



Mid-term workshop  
Bratislava, May 26-28 2010

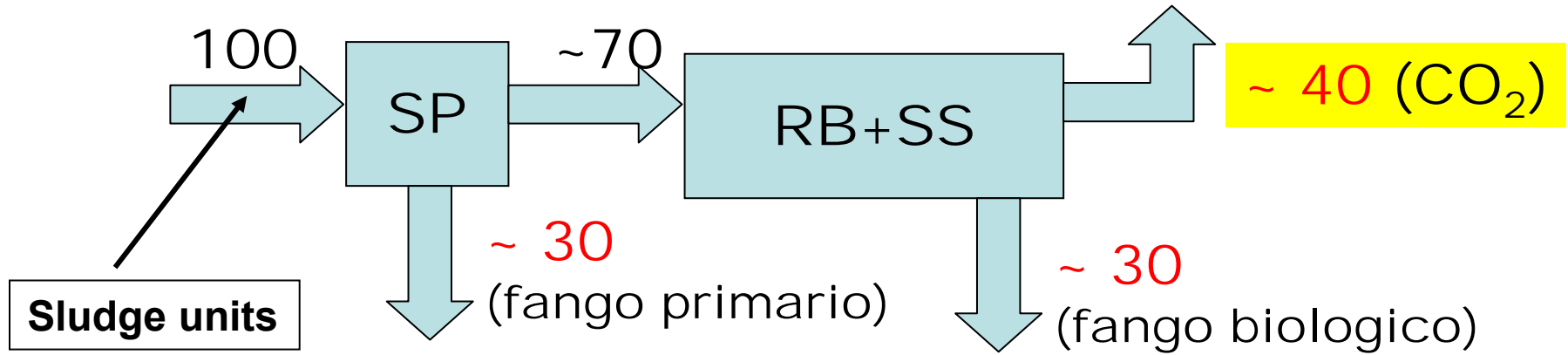
## Research needs in alternative sewage treatment technologies

- There is general agreement on the contribution of greenhouse gases (GHG) to climate change.
- When dealing with technologies to reduce GHG, so to contrast climate change, the importance of the contribution of waste water treatment plants is usually neglected, even though they play an important role. In fact:
  - treatment plants are everywhere;
  - they work 24 hrs/day;
  - their contribution in terms of GHG emission is as much significant as that of transport;
- The consequence is that research on this topic has not been performed almost at all.

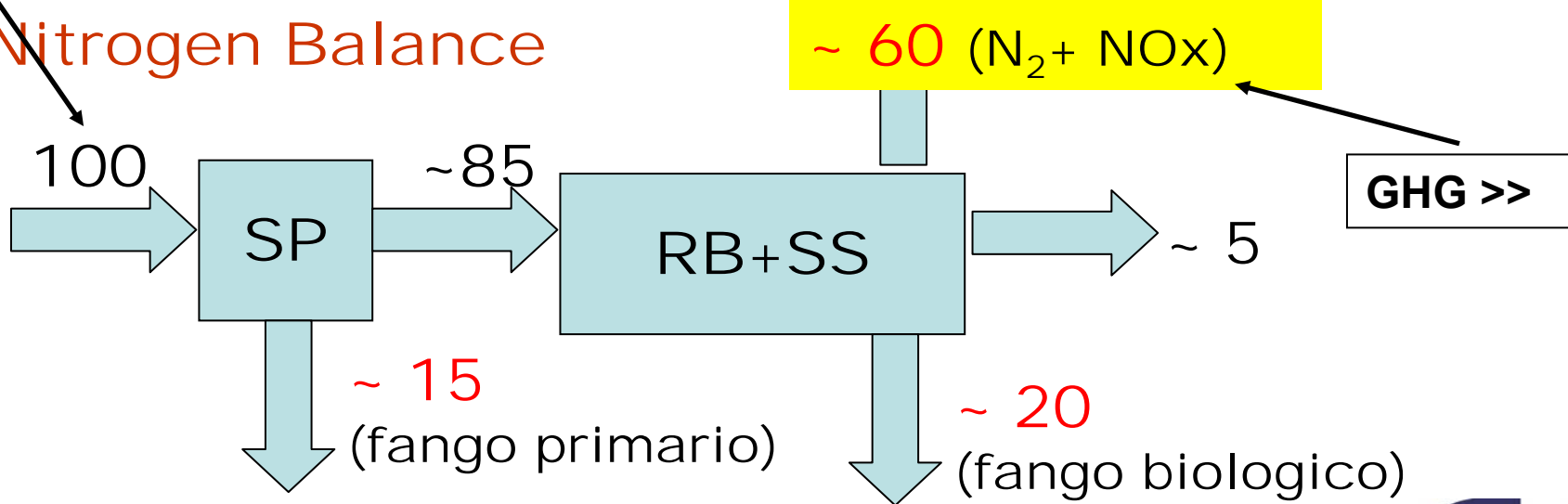


# (Nutrient leakage - greenhouse gas emission)

## COD Balance



## Nitrogen Balance



# PROCESSI AEROBICI vs PROCESSI ANAEROBICI (per 1000 kg di COD)

**AER.)**  $\text{COD} + \text{O}_2 \rightarrow \text{CO}_2$  (50% COD) + Fango (50% del COD) +  $\text{H}_2\text{O}$

**AN.)**  $\text{COD} \rightarrow \text{CH}_4$  (60% COD) +  $\text{CO}_2$  (30% COD) + Fango (10% COD) +  $\text{H}_2$

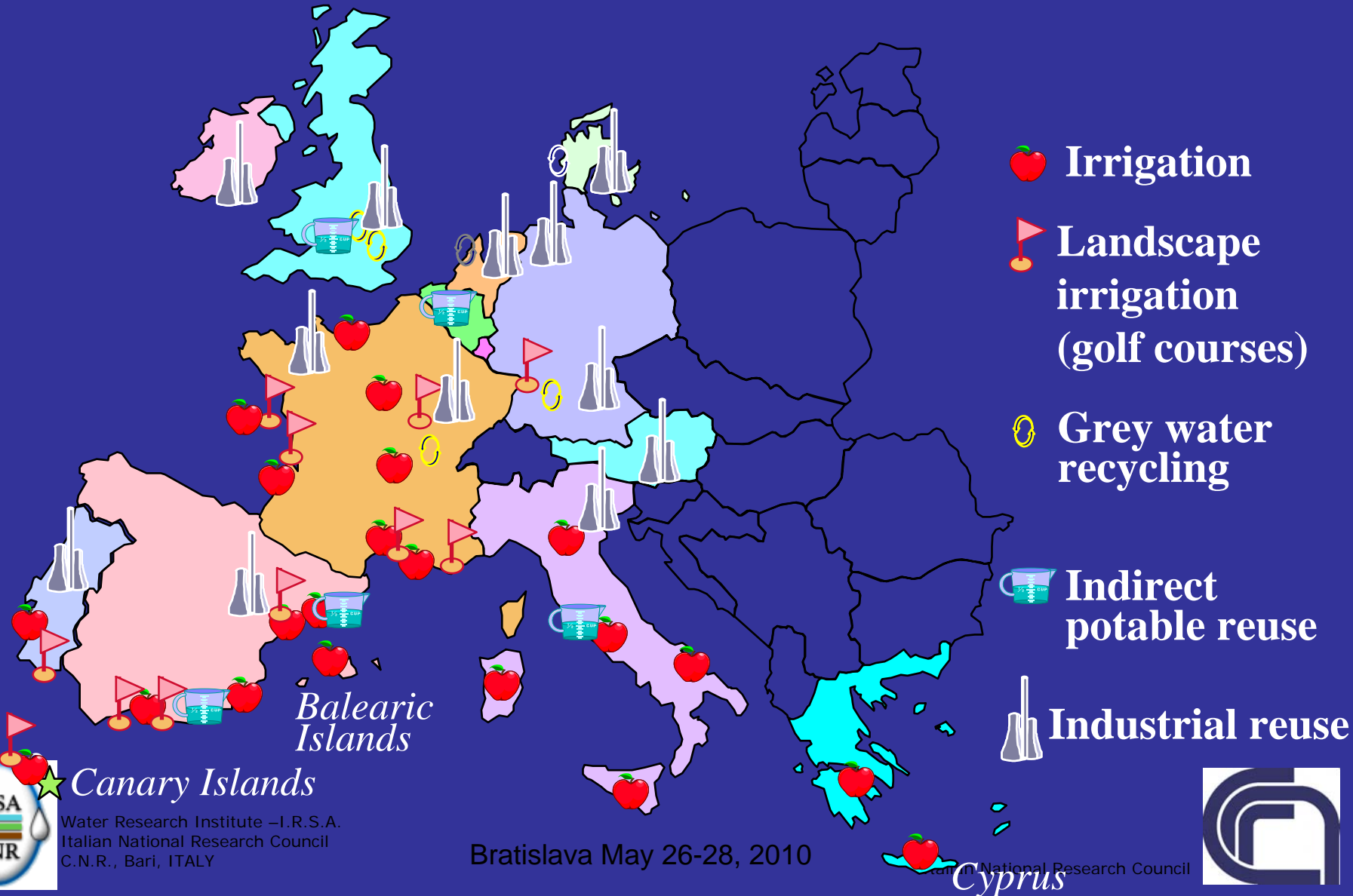
	<b>AEROBICO</b>	<b>ANAEROBICO</b>
<b>Sludge production</b>	<b>400-600 kg</b>	<b>20-150 kg</b>
<b>Energy consumption</b>	<b>1100 kwh</b> yes	<b>-3300 kwh</b> ( $\text{CH}_4$ production !)
<b>Nutrient consumption</b>	Fossil fuel used	no
<b>Azoto</b>	<b>20-25 kg</b>	<b>1-5 kg</b>
<b>Fosforo</b>	<b>1,5-2</b>	<b>0,5-1</b>

- All in all it emerges that anaerobic processes are the most favourable from the point of view of GHG emission.
- Nevertheless, to reach an optimal yield within an anaerobic process, the COD should be  $\sim 4000$ , while urban sludges have COD  $\sim 600$ , which is too low.
- Technologies are needed which allow high yields with COD inputs  $<$  than those existing at present.



# Water reuse in EU Countries

## Different types of reuse



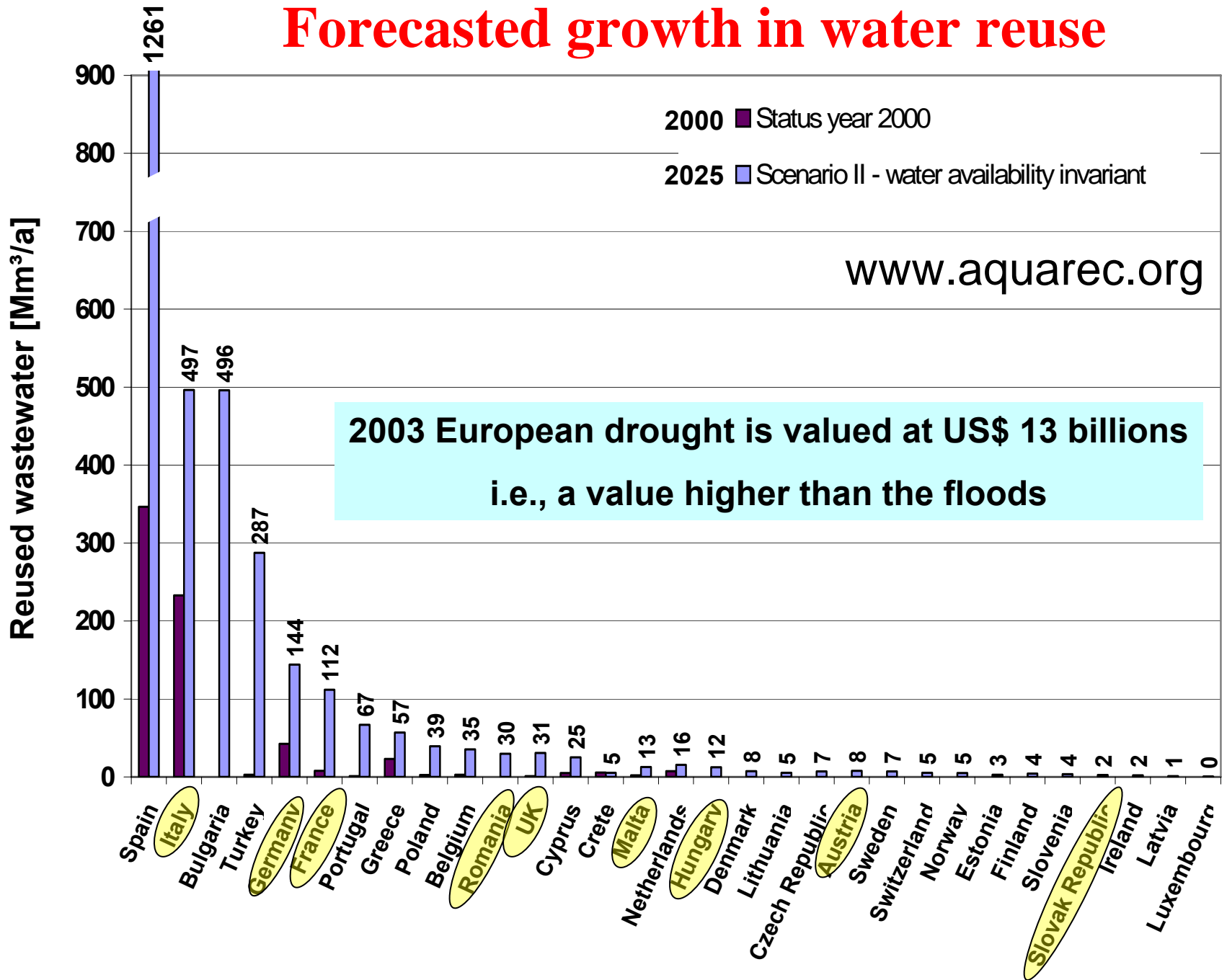
Water Research Institute - I.R.S.A.  
Italian National Research Council  
C.N.R., Bari, ITALY

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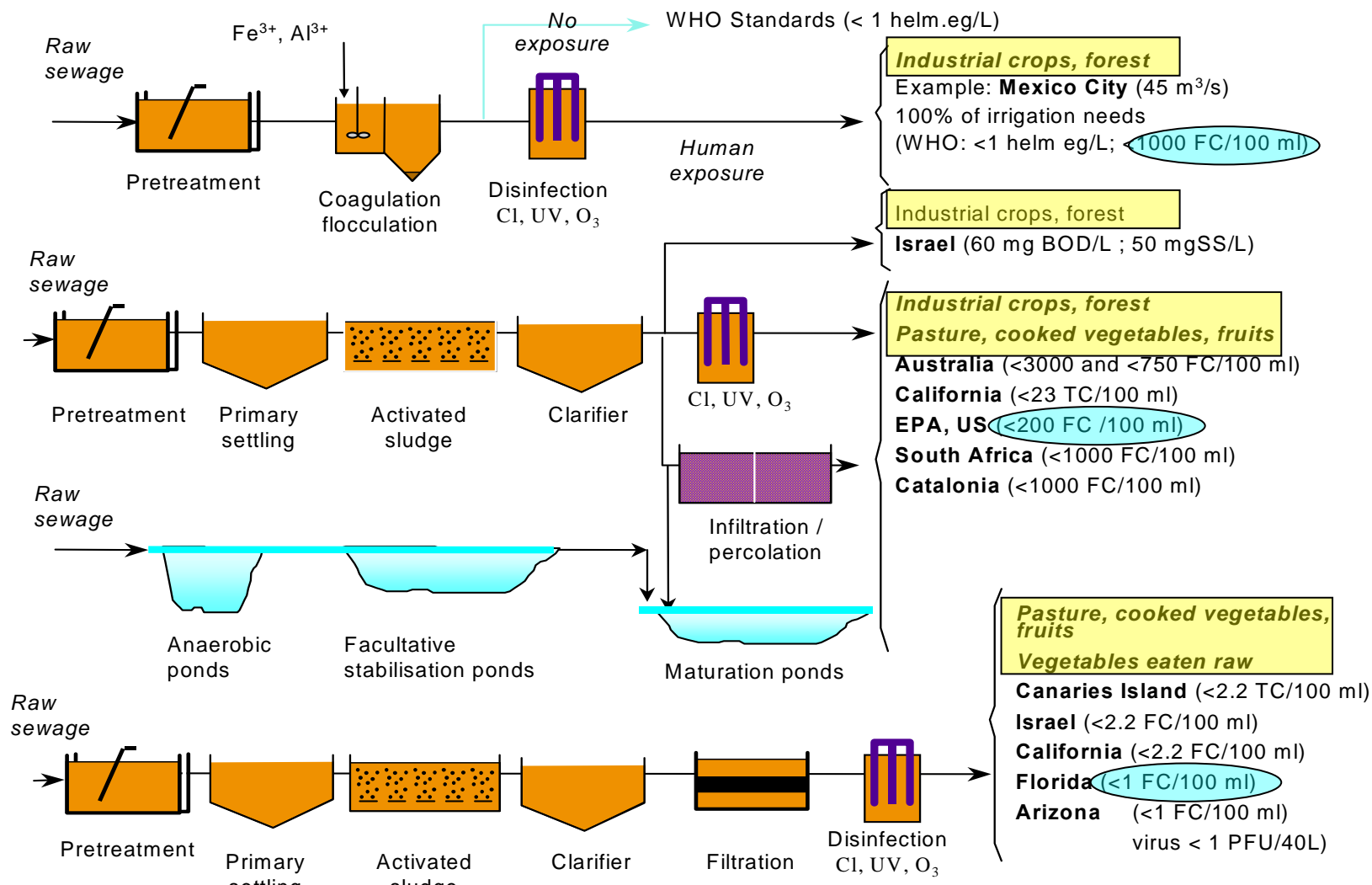
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# Forecasted growth in water reuse



# Typical treatment schemes used to achieve different water quality objectives for agricultural irrigation



- The philosophy is that water treatment and management have to be suited to the particular use water has to be supplied for, so not to waste money and energy.
- All in all .....



# Los Angeles – USA



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