



MARSOL Workshop Technical Solutions for Managed Aquifer Recharge



Wednesday, March 11th 2015. 10 h.
Centro cultural "Las Fuentes", C/ Alta, nº 21 -23. Gomezserracín (Segovia)
Activity to involve groundwater users.

Collaborate:



This initiative takes place in the framework of "FP7-ENV-2013 MARSOL (GA 619 120). Demonstrating Managed Aquifer Recharge as a Solution to Water Scarcity and Drought (WFD)" with the support of the European Commission, however it reflects the views only of the authors, and the Commission cannot be held responsible of any use which may be made of the information contained therein.

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Comisión Europea



Within the framework of MARSOL project (FP7, Water Innodemo call) are intended activities regarding "Training of project participants' staff, researchers, industry/SMEs, and end users on Managed Aquifer Recharge (MAR) and new developments in this field, to foster knowledge among all project partners and to ensure that the project's RTD and DEMO results effectively reaches the end-users." In this context, the main objectives for this training workshop are:

- To expose the technical solutions applied by the partner's expertise regarding each demo-site, studying the applicability to be used in other equivalent environments.
 - Exposition of successful construction criteria (specific designs, materials...)
 - Exposition of successful water management criteria, mentioning the "must" as well as the "musn't".
 - Criteria for cleaning and maintenance of the existing structures lengthening the infiltration capacity and the life-span of the structures.
 - Other criteria that the expert speakers could include in their presentations regarding technical solutions, benchmarking, indicators and dissemination procedures.
 - Response to all the questions that could arise along the full workshop.
- The activity is directed to MARSOL partners, technicians, practitioners, public authorities, farmers and irrigation communities' board, as well as students and the population in general.
Important notice: As it is a rural area, speakers will employ a colloquial language in their expositions.

PROGRAM

10:00 - 10:10	Welcome. Mr. Enrique Herranz. ATE. President of the Carradillo Irrigation Community.
10:10 - 10:30	MAR and water footprint • Ms. Elvira del Pozo Campos. Agronomic Engineer (TRAGSATEC)
10:30 - 10:55	analysis. • Dr. Xavier Sánchez Vila. CIVIL Dr. Engineer (UPC, MARSOL)
10:55 - 11:15	Practical technical solutions for Managed Aquifer Recharge facilities • Dr. Enrique Fernández Escalante. Hydrogeologist (TRAGSA, MAR to MAR-ket)
11:15 - 11:35	Urban rain water harvesting and Infiltration. Architectonical designs and solutions • Mr. Ignacio Prieto Leache. Architect (TRAGSATEC, DINA-MAR)
11:35 - 12:00	Coffee break
12:00 - 12:20	Low Impact MAR activities and benchmarking • Dr. Jon San Sebastián Saulo. Biologist (TRAGSATEC, DINA-MAR)
12:20 - 12:40	MAR, energy efficiency and use of alternative energy systems for Irrigation. Tech. solutions • Mr. Francisco de Borja González Herrarte. Agronomic Engineer (TRAGSA)
12:40 - 13:00	ICTs solutions for MAR activities • Ms. Maria Eugenia Garcia de Garayo y Milán. (Telecom. Eng (TRAGSA-WIRE AG)
13:00 - 13:20	Technical solutions for MAR experiences in Spain. State of the art and future panorama • Dr. José Antonio de la Orden Gómez. Mining Dr Engineer (Spanish Geological Survey).
13:20 - 13:35	Premiere of the film "MAR Technical solutions in Arenales aquifer"
13:35 - 14:00	Open debate. Rapporteur: D ^a Elvira del Pozo Campos (TRAGSATEC)
14:00	Closing. Sra. D ^a . Laura del Río Arranz. Mayor of Gomezserracín (TBC).

TBC: To be confirmed.

This schedule, approved in principle, might be subject to modification. Organized by:



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MAR and Water Footprint

By Elvira del Pozo
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*<http://www.marsol.eu>



Índex

1. CONCEPT
2. COMPONENTS
3. WF & AGRICULTURE
4. WF & MAR
5. MAR EXAMPLES
6. CONCLUSIONS



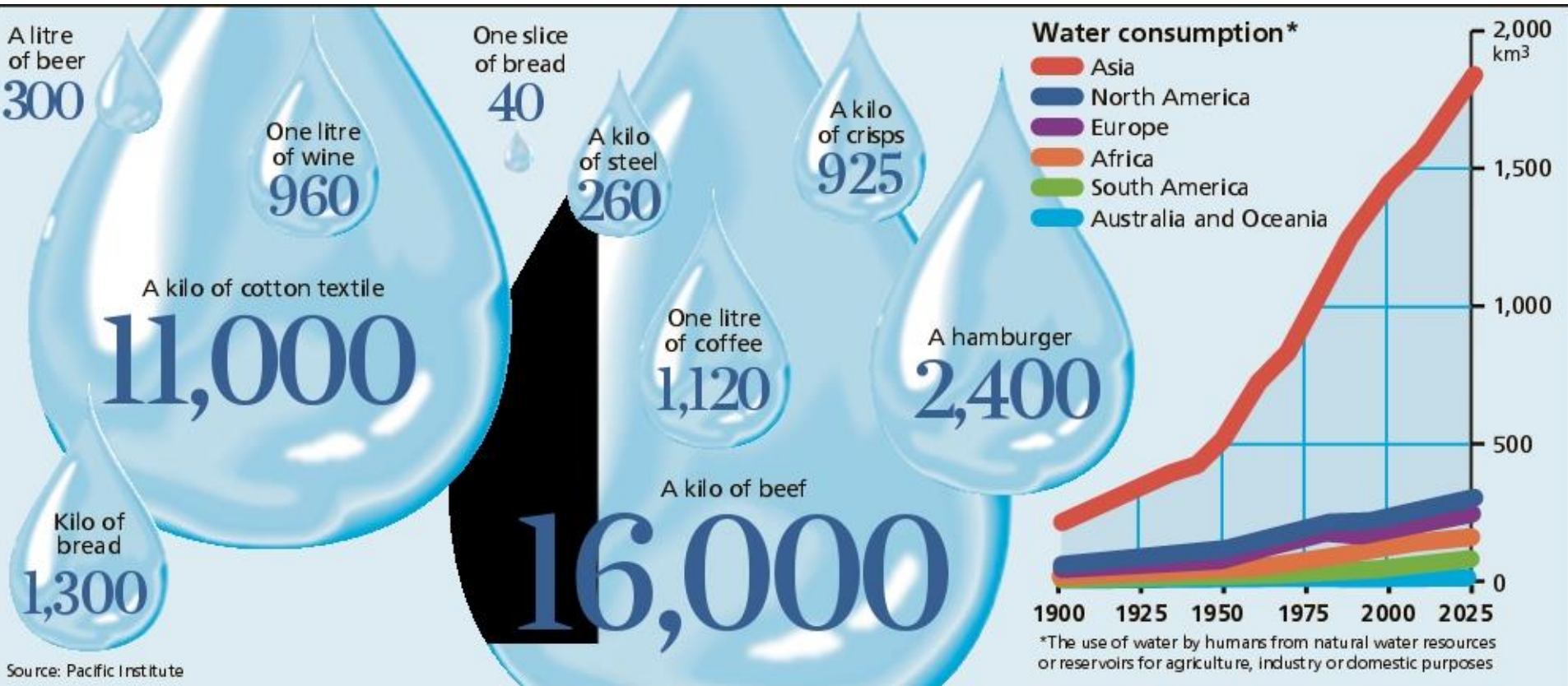
TECHNICAL SOLUTIONS FOR
MANAGED AQUIFER RECHARGE

MARENALES

Water footprint

The total volume of freshwater (VIRTUAL) consumed (evaporated) & polluted:

- to produce goods
- in a contry, sector, enterprise, person...



Source: Pacific Institute

WF food

Water to grow
the potatoes

130 l/kg



Water used in
processing

10 l/kg



Water used in
the home

0.1 l/kg

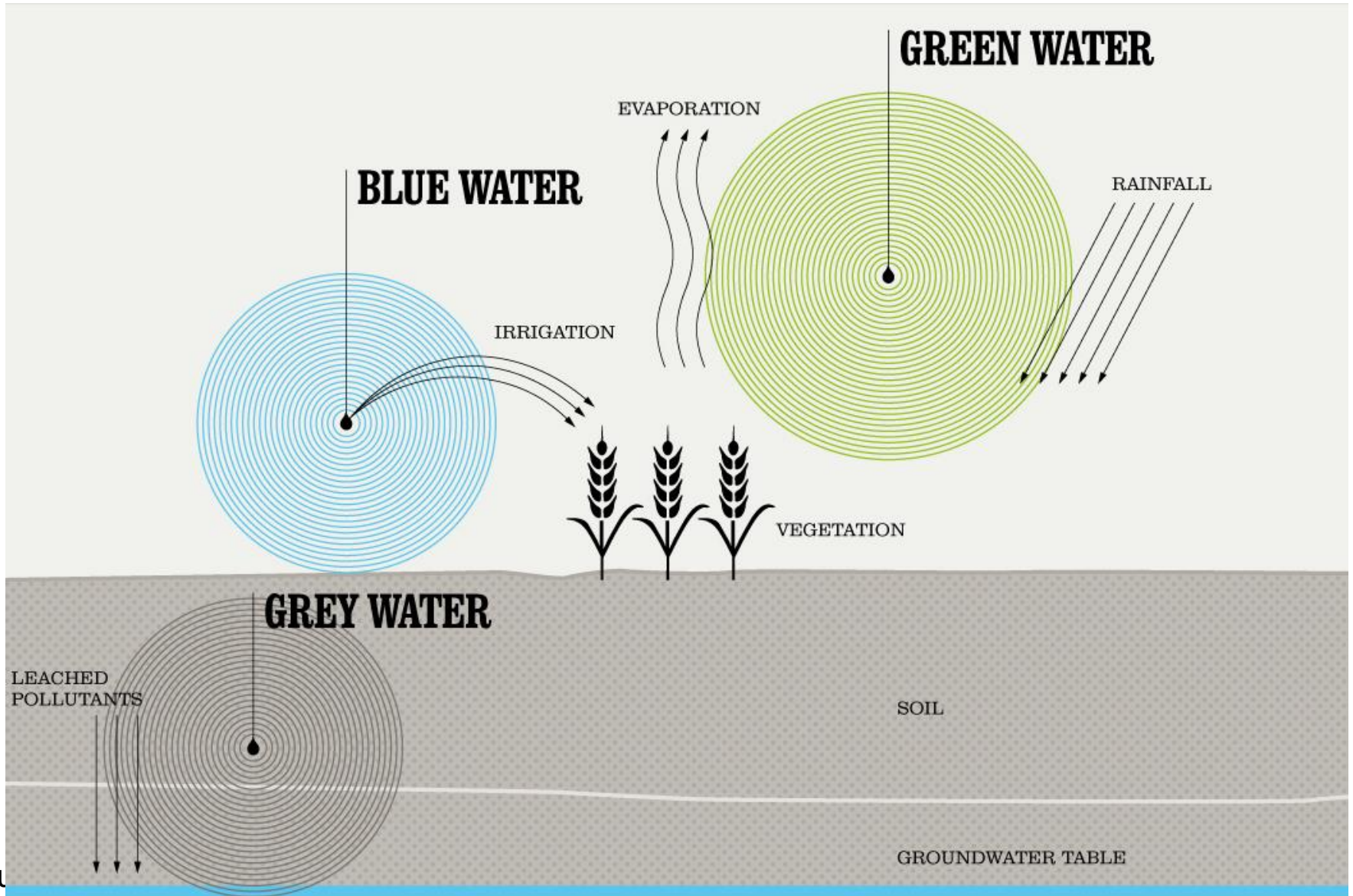


How thirsty is your food?



ALIMENTO	HUELLA HÍDRICA(L/Kg)
Aceite de oliva virgen	14.431
Aceite de girasol	6.656
Azúcar refinado	1.781
Cebollas	345
Chocolate	17.195
Harina de trigo	1.848
Jamón curado	5.797
Huevos frescos	3.264
Leche entera	1.898
Mantequilla	5.553
Nuez moscada	34.319
Queso rallado	5.060
Mandarinas (cítricos)	748
Mostaza	4.300
Pollo	3.364

Components





WATER FOOTPRINT OF GROWING A CROP:

$$\frac{\text{Crop water use (m}^3\text{/ha)}}{\text{Crop yield (ton/ha)}}$$

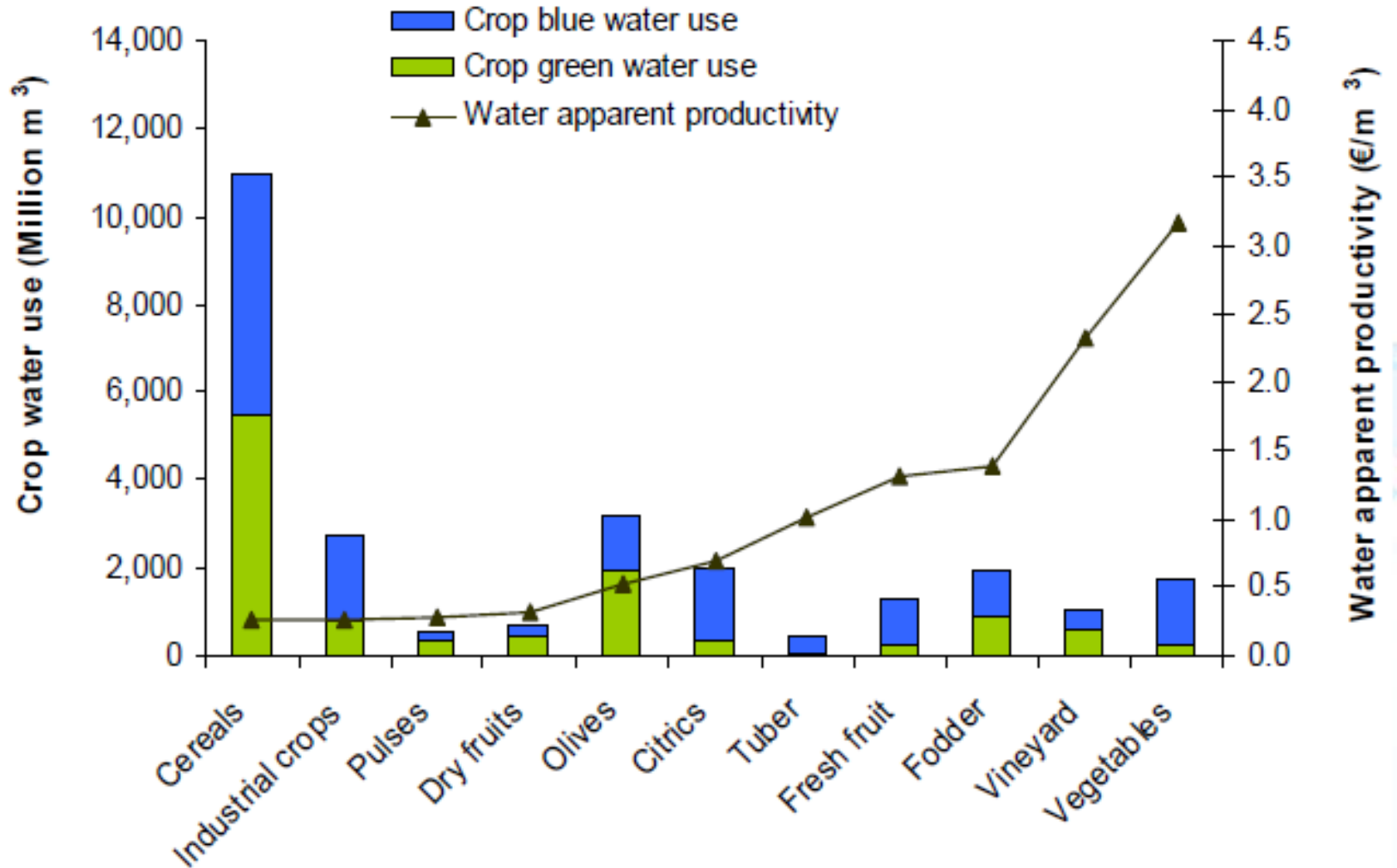
Green water evapotranspiration =
min (crop water requirement, effective precipitation)

$$CWU_{\text{green}} = \sum ET_{\text{green}}$$

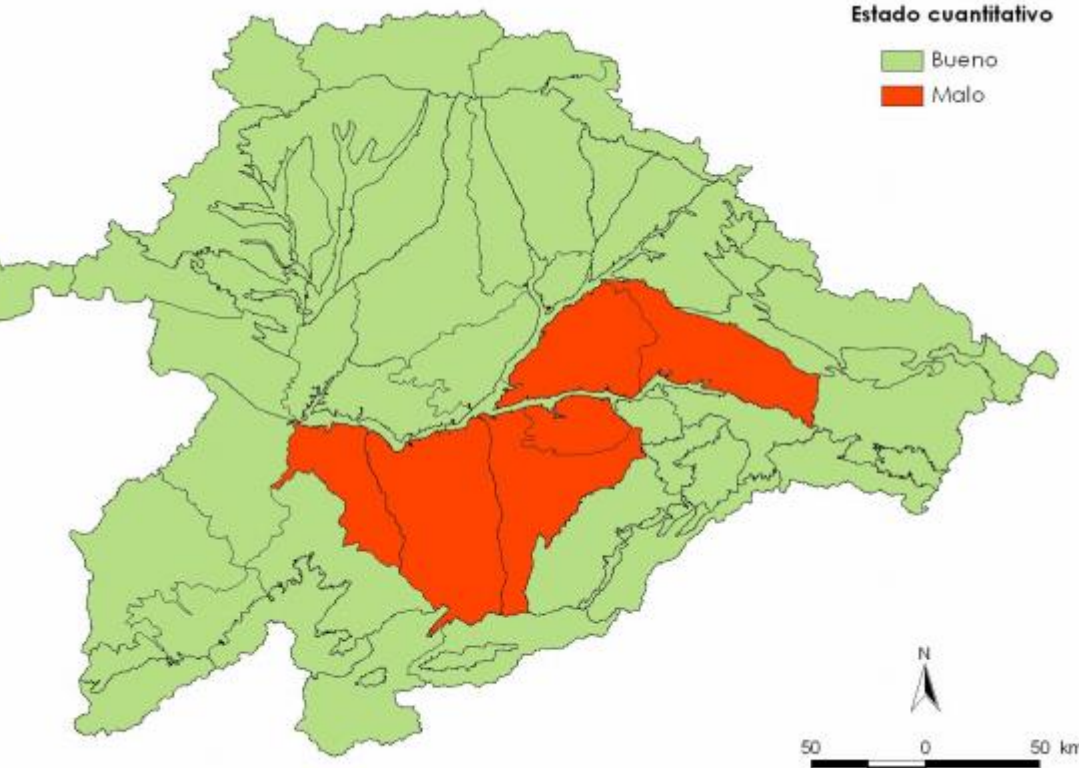
Blue water evapotranspiration =
min (irrigation requirement, effective irrigation)

$$CWU_{\text{blue}} = \sum ET_{\text{blue}}$$

WF: Agriculture in Spain



Colour is important



Identificación masa agua subterránea		Tipo de riesgo
Código	Nombre	Cuantitativo
		Extracción
7	Terciario y Cuaternario del Esla-Cea	
9	Tierra de Campos	
16	Castrojeriz	
20	Aluviales del Pisuegra-Arlanzón	
25	Páramo de Astudillo	
28	Verín	
29	Páramo de Esgueva	X
30	Aranda de Duero	X
31	Villafáfila	
32	Páramo de Torozos	
37	Cuenca de Almazán	
38	Tordesillas	
39	Aluvial del Duero: Aranda-Tordesillas	
41	Aluvial del Duero: Tordesillas-Zamora	
43	Páramo de Cuéllar	X
44	Páramo de Corcos	
45	Los Arenales	X
47	Medina del Campo	X
48	Tierra del Vino	X
52	Salamanca	
55	Cantimpalos	
59	La Fuente de San Esteban	
63	Ciudad Rodrigo	
64	Valle de Amblés	



Mitigation of the WF

- Spain WF is more than 48.000 hm³
- >80% caused by agriculture
- More than a million hectares irrigated from acuífer
- 38% of the 699 subterránean water masses has bad status
- WFD aims to get good status in all acuífers by 2027
- WF should be reduce or/and... find a way of mitigate it:

One of the most efficient ways to alleviate water footprint is through effective action to promote and accelerate the recharge, where water is being extracted, often with negative balance for the aquifer.



MAR & WF

- Coca-Cola South Latin, + Water Initiatives:
 - projects that favor the development of native forests in Córdoba (Argentina): adequate water infiltration into the soil and groundwater levels
 - San Pedro de Melipilla and Coquimbo (Chile): develop works that provide complete infiltration in soils and aquifers precipitated water
- In Argentina, Danone Group: project "Leave your footprint, a Reserve for more Reservations"
- Ancash region (Peru): initiative that aims at optimizing the operation of treatment plants wastewater in small communities
- In Costa Rica, the FEMSA Foundation is facilitating the work of community organizations who want to preserve the origin of the water, through the purchase of the headwaters and reforestation of its slopes and basins.



CONCLUSIONS

- Water footprints are important as an **indicator** of impact on environment
- But **it's not all about size**: don't assume that a big water footprint is *bad*
- Need to consider ecosystem impact, which will be very case specific: **It's not just about to produce with less water but with less impact**
- **MAR is a good technique for reducing impact in aquifer** in risk
- Can contribute to more sustainable crops with less irrigation restrictions
- Also is a way to compensate society for agricultural externalities (agriculture is responsible of more than 80% of Spanish's water footprint)



TECHNICAL SOLUTIONS FOR
MANAGED AQUIFER RECHARGE

MARENALES

SPANISH TRAINING WORKSHOP
2015 MARCH



MARSOL PROJECT
MARENALES Workshop
Technical Solutions for
Managed Aquifer Recharge



*****Thank you*****

Gomezserracín, 2015 March 11th

Collaborate:



This initiative takes place in the framework of "FP7-ENV-2013 MARSOL (GA 619.120). Demonstrating Managed Aquifer Recharge as a Solution to Water Scarcity and Drought (WP5)" with the support of the European Commission, however it reflects the views only of the authors, and the Commission cannot be held responsible of any use which may be made of the information contained therein.

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