



Alliance for
Internet of Things
Innovation

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New Trends on Smart Agriculture – the water challenge

Jürgen Sturm

Chair AIDI WG IO „Smart Environment“

Where do we stand?

Water is a scarce good – why?

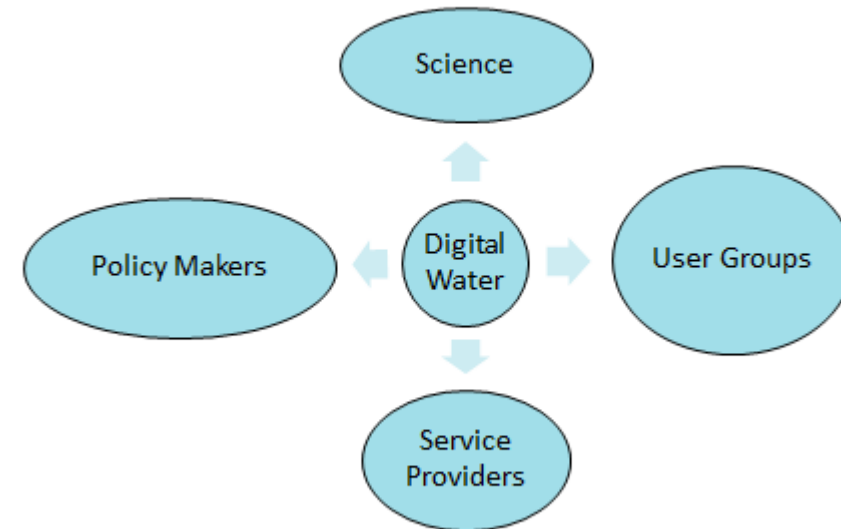
IoT Week 2016 in Belgrade: Different dimensions of scarcity:

- ❖ Geographic scarcity – inadequate quantity and quality
- ❖ Political scarcity – inadequate rules and agendas
- ❖ Economic scarcity – inadequate infrastructure
- ❖ Technical scarcity – inadequate maintenance and tools
- ❖ Social scarcity – inadequate information and communication
- ❖ Scientific scarcity – inadequate research on water topics



**Can IoT and „Digital Water“
help to overcome scarcity?**

Digital Water – A holistic term



Towards a digital single market for water services



EU Action Plan



Action Plan:

No.	Action	Activities	Timetable	Implementation Instruments
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INTEROPERABILITY & STANDARIZATION (I&S)

DATA SHARING (DS)

SMART WATER (SW)

CYBER-SECURITY (CS)

ACTORS AWARENESS - WATER & DIGITAL (AW)

POLICY (POL)

BUSINESS MODELS (BM)



ict4water.eu
Gabriel Anzald

Well known facts ... estimates ... and consequences



"In Africa, only about **6%** of the total cultivated land is irrigated... It is estimated that irrigation alone could increase output by up to **50%** in Africa."

Kingso Nwani, IFAD President
International Water Management Institute (IWMI)

IFAD's natural resource management efforts promote rain water harvesting, recycling, gravity-fed drip irrigation and alternate wetting and drying (AWD) among other water conservation techniques.

WATER AVAILABILITY PER CAPITA IN THE ARAB WORLD IS EXPECTED TO BE HALVED BY 2050

DEFORESTATION
1-2 ACRES RAINFOREST ARE CLEARED EVERY MINUTE
ANIMAL AGRICULTURE IS RESPONSIBLE FOR 91% OF AMAZON DESTRUCTION

CLIMATE CHANGE
GLOBAL GREENHOUSE GAS EMISSIONS
51% DUE TO LIVESTOCK AND THEIR BYPRODUCTS
13% DUE TO TRANSPORT (ROAD, AIR & WATER)

WATER USE
1 GALLON OF MEAT = 660 GALLONS OF WATER
EQUivalent to SHOWERING FOR 2 MONTHS

WASTE
WASTE FROM A FARM OF 2500 DAIRY COWS = WASTE FROM A CITY OF 411000 PEOPLE

29% OF THE WORLD'S FRESH WATER IS USED FOR ANIMAL PRODUCTION. 1 IN 6 PEOPLE (1.1 BILLION) GO EACH DAY WITHOUT ACCESS TO FRESH DRINKING WATER.

COWSPIRACY
THE NUTRITION MYTH

1 SERVING Beef over **1,200** gallons of WATER

1 SERVING Chicken **330** gallons of WATER

1 COMPLETE VEGAN MEAL **98** gallons of WATER

Make The Connection!

Towards a smart water framework



SMART WATER (SW)

SW.1

Reinforce better utilization and effective **deployment of new technology enablers**

2018
2022

Activity 1:
R&D smart "metering - sensors", Big Data, IoT, Hybrid Infrastructures, ...
Activity 2:
Quasi-real time data analysis, forecasting, event diagnosis ...
Activity 3:
Machine learning, artificial intelligence ...

SW.2

Promote a **Digital Water Innovation Hub**

2019
2023

Activity 1:
Data-intensive and cost-efficient water business models, products and services
Activity 2:
Advance in the consolidation of the ICT4Water community.
Activity 3:
Develop and deploy one-stop-shops for digital water services.
Activity 4:
Deploy technology infrastructure (competence centre)

SW.3

Improve efficiency and circularity in **digitalization of water use and reuse**

2019
2023

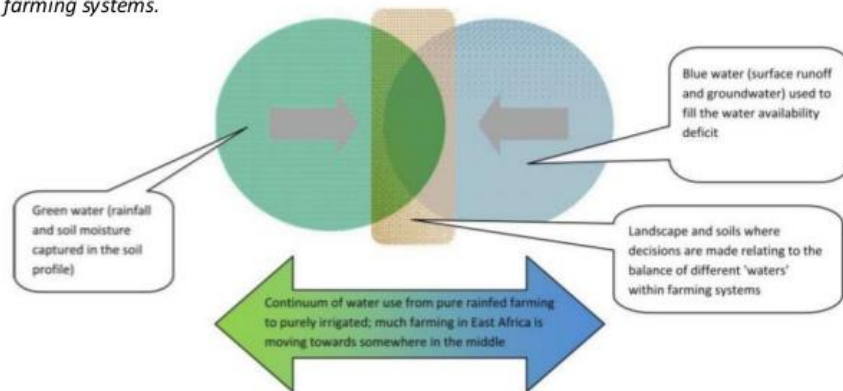
Activity 1:
Boosting Smart Cities and Smart Agriculture Linkage, Leakage detection, sustainable reduction of elastic water consumption, usage of grey water and cascade use of water, promotion of water reclamation and reuse best practices.
Activity 2:
Retrofitting existing water infrastructure creates challenges in terms of how to adapt existing infrastructures with new technologies at least can reduce the cost for the community in order to meet current and emerging demands.
Activity 3:
Reinforce Public-Private Partnership to leverage risks (including health) and opportunities

We need to understand ... develop ... transform ...

Water Smart Agriculture ...

So what is Water Smart Agriculture?

In its simplest sense, Water Smart Agriculture is an approach to farming that balances water availability, access and use across the range of water sources, and according to principles of socio-economic, environmental and technical sustainability. It seeks to maximize returns whilst protecting environmental flows and ensuring equality within farming systems.

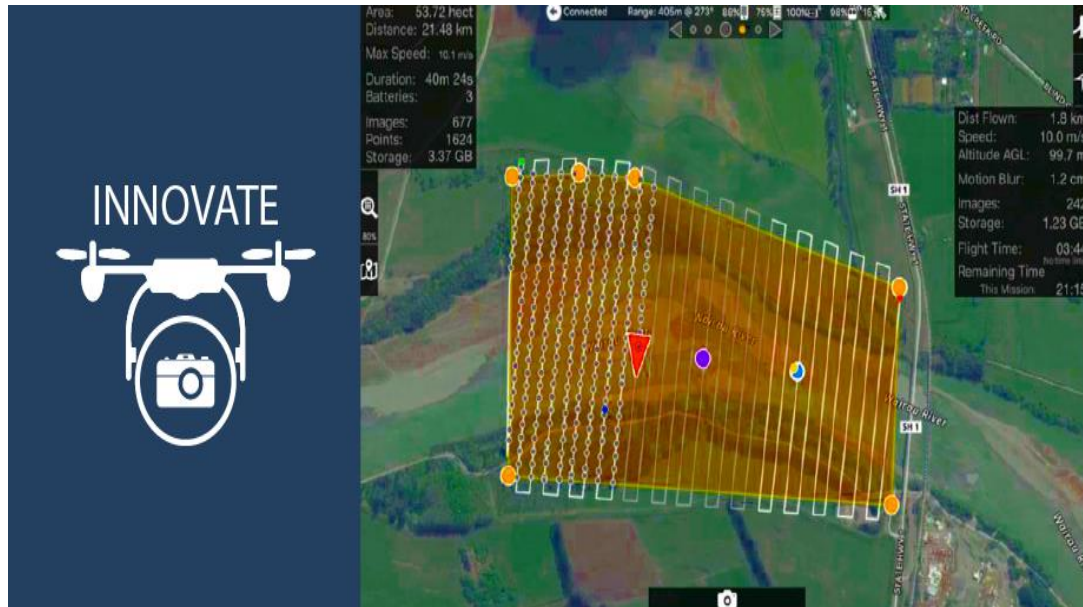


... into Smart Water Agriculture



Use natural water resources ...

Manage and improve use of natural sources



- Use drones to provide new perspectives on hydrometry

(<http://aquaticinformatics.com/blog/hydrology/drones-providing-new-perspective-hydrometry/>)

- Improved flow gauging of natural water resources and better understanding of water availability

Where to irrigate ...

Smart Sensing



- Enable tailor made solutions
- Measure quality and quantity of water used
- Collection of data and use of data sources to improve efficiency

When to irrigate ...

Smart Irrigation



- Use water as stress relief for plants
- Make best use of a scarce resource
- Sustainable way to improve harvesting

The way ahead

- Smart water management is an integral part of digital farming
- EU Action plan is a very adequate framework to link developments in water management to developments in smart farming
- AIOTI can provide one of the platforms for bringing the water sector and the agricultural sector together to implement the action plan.

