Benchmarking and Data Envelopment Analysis (DEA) techniques applied to irrigation areas

(Benchmarking et Data Envelopment Analysis techniques appliquées aux régions d'irrigation)

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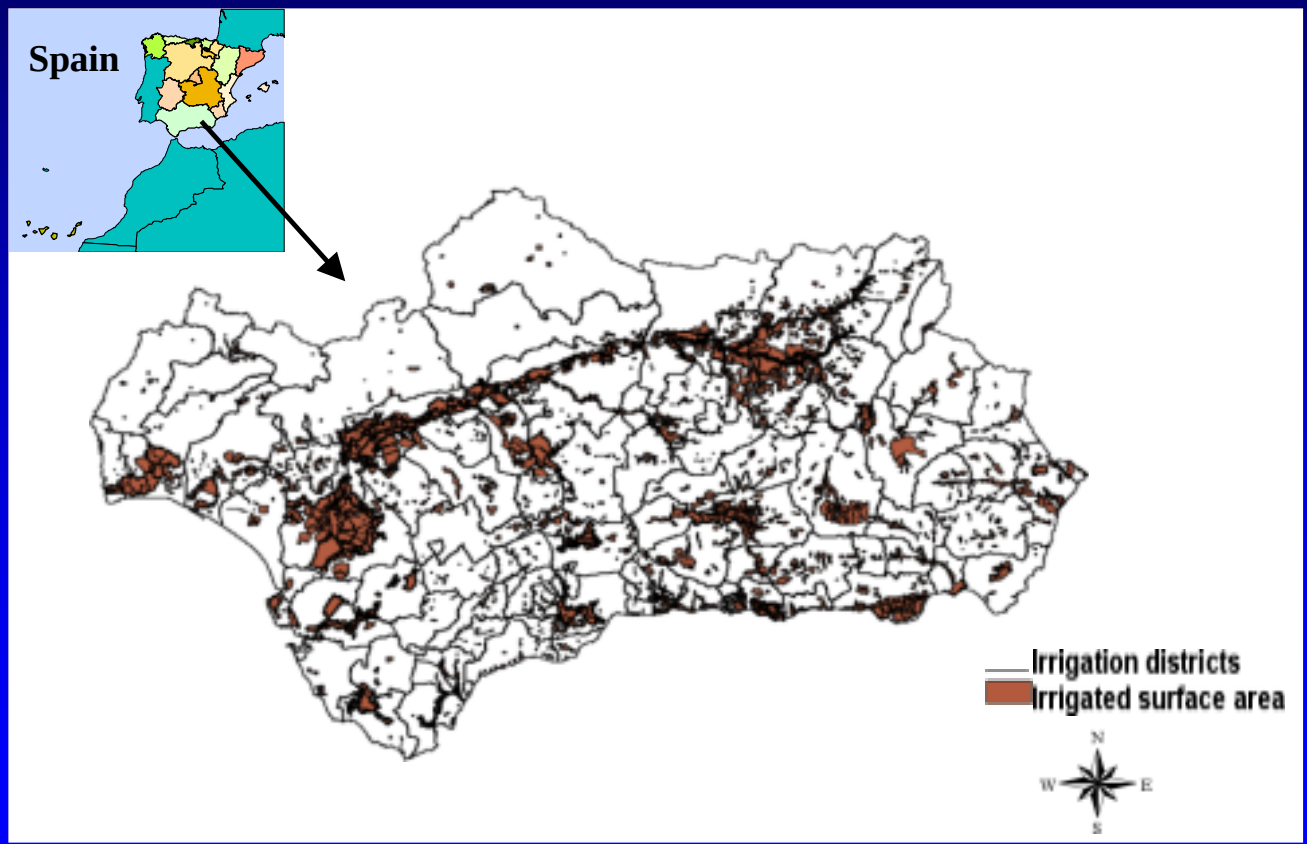
Distribution of irrigated surface area and irrigation districts in Andalusia.



- 815.000 ha of irrigated surface area which represents the 19 % of its cultivated surface area .
- Irrigated surface area produces 53% of the final value of agricultural production
- 156 Irrigation districts
- 651 hm^3/year global deficit

- Selection of the most representatives irrigation districts using Data Envelopment Analysis (DEA) techniques

- More detailed comparison with the totality of the performance indicators developed by Malano and Burton (2001)

Data Envelopment Analysis

- Consider the efficiency in relative therms
- Non parametrics frontiers of production
- Consider the production process as a set of inputs wich obtain a set of outputs
- Use linear programming to determine the relative efficiency
- The study of the efficiency can be oriented to Inputs or Outputs

Data Envelopment Analysis

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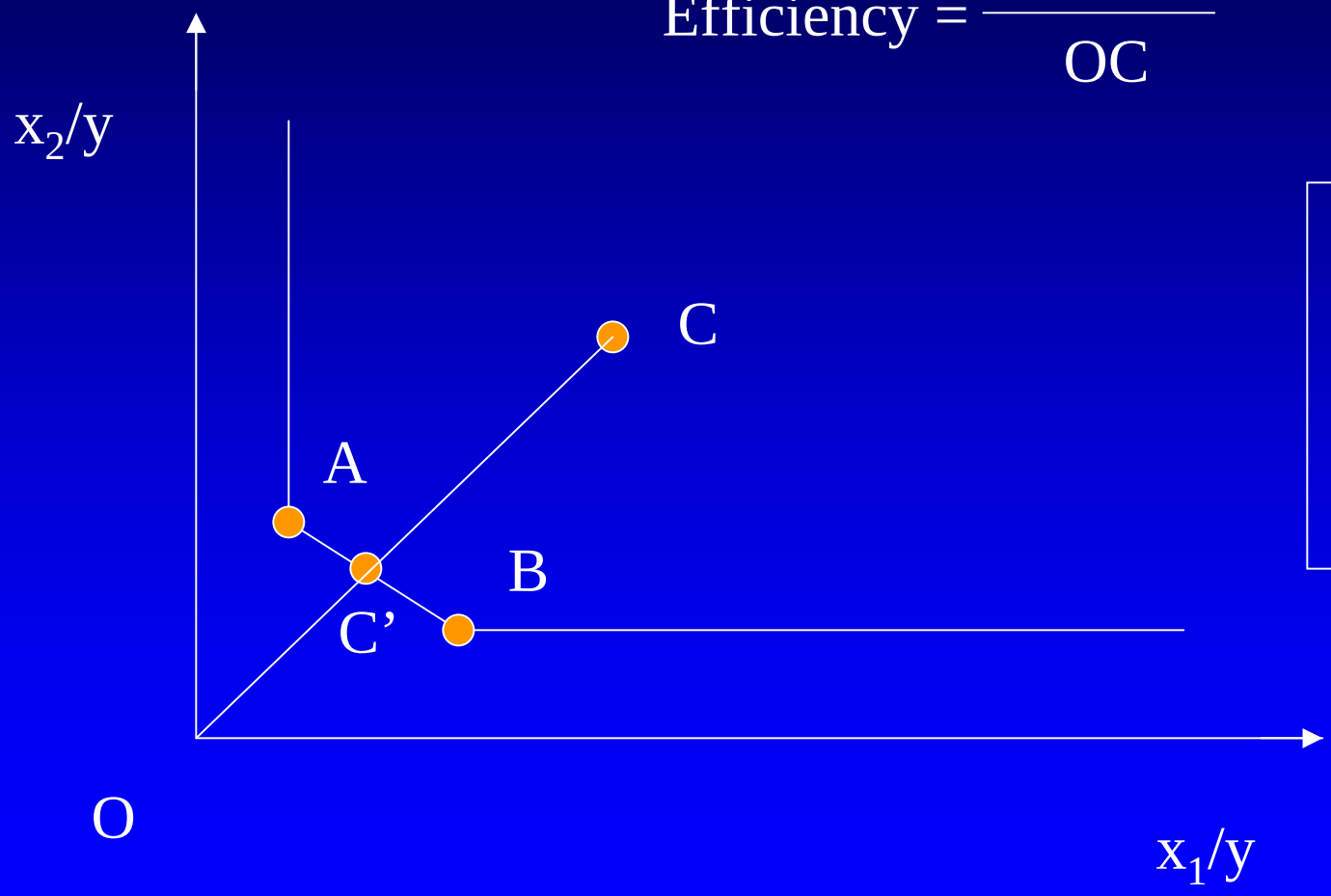
$$\text{Efficiency} = \frac{OC'}{OC}$$



x_1 Inputs

x_2

y Output

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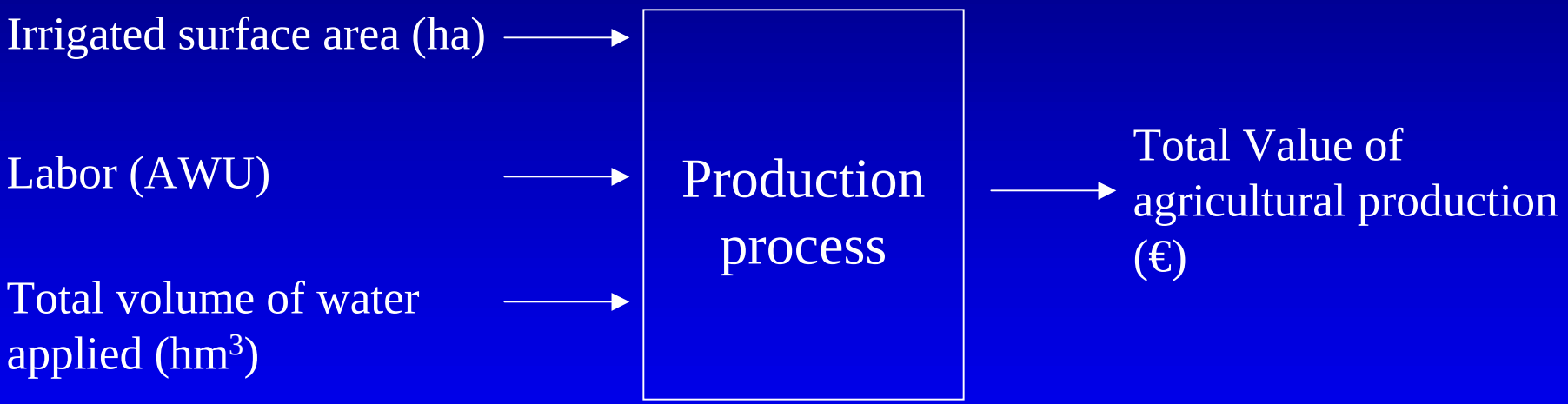
Inputs and Outputs considered in DEA study



BCC efficiency throughout Andalusia

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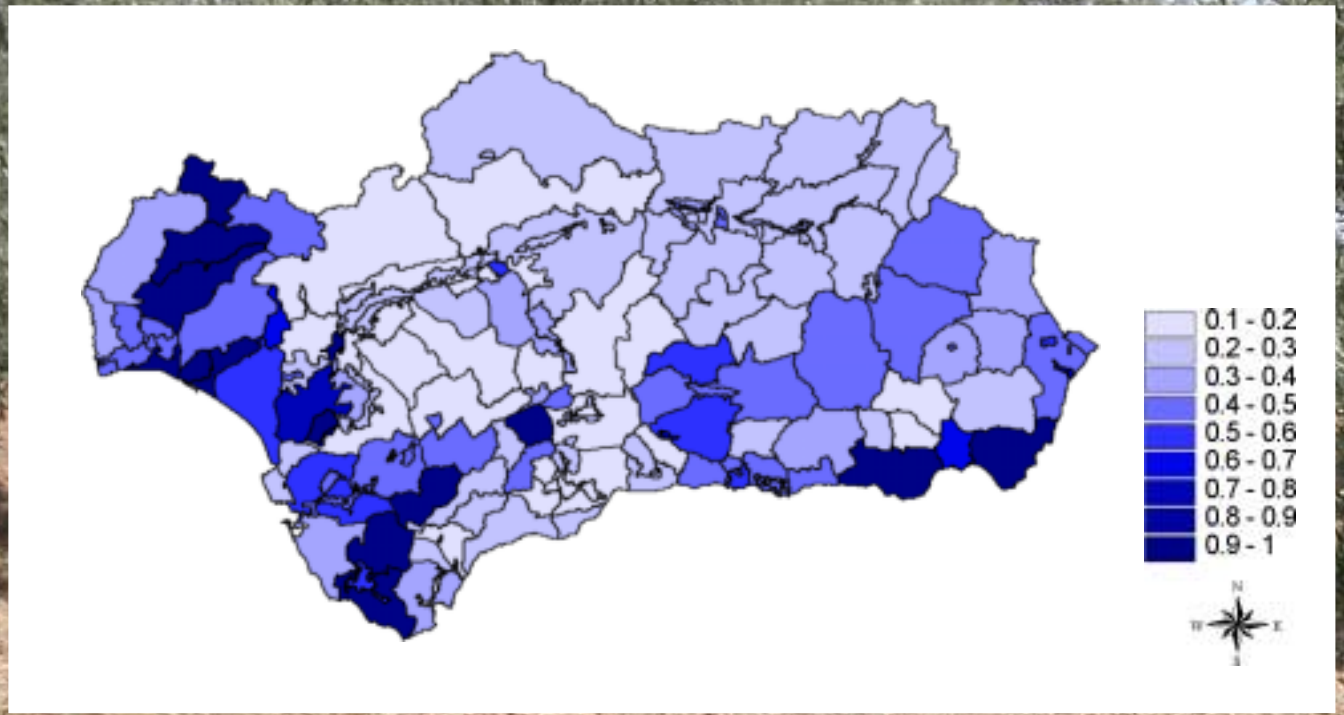

BCC efficiency of the homogeneus districts

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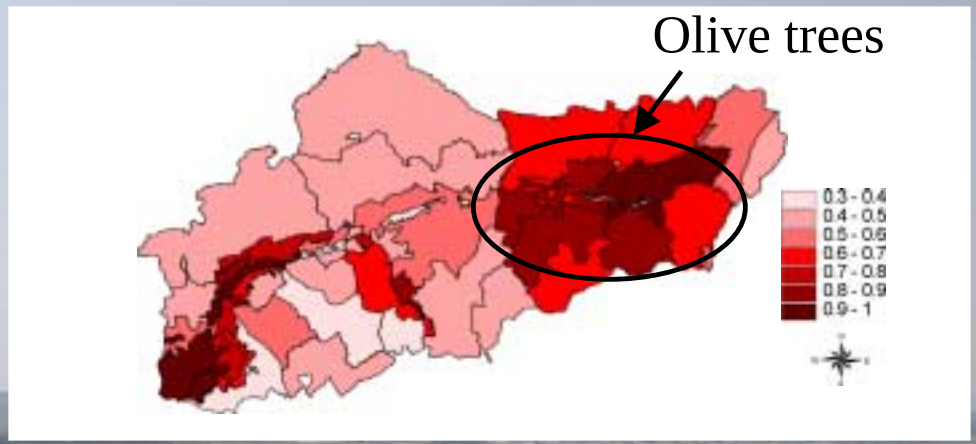
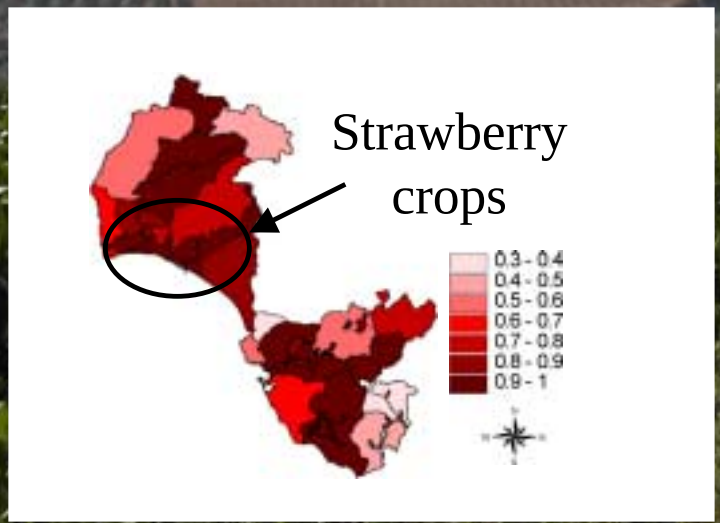
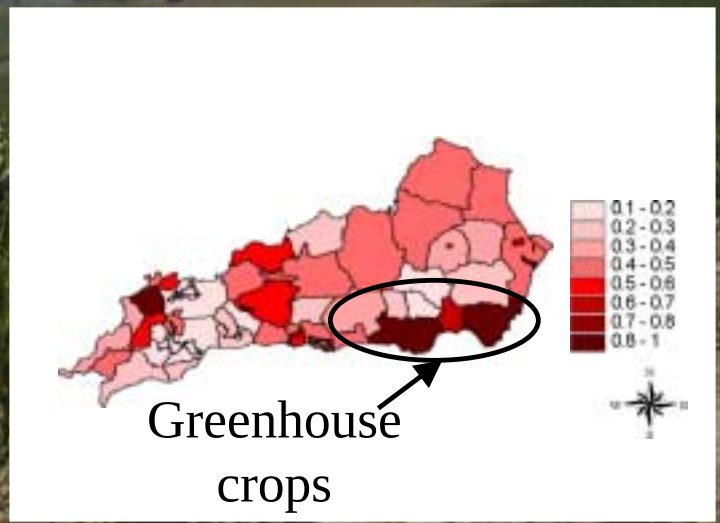
1.- Interior



2.- Atlantic Littoral



3.- Mediterranean Littoral



Irrigation districts selected

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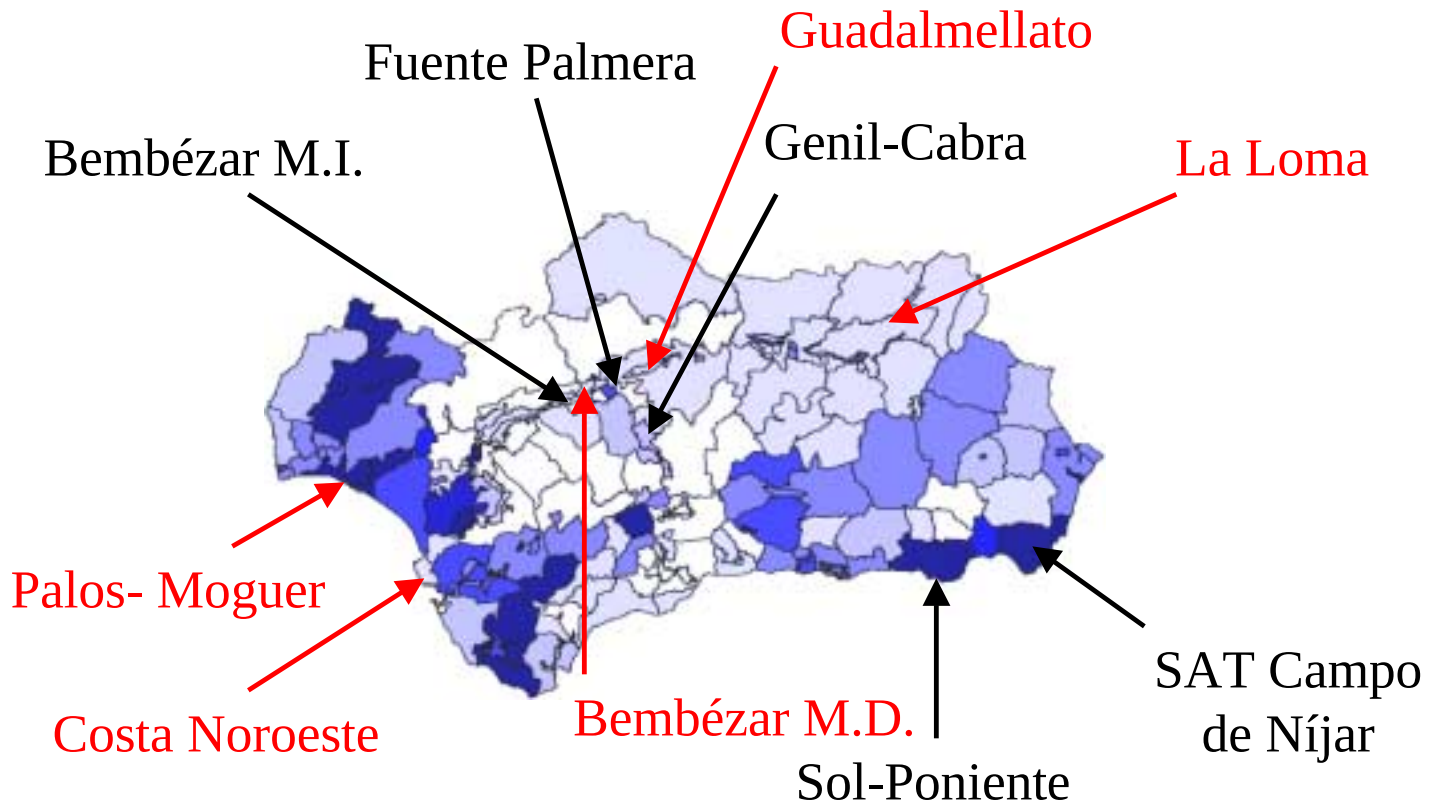

Irrigation districts selected

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District	Irrigation system	Crops	Revenue collection
Genil-Cabra	Sprinkler Localized	Extensive	€/ha €/m^3
Fuente Palmera	Localized	Extensive	€/ha €/m^3

Irrigation districts selected

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District	Irrigation system	Crops	Revenue collection
Bembézar MI	Surface (Furrow)	Extensive	€/ha

Irrigation districts selected

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District	Irrigation system	Crops	Revenue collection
Sol-Poniente	Localized	Intensive	€/m^3
SAT Campo de Níjar	Localized	Intensive	€/m^3

Output per unit water supply (€/m³)

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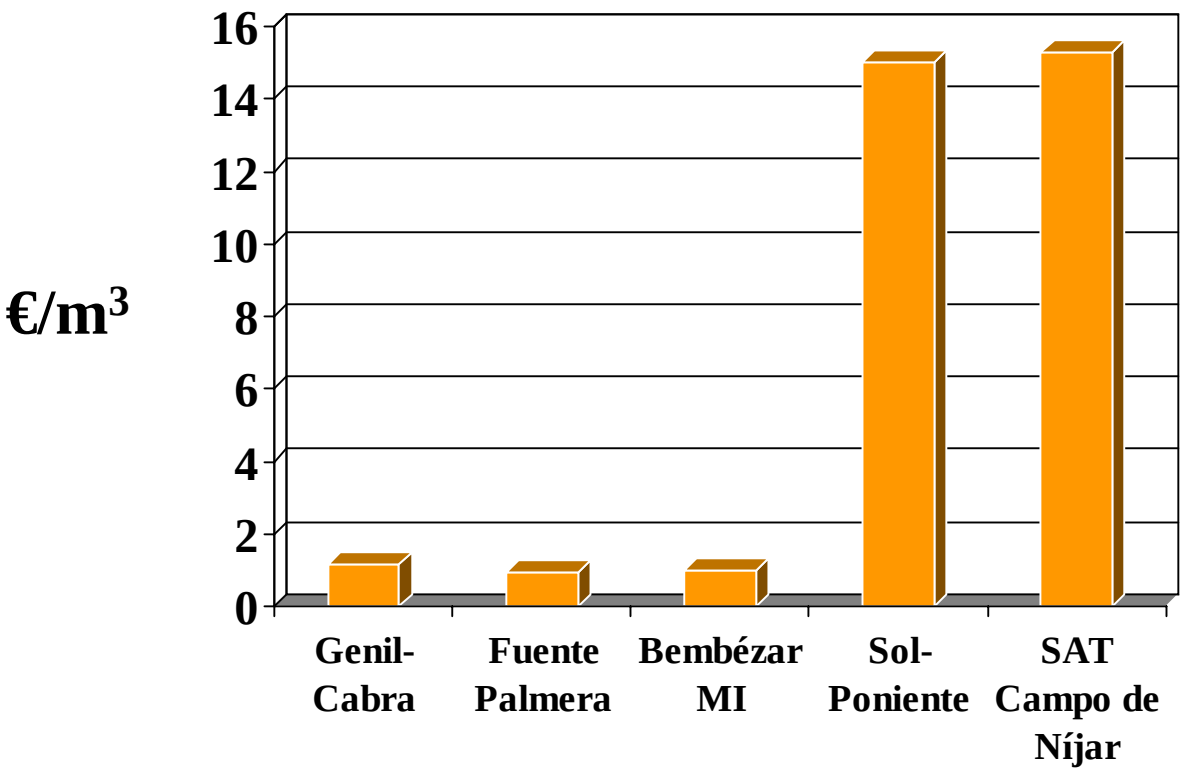

Total Management Operation and Maintance cost per unit area (€/ha)

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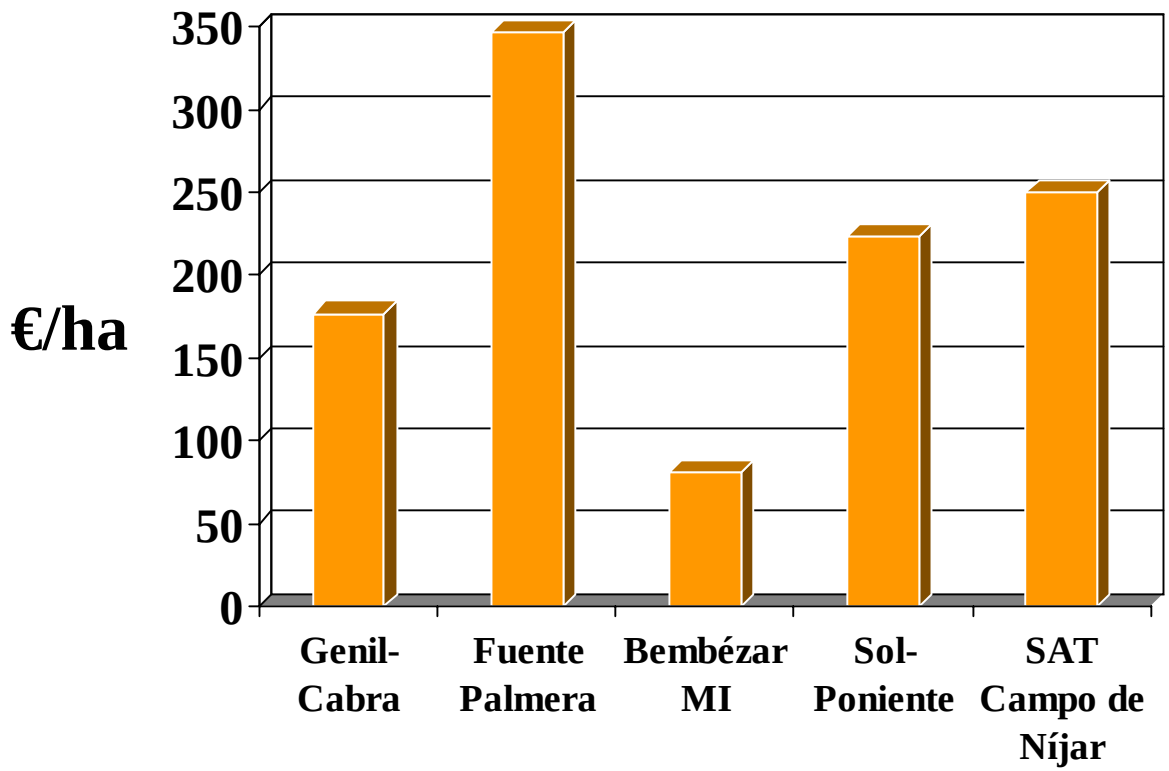

Output per unit irrigated area (€/ha)

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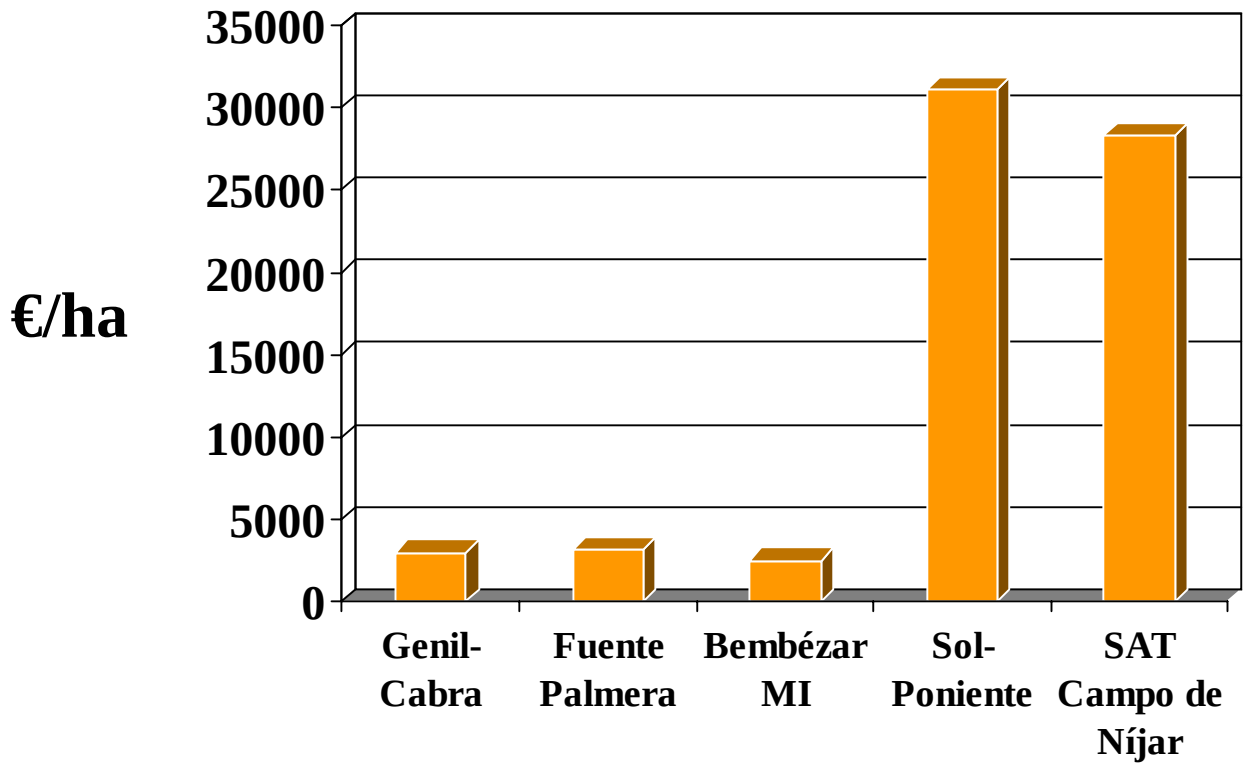

Average revenue per cubic metre of irrigation water supplied (€/m³)

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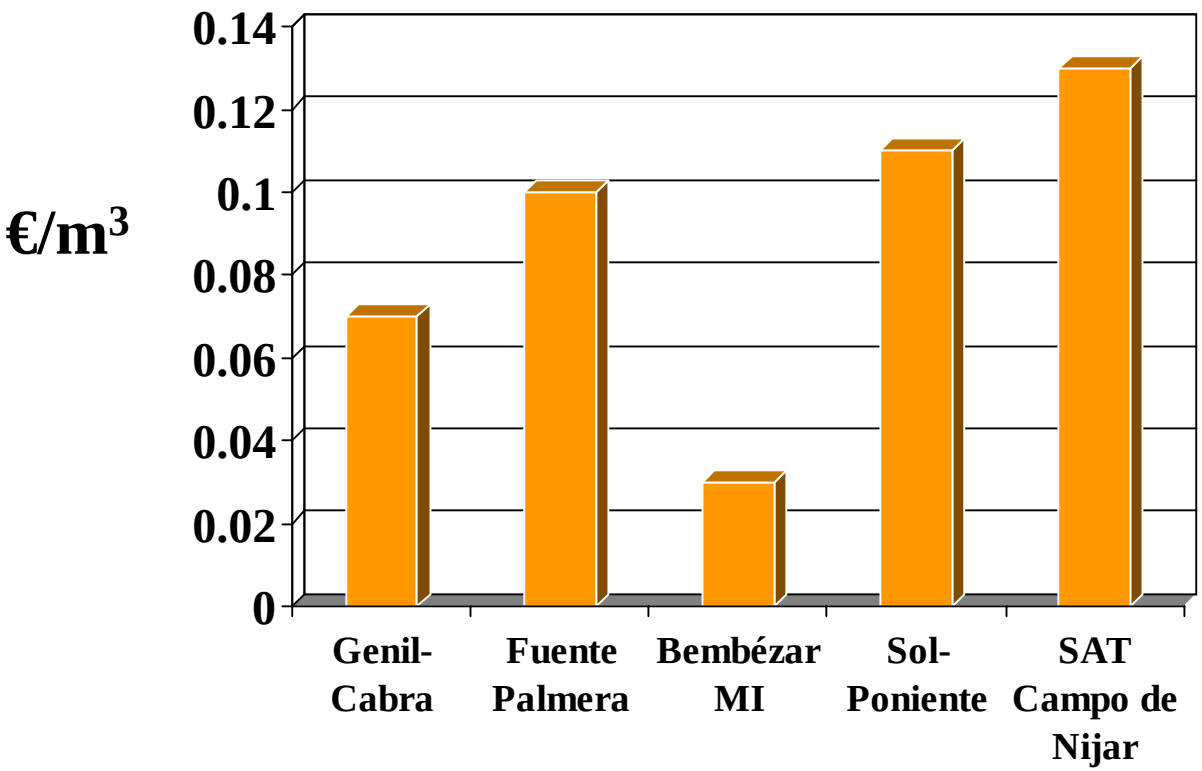

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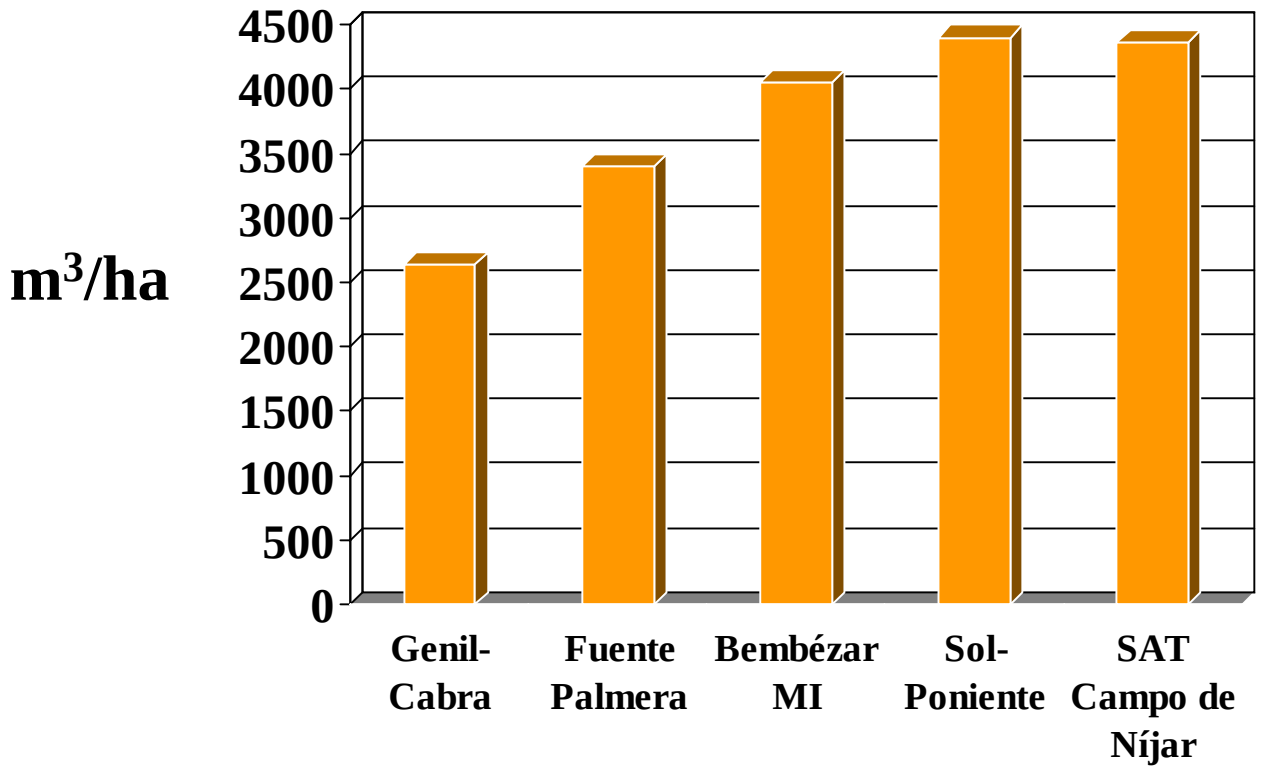
Annual irrigation water supply per unit command area (m^3/ha)



Total cost per person employed on water delivery (€/person)

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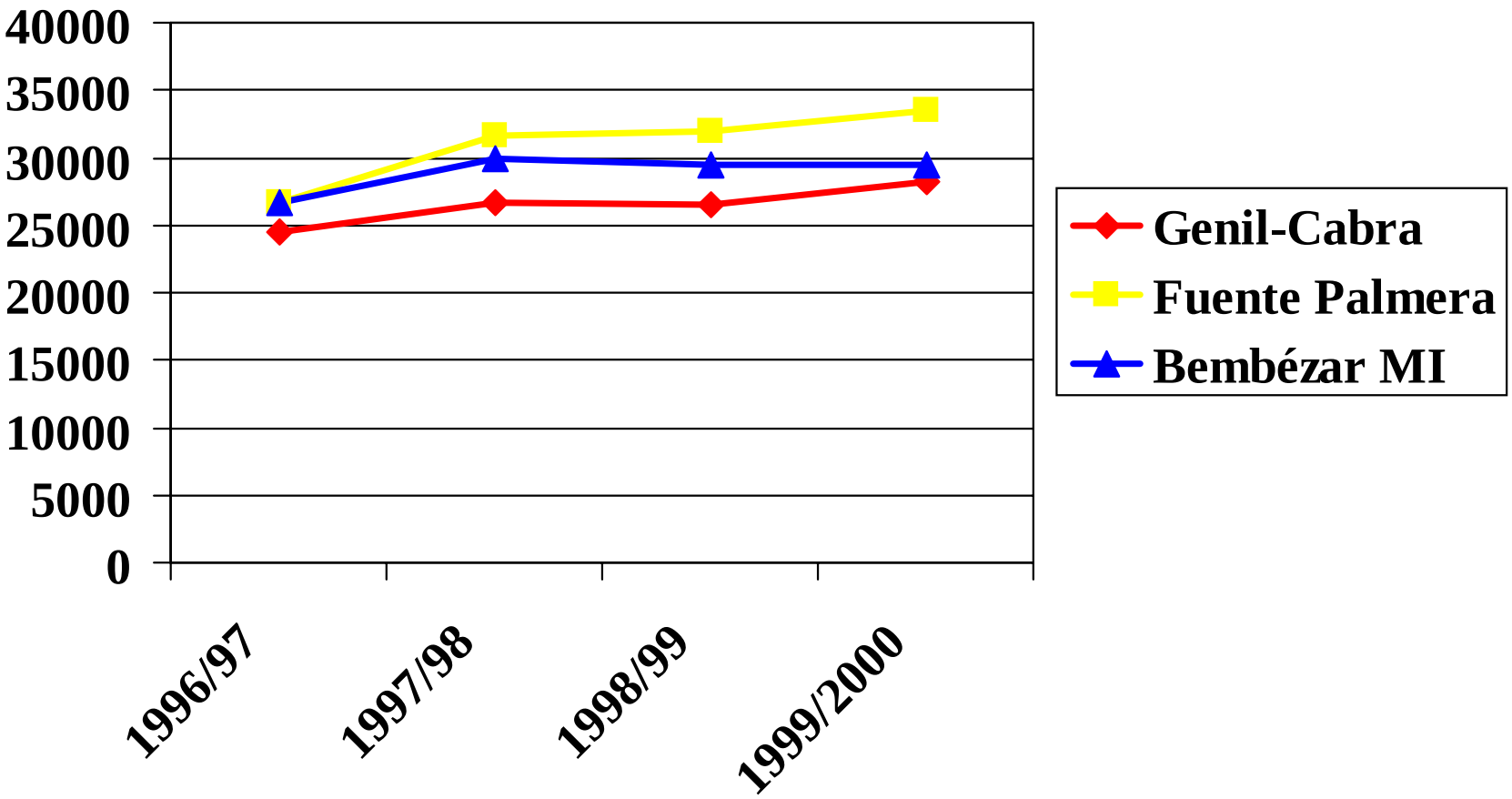

Annual irrigation water supply per unit command area (m^3/ha)

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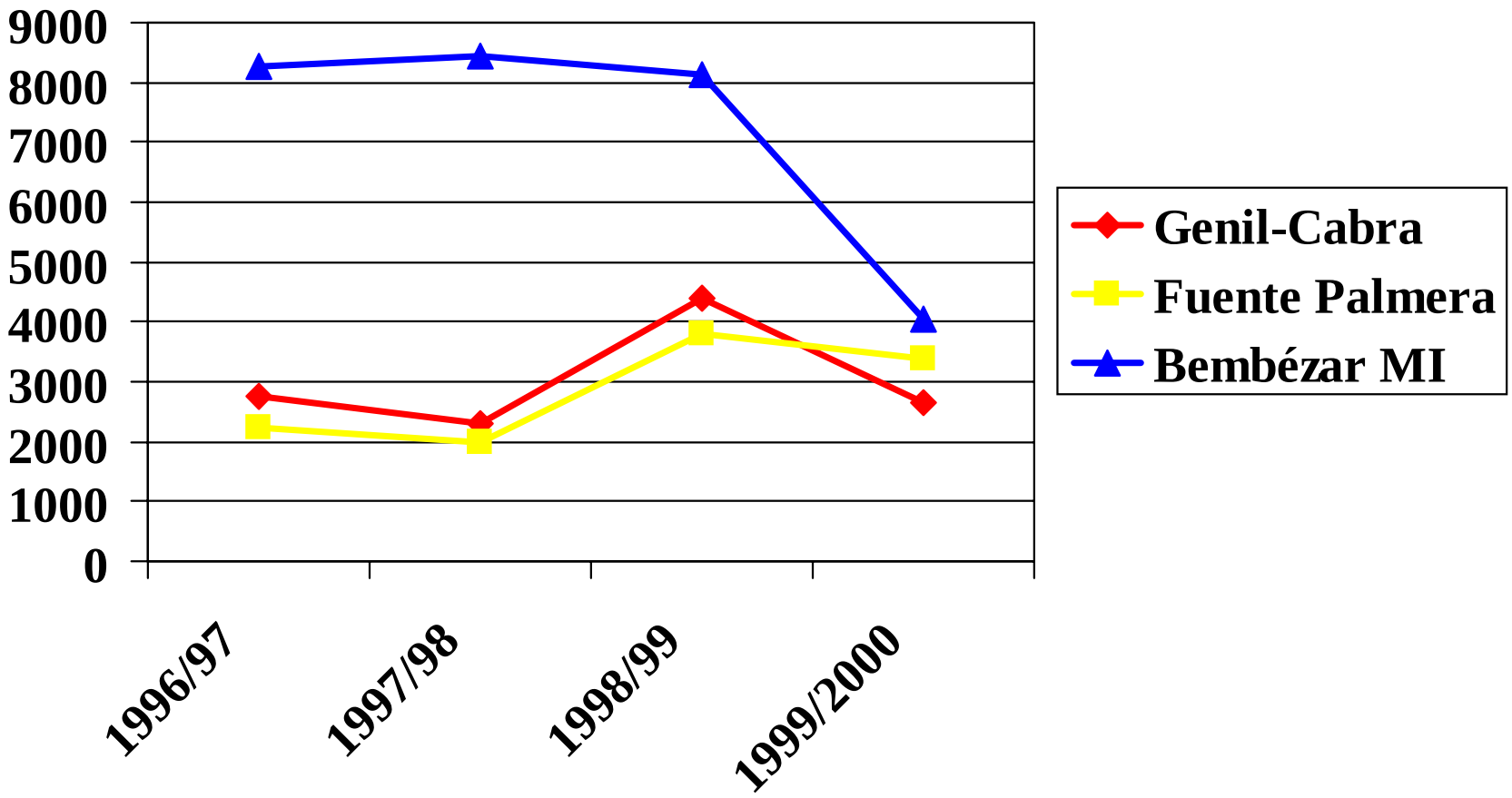

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