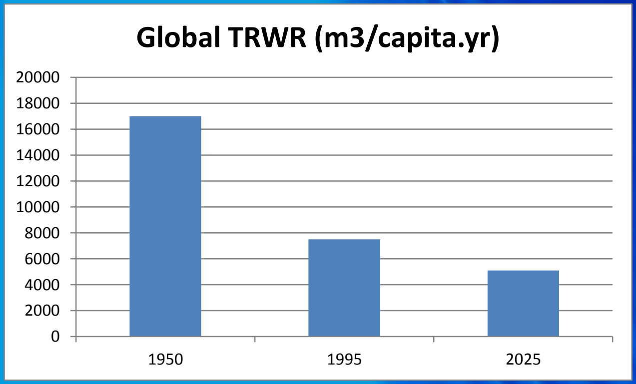
Sustainable Water Management at SOLVAY

Koen Vermeiren



CEFIC - Water Workshop

Outline

- Environmental Plan 2012 – 2020 (Water)
- Water intake versus consumption
- Water risk assessment : tools and conclusions
- Best practices for sustainable water management
- Illustration of our committment

Environmental Plan 2012-2020 (*)

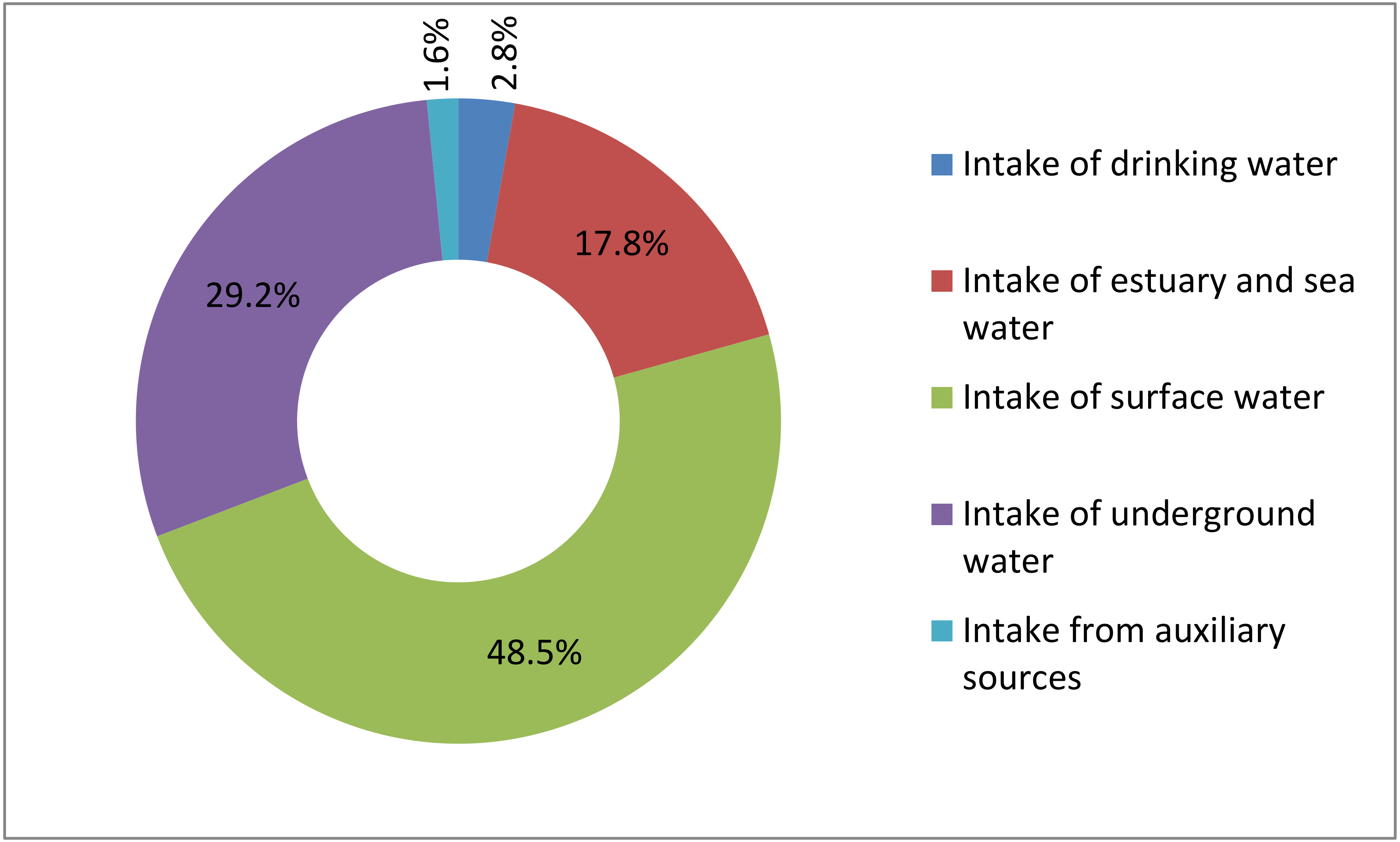
Water Objectives

- To reduce further by 10% (**) the withdrawal of drinking water and groundwater
- To implement a Sustainable Water Management in 100 % of the sites under hydric stress

(*) Sustainable Development report 2012, http://www.solvay.com/EN/Sustainability/Sustainability.aspx, p 7

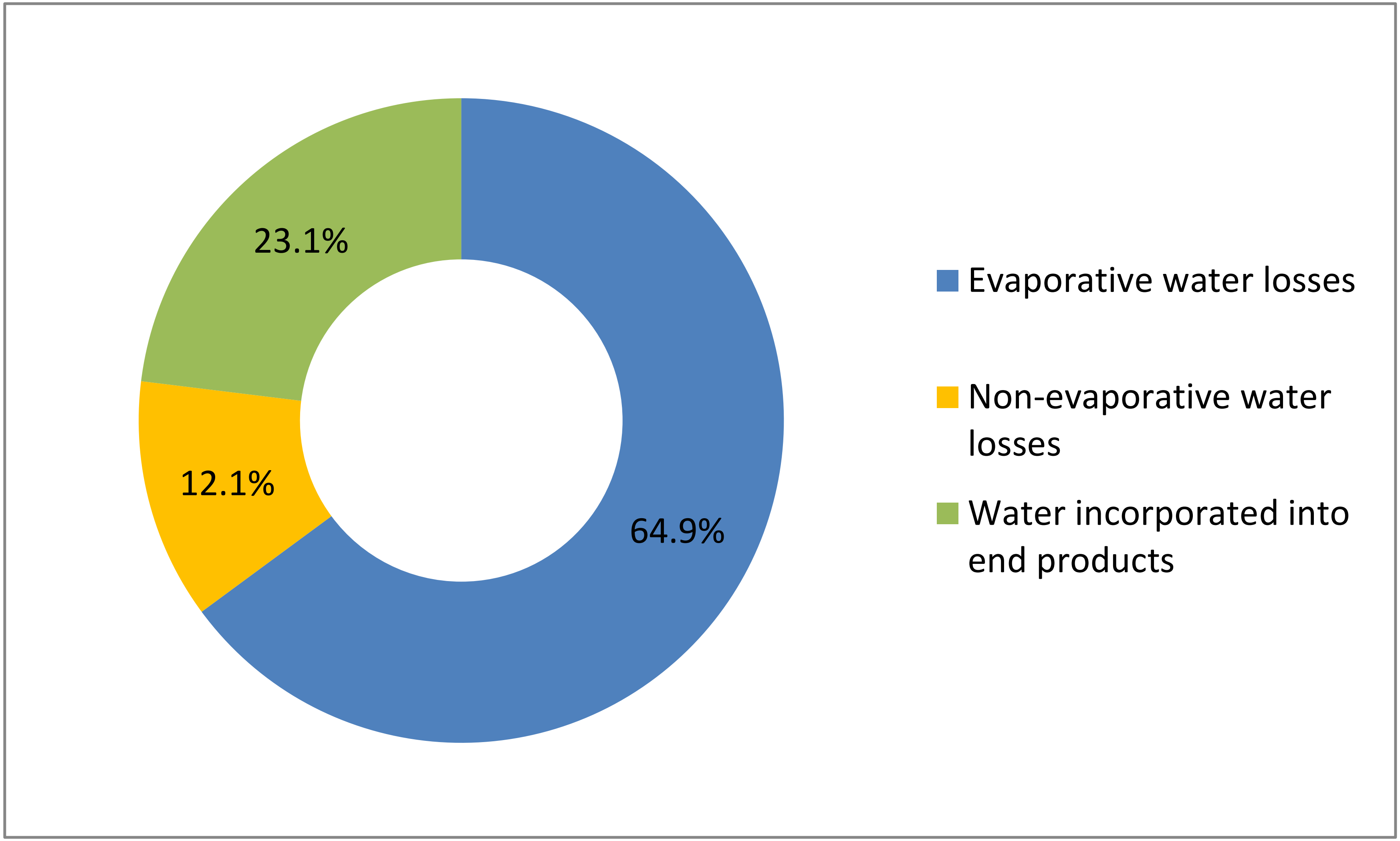
(**) At constant operational perimeter

Water intake (2013) : 800 Mm^3



SOLVAY
asking more from chemistry®

Water consumption (2013) : 44 Mm^3



Water Risk Assessment

Methodology

- Application of macroscopic pre-screening tools to identify sites at risk (121)
  - Global Water Tool (WBCSD)
  - Aqueduct (WRI)
- Confirmation of hot spots by a detailed analysis taking into account local situation (35)
  - Internal water risk evaluation survey
- Monthly water scarcity evaluation (17/35)
  - UNESCO-Institute for Water Education, Hoekstra et al., 2011

Application of macroscopic screening tools

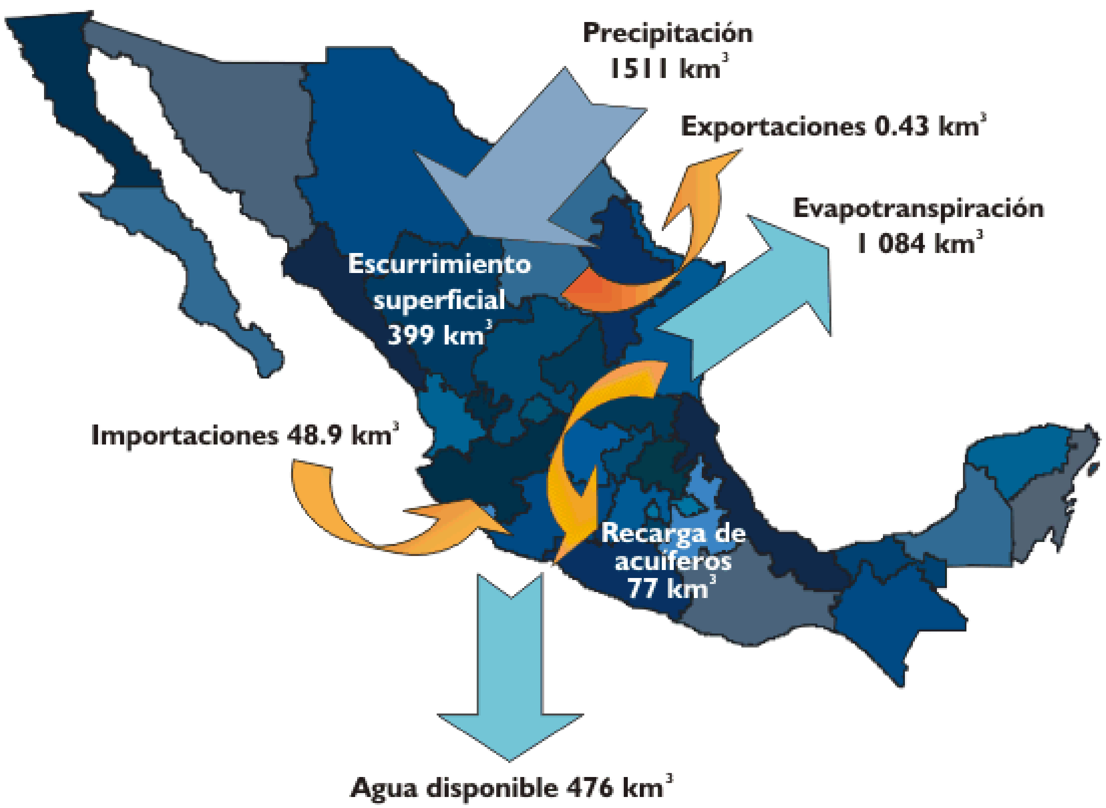
- *Global Water Tool (WBCSD)*
  - On-line mapping system plotting site locations with water, sanitation, population and biodiversity datasets
  - Generates DJSI, GRI, CDP Water and Bloomberg external reporting metrics
  - Inventories, risk and performance metrics charts and maps combining company sites' location with country and/or watershed data
  - Establishes relative water risks in a global company's portfolio, in order to prioritize action

- *Aqueduct (WRI)*
  - Creates high-resolution maps of water risks, tailored to unique risk exposure profiles for different industry sectors based on the analysis of a total of 14 aggregated indicators
  - Indicators are divided into three main risk categories: physical (quantity, quality), regulatory and reputational

Application of macroscopic screening tools

Water balance at the country level (GWT)

Figura 7.4 Balance de agua en México



Fuente:
CNA. *Estadísticas del agua en México 2005*. México. 2005.

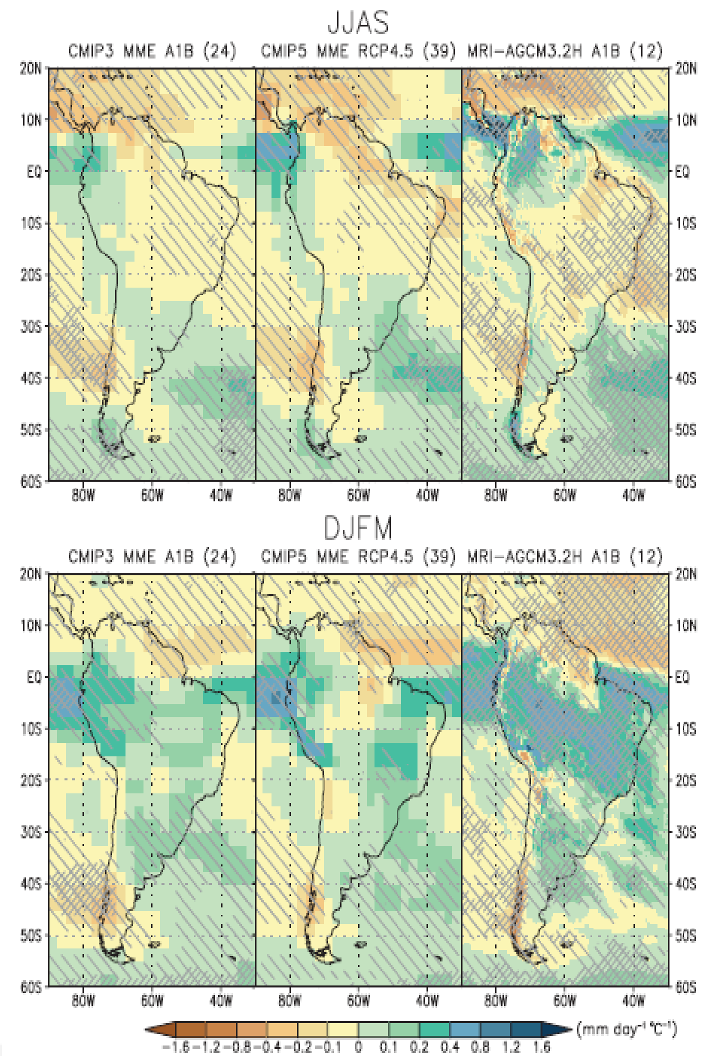
SOLVAY asking more from chemistry®

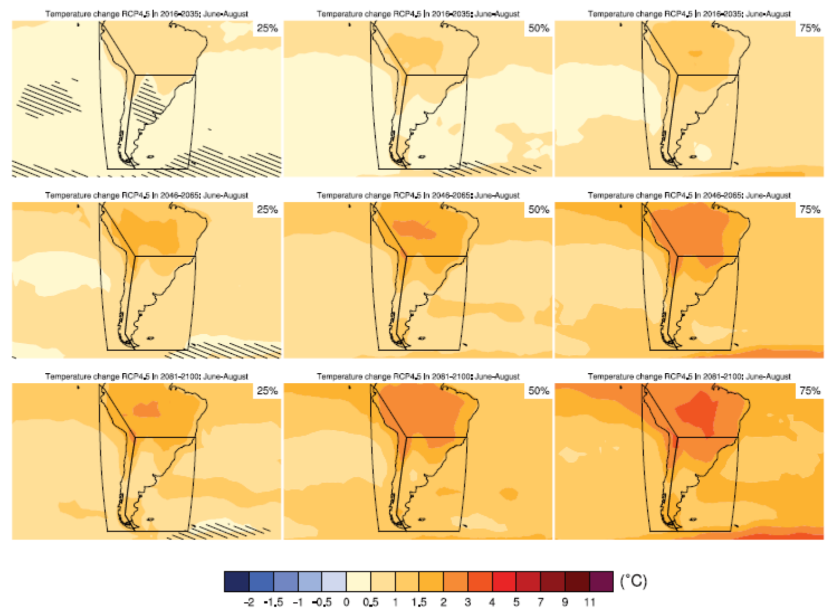
Further analysis of identified hotspots

Survey

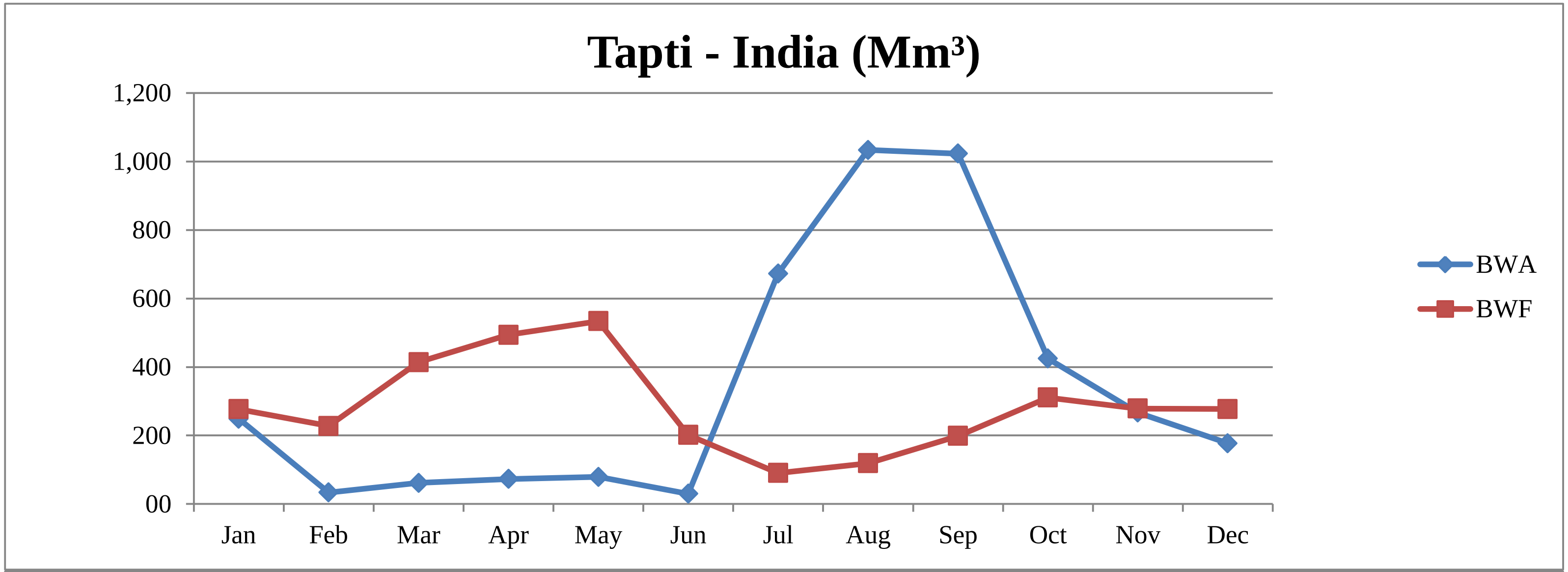
- General questions (water management practices)
- Qualitative and quantitative questions per water source used by the site (names, quality, cost, abstraction limits, share in total use, sustainability…)
- Rainfall statistics
- Reputational Risk
- Development in the region (economic, demographic)
- Maps (hydrographic, topographic,,,)
- Potential impact of climate change (AR5 from IPCC)
- Planned production volumes
- Internet search

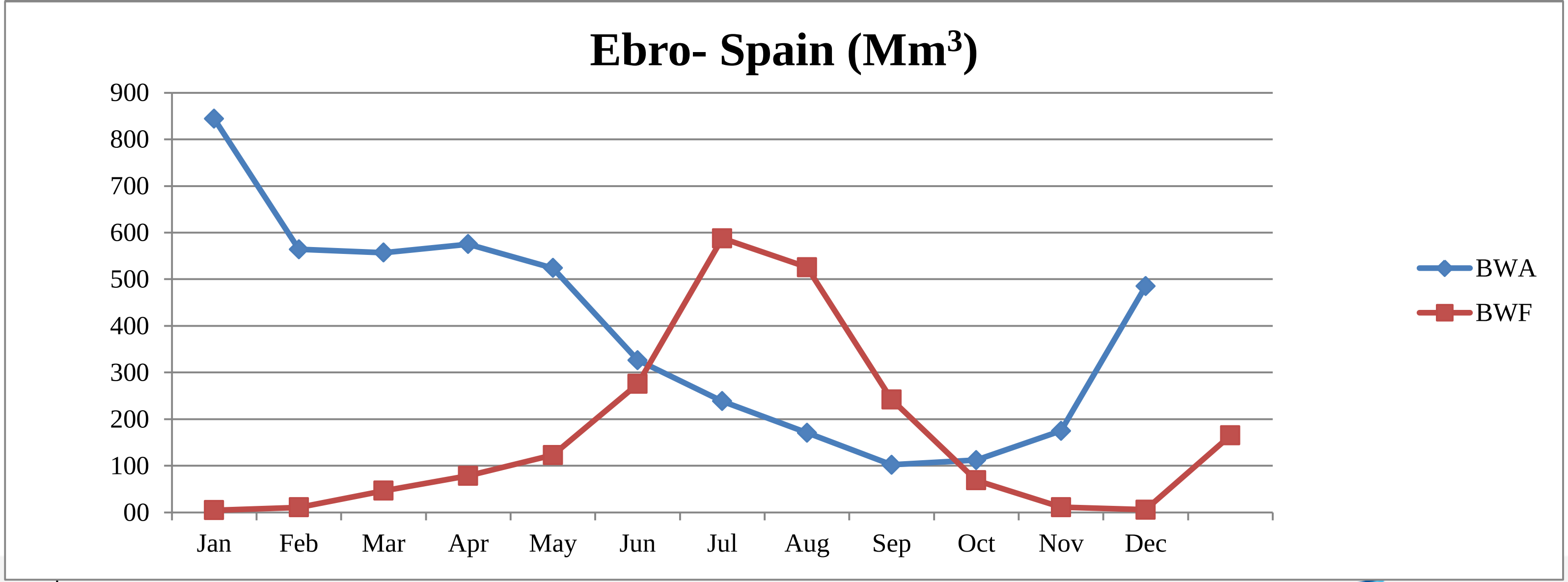
Predicted impact of climate change in Latin America (AR5, IPCC)





Seasonal stress (Hoekstra et al., UNESCO-IHE)

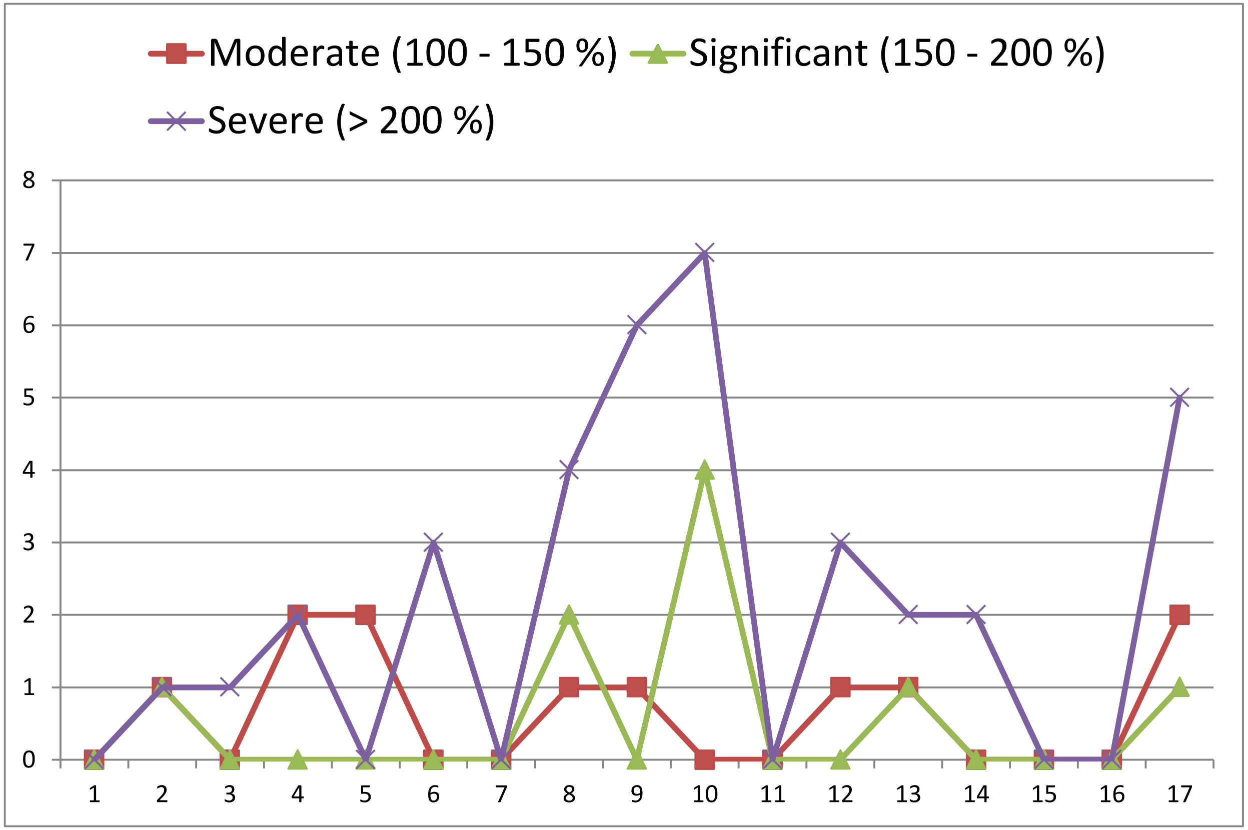




SOLVAY
asking more from chemistry®

Number of months of scarcity in a year for 17 river basins

(Hoekstra et al., 2011)



Scarcity = 100 x (BWF/BWA)

11/17 basins face “severe” stress during at least 1 month per year !

Application of macroscopic screening tools

Drawbacks

- Country and even watershed resolution is insufficient for water risk evaluation
- Errors in databases (names of watersheds, missing dams…)
- Conclusions based on past statistics, not including extreme droughts / floodings from last decade
- No information on seasonal stress
- Incoherencies between results of different tools
- Do not integrate exploitation difficulties for economical or political reasons
- Do not take into account the water needs for eco-systems (blue water availability ~ 20 % of run-off)

→ Potentially incorrect water risk evaluation

Conclusions from our water risk assessment

- Screening tools are a first step, but their conclusions should be taken with precaution and refined with a local analysis using data with a higher temporal and spatial resolution
- There is a risk of declaring as “safe” sites which can face seasonal stress
- On a total of 17 catchments, 11 were confirmed as currently being under severe hydric stress during at least 1 month/year
- Some data, required by our survey, were difficult to get or not available (water share per source, weather statistics, economic and demographic development…)
- Large uncertainties in potential impact of climate change
- Modeling will be needed for a further refinement
- Risk based approach to be developed
- Type and urgency of actions for concerned sites will be discussed with GBU

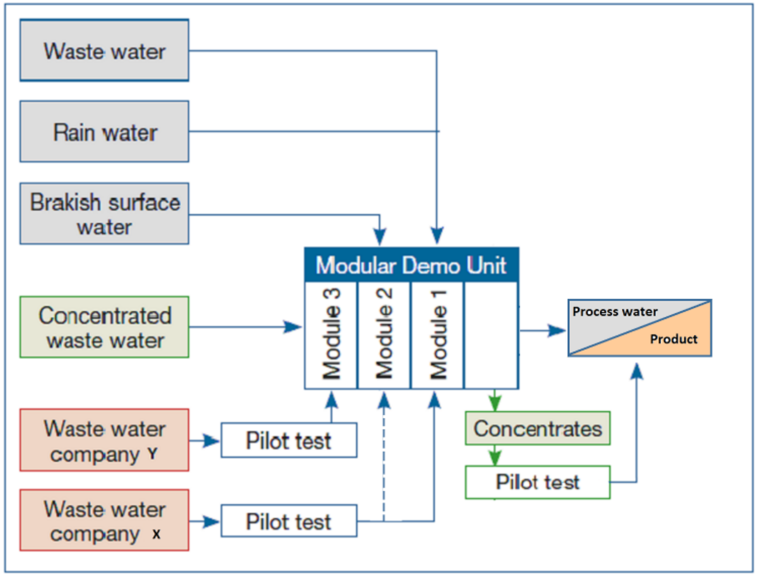
Best practices for sustainable water management

- Diversification of water resources
- Avoid using drinking water whenever possible
- Fit for purpose water qualities
- Increase water efficiency and enhance water storage capacity
- Statistical analysis of extreme weather events (droughts, flooding)
- Modeling of river-flow and lake levels as a function of rainfall
- Regular monitoring of water source levels
- 4R : Reuse – Recycle – Reduce - Replace
- Impact analysis of severe drought (emergency plan)
- Build business case on real value of water
- Behavioral aspects (reactivity to spills)
- Use rainwater collected on production platforms, roofs…
- Networking: internal (production/utilities), external companies, river basin management committees, consultants

CEFIC 2014 Responsible Care : Solvay-Lillo (E4-water)

A 3 step approach to recycle own and third-party company's water streams in Antwerpen (Belgium)

- **Solvay Lillo and other companies use large amounts of drinking water in this harbor**
- Project now reaching full deployment : 2 first steps fully industrialized and securing 33 m³/ hour water savings (290000m³/year). 3rd step currently being industrialized .
- For Solvay, savings will amount to 30% (half a million m3 per year) at least, or even 60% of current drinking water consumption. In addition, less effluent water will be released to the environment.
- This experiment, also involving Solvay Rosignano, Evides Industriewater, VITO and other neighbors of the Antwerp chemical cluster, **demonstrates the value of collaborating to maximize water savings.**



www.solvay.com

SOLVAY

asking more from chemistry®