

# **PAWA – Pilot Arno Water Accounts**

Final workshop

SEEA-W

System of Environmental-Economic Accounting for Water

## **From the SEEA-Water tables to the optimization of measures**

Eric MINO

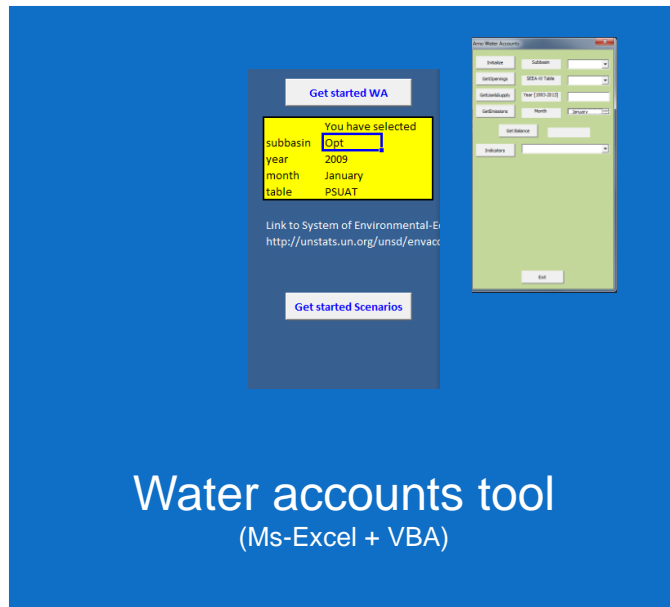
EMWIS Technical Unit

Florence, 30 March 2015

# General approach for the optimisation of measures

## *Preliminary steps:*

- *Sub-basin where quantitative management measures should be applied*
  - *Catalogue or list of potential measures (generic)*
1. Water accounts based analysis on sub-basins
    - identify (or confirm) water stress situations for specific months
  2. Selection of measures that could be applied
  3. Adaptation of the measures to the local context
  4. Use of the selected adapted measures for simulating their impact using the WA-scenario tool
  5. Comparison and decision on integration into RBMP



# Pilot basins Dataset 1993-2013

[illegible]

**Pilot basins**

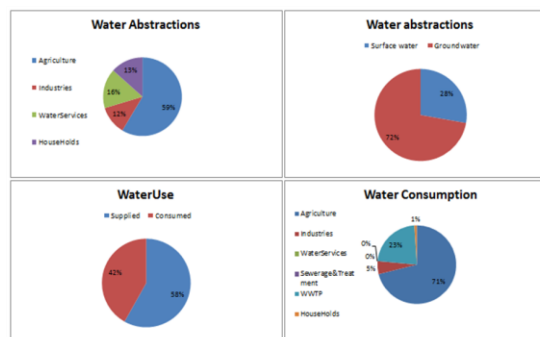
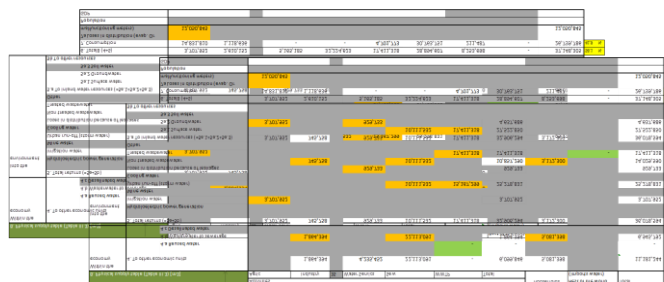
**CC scenarios**

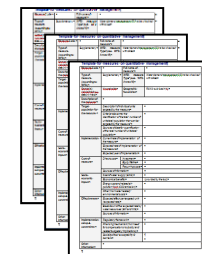
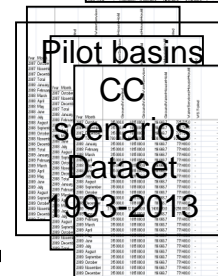
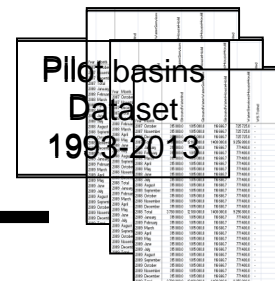
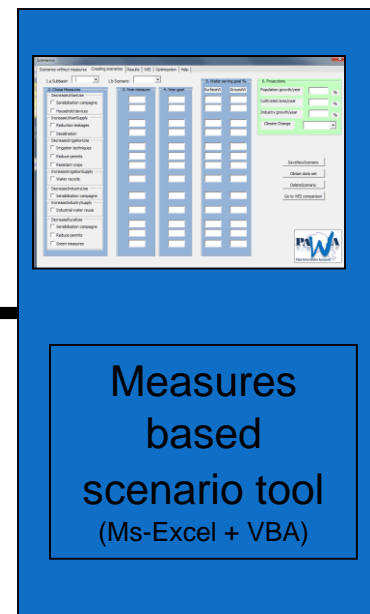
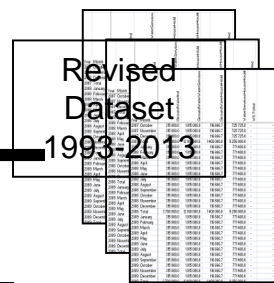
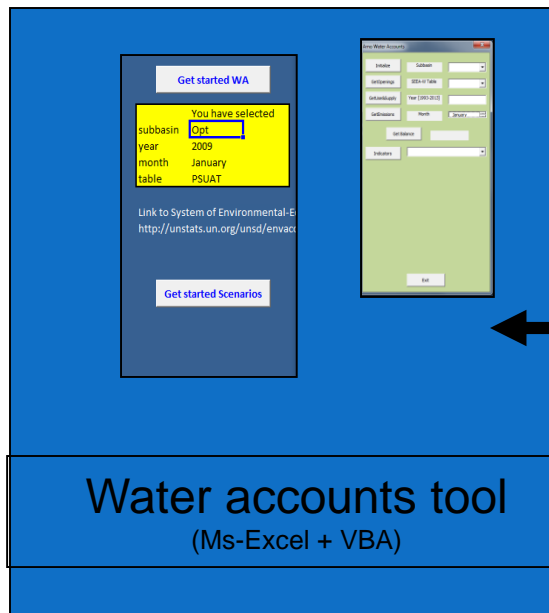
**Dataset**

**1993-2013**

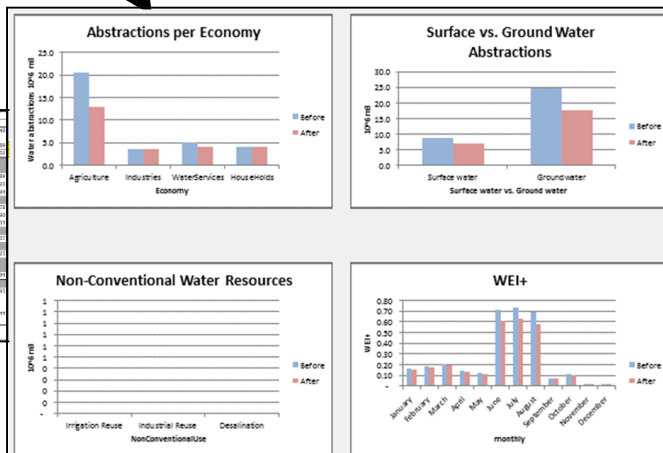
# Climate Change simulation

Pilot basins  
CC senarios  
Dataset  
1993-2013





Subbasin	Year	Month	Table	Value
Opt	2009	January	PSUAT	1000000
Opt	2009	February	PSUAT	1000000
Opt	2009	March	PSUAT	1000000
Opt	2009	April	PSUAT	1000000
Opt	2009	May	PSUAT	1000000
Opt	2009	June	PSUAT	1000000
Opt	2009	July	PSUAT	1000000
Opt	2009	August	PSUAT	1000000
Opt	2009	September	PSUAT	1000000
Opt	2009	October	PSUAT	1000000
Opt	2009	November	PSUAT	1000000
Opt	2009	December	PSUAT	1000000



Name of measures	Impacts
1. Sensitization campaign	Water supply services reduce abstractions
2. Household devices	Water supply and HH reduce abstractions
3. Reduction leakages	Water supply reduce abstractions and reduce leakages, water services to households is constant
4. Desalination	Water supply services reduce abstraction
5. Irrigation techniques	Less water abstracted by agriculture
6. Reduce permits (agriculture)	Reduce irrigation abstractions, temporarily
7. Drought resistant crops	Reduce irrigation abstractions
8. Water recycle	Reduce irrigation abstractions
9. Sensitization campaign	Reduce industry abstractions
10. Industrial water reuse	Reduce industry abstractions
11. Sensitization campaign	Reduce rural household abstractions
12. Reduce permits (households)	Reduce rural household abstractions, temporally
13. Green measures	Reduce rural households abstractions
14.a Increase prices irrigation borehole	Irrigation reduce abstractions, temporarily
14.b Increase prices rural borehole	Reduce rural household abstractions, temporarily
15. Rehabilitation aquifers	Increase variable of outflow discharge
16. Reservoirs management	Increase variable of outflow discharge

Scenarios without measures | **Creating scenarios** | Results | WEI | Optimization | Help

Subbasin Chiana

WaterAccountsTable without measures

Climate Change

Chiana

Initialize

Year [1993-2013]

2009

GetOpenings

SEEA-W Table

PSUAT

GetUse&Supply

Month

January

Get Results

Territory Selected annual values

Agriculture  
Abstractions  
[10<sup>6</sup> m3]

18.53976

Agriculture  
Consumption  
[10<sup>6</sup> m3]

14.831809

Industry  
Abstractions  
[10<sup>6</sup> m3]

3.728788

Industry  
Consumption  
[10<sup>6</sup> m3]

1.1186364

W. Services  
Abstractions  
[10<sup>6</sup> m3]

5.1651848

W. Services  
Consumption  
[10<sup>6</sup> m3]

0

Households  
Use  
[10<sup>6</sup> m3]

8.4651851

Households  
Consumption  
[10<sup>6</sup> m3]

0.2114866

Total  
Abstraction  
[10<sup>6</sup> m3]

31.663468

Total  
Consumption  
[10<sup>6</sup> m3]

16.161932

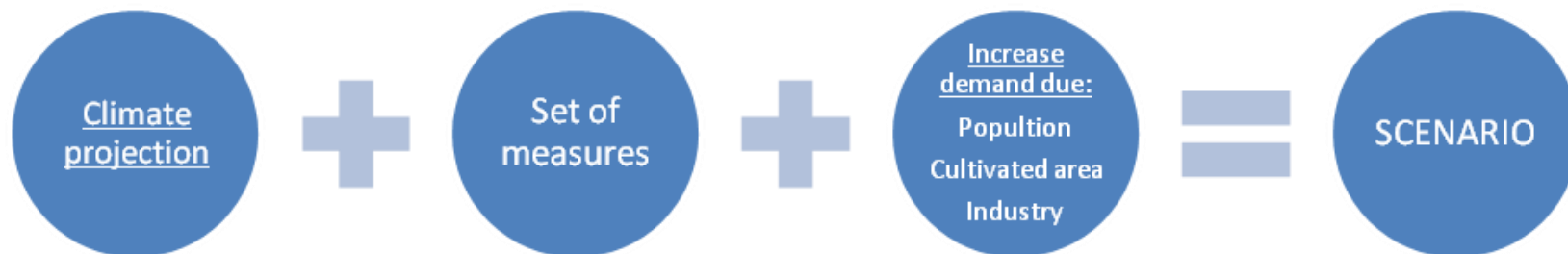
Unmet  
demand  
[10<sup>6</sup> m3]

-5.662498

Water  
available  
[10<sup>6</sup> m3]

152.83973

Exit



1.a Subbasin Chiana 1.b Scenario Scenario0

2. Chose Measures

DecreaseUrbanUse

☒ 1. Sensitisation campagne

☒ 2. Household devices

IncreaseUrbanSupply

☒ 3. Reduction leakages

☐ 4. Desalination

4. StartYe

1993

1993

1993

5. EndYear

2014

2014

2014

6. Water saving %

SurfaceW	GroundW
<span>10</span>	<span>10</span>
<span>5</span>	<span>5</span>
<span>5</span>	<span>5</span>
<span></span>	<span></span>

3. Growth/Increase

Population demand/year 0.5 %

Irrigation demand/year 0.5 %

Industry demand/year 0.5 %

Climate Change Chiana



1.a Subbasin

Chiana

1.b Scenario

multi

2. Chose Measures

DecreaseUrbanUse

☒ 1. Sensitisation campagne
 ☒ 2. Household devices

IncreaseUrbanSupply

☒ 3. Reduction leakages
 ☐ 4. Desalination

DecreaseIrrigationUse

☒ 5. Irrigation techniques
 ☒ 6. Reduce permits (summer season)
 ☐ 7. Resistant crops

IncreaseIrrigationSupply

☒ 8. Water reuse

DecreaseIndustryUse

☐ 9. Sensitisation campagne

IncreaseIndustrySupply

☒ 10. Water reuse

DecreaseRuralUse

☐ 11. Sensitisation campagne
 ☒ 12. Reduce permits (summer season)
 ☐ 13. Green measures

Others

☐ 14.a Increase prizes Agric (summer)
 ☐ 14.b Increase prizes Rural (summer)
 ☐ 15. Aquifer decontamination
 ☒ 16. Reservoirs management

4. StartYe

1993

1993

1993

1993

1993

1993

1993

1993

1995

5. EndYear

2014

2014

2014

2014

2014

2014

2014

2014

2014

6. Water saving %

SurfaceW

GroundW

10

10

5

5

20

20

15

15

25

25

30

30

20

20

20

20

3. Growth/Increase

Population demand/year

0.5

%

Irrigation demand/year

0.5

%

Industry demand/year

0.5

%

Climate Change


C\_ipsl-rcp85

SaveNewScenario

Obtain data set

Clear Scenario

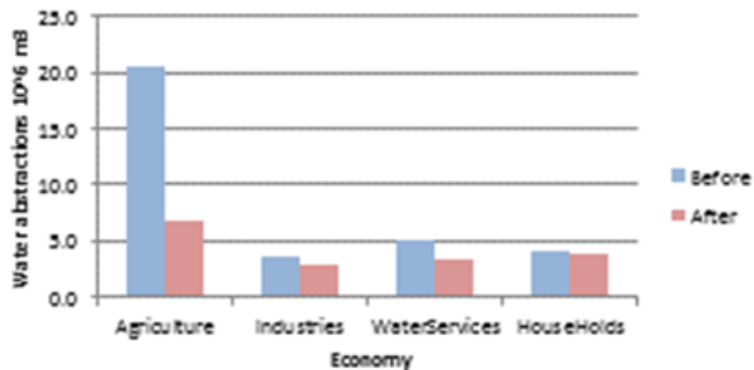
Next



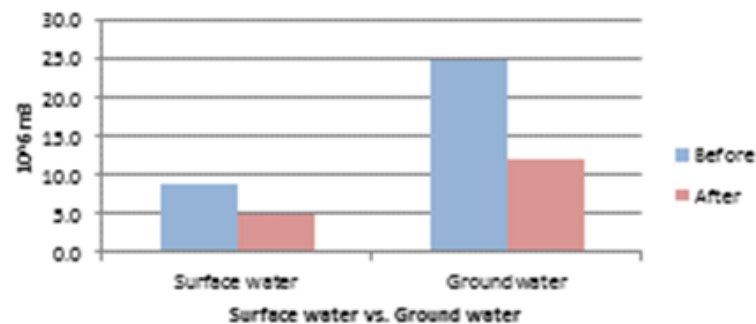
PAWA  
Pilot Arno Water Accounts



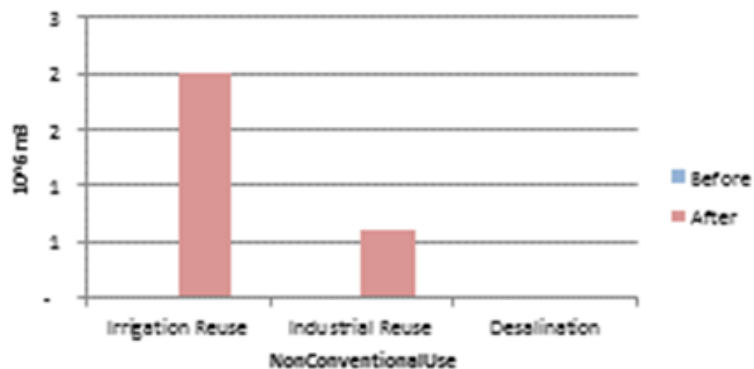
## Abstractions per Economy



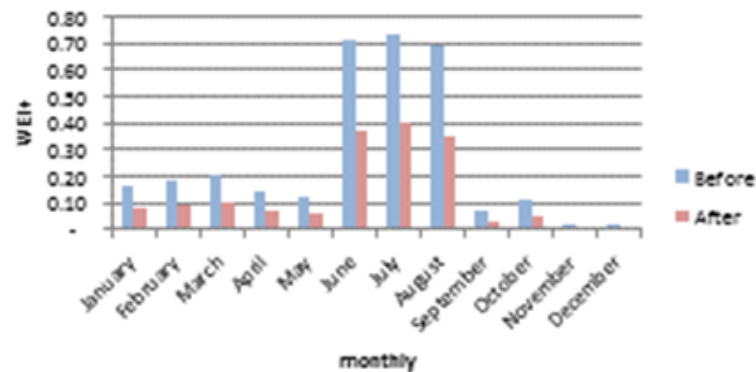
## Surface vs. Ground Water Abstractions



## Non-Conventional Water Resources



## WEI+



- Iterative simulations using different measures to obtain:
  - Unmet demand = 0
  - $WEI_+ < 0.4$
- Targets defined for the measures

Economy	Water saving targets	Non-conventional use ( $10^6 \text{ m}^3$ )
Irrigation	- 70%	+ 2.01
Water services	- 35%	
Industry	- 20%	+ 0.6
Households	- 30% (summer)	

**Thank you for your kind attention!**

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<http://pawa.emwis.net/>