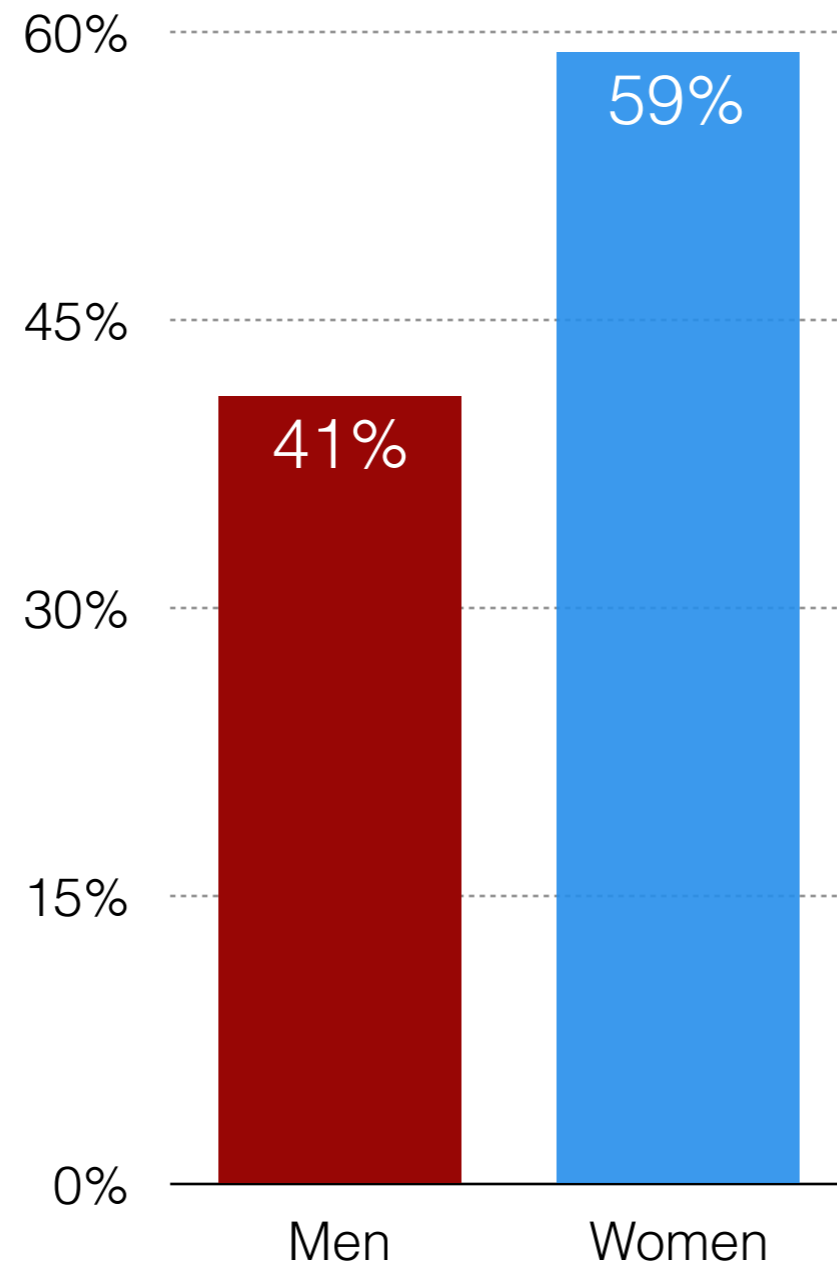
Would you be willing to support this program?

- 1. Yes.** I would support this program and would be willing to contribute by paying a higher monthly bill.
- 2. No.** I would not support such a program and would not pay for it.

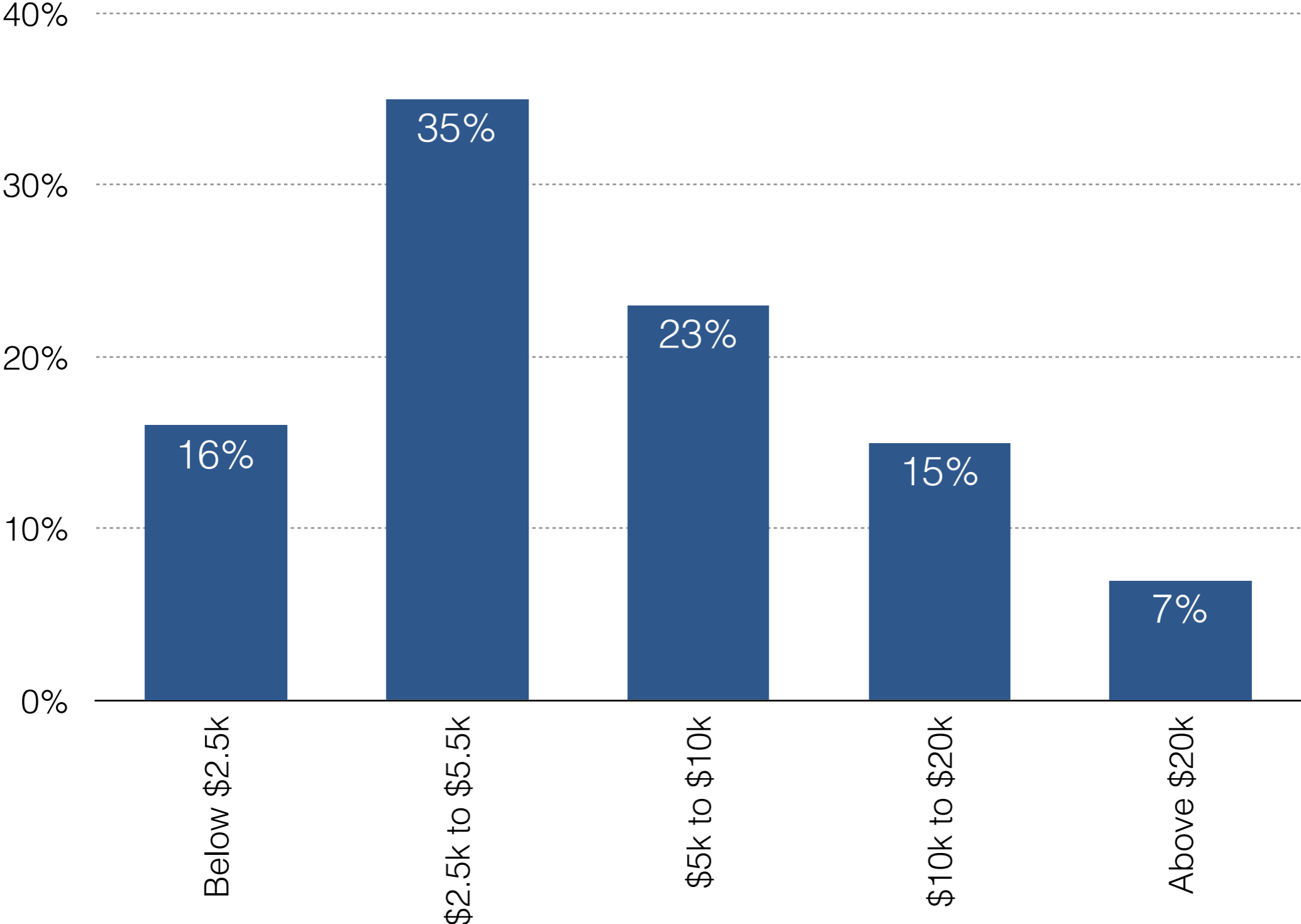
How much would you be able and want to pay for this program?

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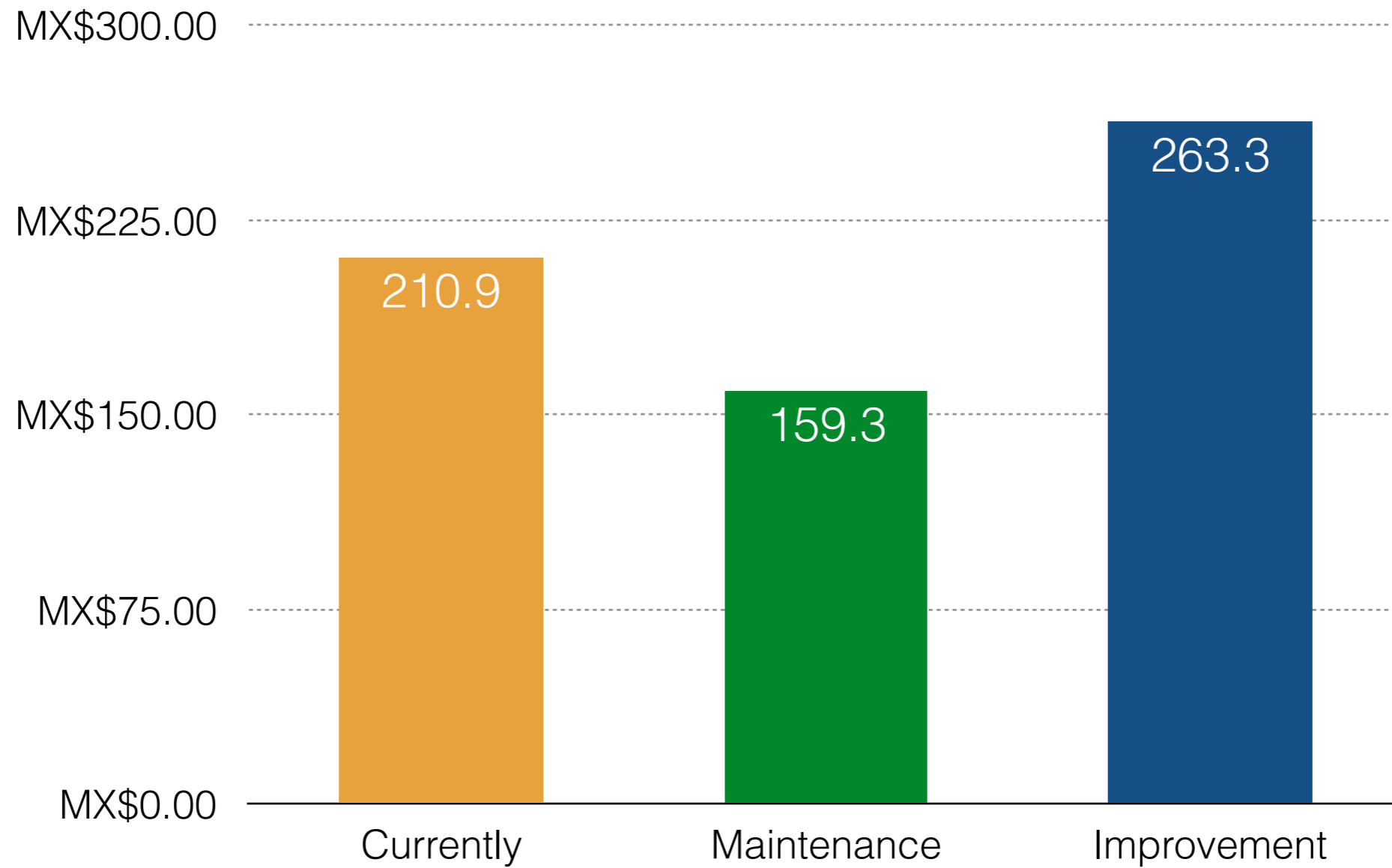
Results: Gender



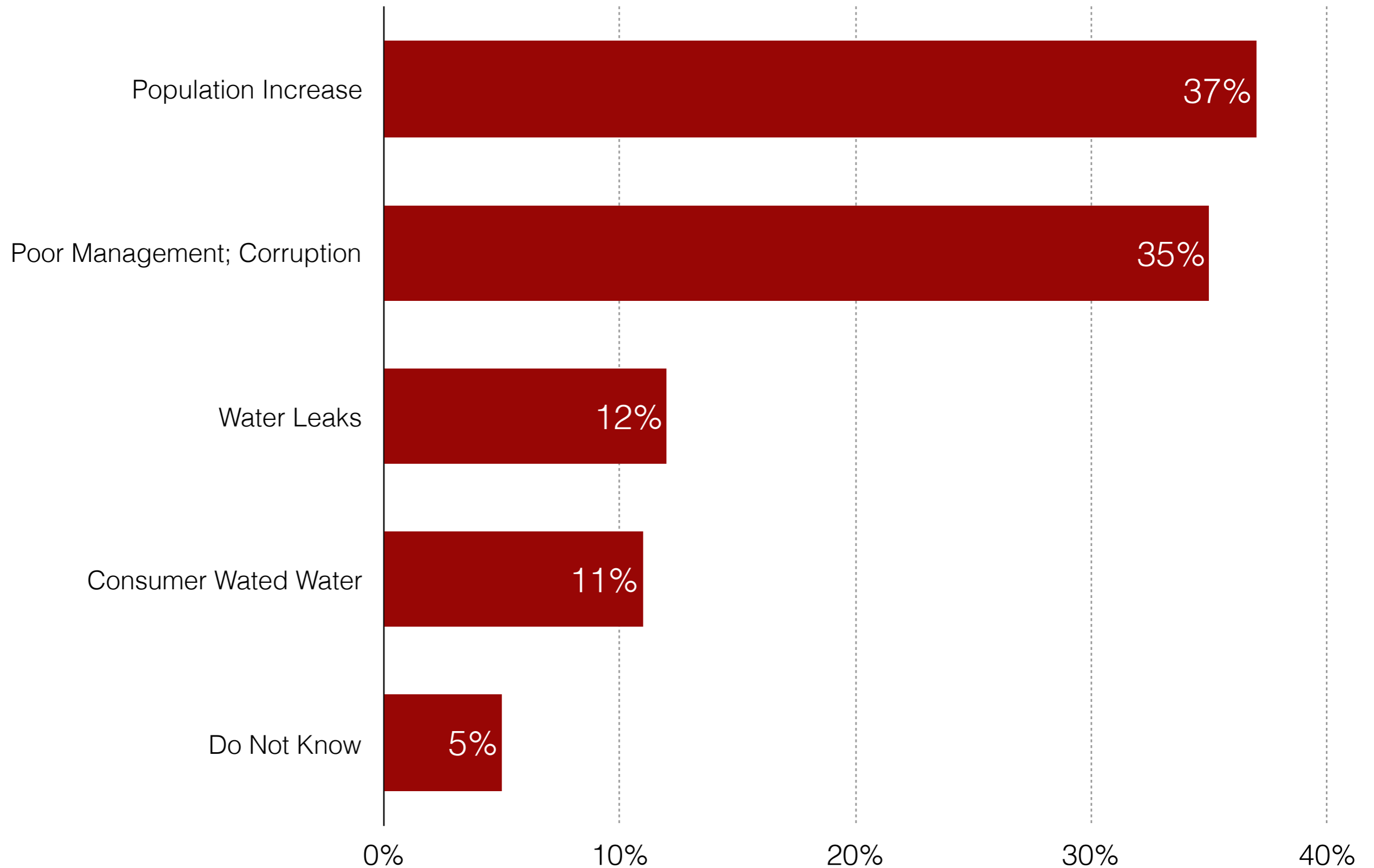
Results: Income



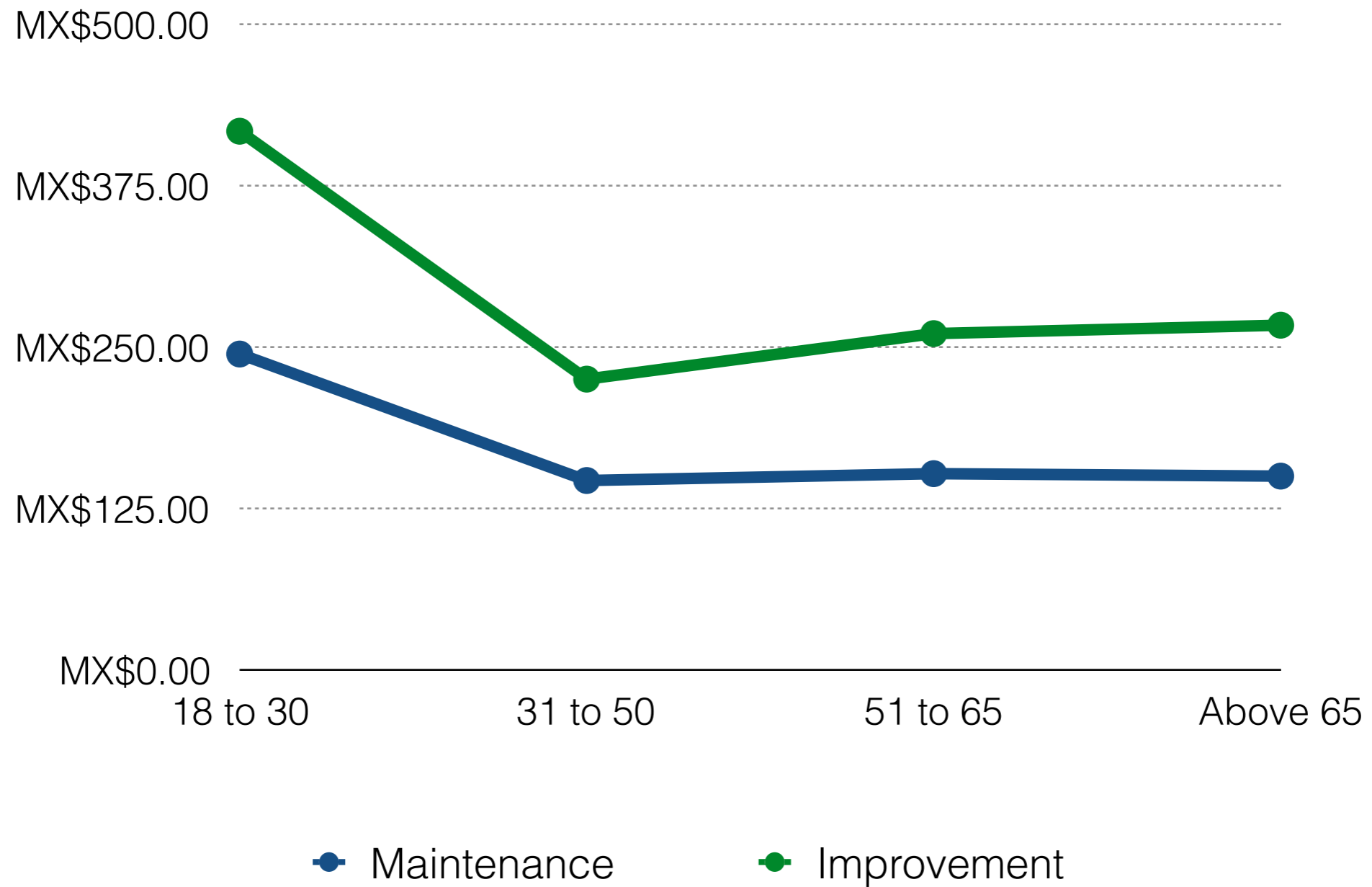
Results: Willingness to pay



Results: Why is service deficient?



Results: Willingness to pay by age



Conclusions

It was confirmed that people are willing to pay enough to cover the costs of providing improved water services.

For the contingent scenario of improvement, users were willing to pay **65% more than for the maintenance scenario** (\$263 vs \$159 pesos).

Some of the most valuable data obtained was qualitative.

E.g. many users commented that considered the service received was of “good quality” but yet reported to buy bottled water as their drinking water source.

Even though WTP studies show that operative and maintenance costs could be covered by slightly higher tariffs, the question remains: **Who is paying for capital investments?**