ENGINEERING, WATER AND SMART CITIES

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DRAFT

This should not be a scientific or textbook but an awareness document for the general public and policymakers.

It is not strict, but on average, each subsection should be around 3 pages long, including figures that we have to make sure we have the right to publish. In total, it should be roughly a 100-page book.

Under each section title, a brief idea of the related content is suggested. Order, titles, and contents could be changed. You may need to add or delete proposed sections. Ideas are welcome.

This will not be an academic-indexed book, but it will be well-recognized and disseminated as it will be published by the World Federation of Engineering Organizations and the World Council of Civil Engineers, both members of the UN-Water program. All contributors will be acknowledged.

1.0 INTRODUCTION

2.0 SMART WATER FOR SMART CITIES

2.1 SDGS - TOMÁS SANCHO & COLLEAGUE (SPAIN)

SDGS history and concepts, SDG6, engineering and SDGs

2.2 SUPPLY, TREATMENT, DISTRIBUTION - TOMÁS SANCHO & COLLEAGUE (SPAIN) / ERIC MUGAMBI (KENYA)

Differences between cities and smart cities.

2.3 ENERGY CONSUMPTION – MIGUEL FIERRO (URUGUAY)

How energy consumption relates to Smart Cities and water

2.4 RECYCLING: STORMWATER MANAGEMENT, SEWAGE WATER MANAGEMENT - TOMÁS SANCHO & COLLEAGUE (SPAIN)

How recycling is inherent to smart cities. Opportunities to recycle water. Economic impacts.

3.0 NON-ENGINEERING SMART WATER ISSUES

Engineering is not the only necessary component to achieve the goals of smart cities' water management

3.1 POLICYMAKERS AND REGULATORS - LEBANG GABASH (SOUTH AFRICA)

Role of politicians and government officers

3.2 EDUCATION – HÉCTOR GARCÍA (URU)

Education for water awareness at elementary, middle and high school levels. Role of teachers and professors.

3.3 COSTS AND FINANCING

Is smart water more costly? Sustainability implies financial soundness. How could everyone access water in smart cities?

4.0 THE CHALLENGE: AGING INFRASTRUCTURE

4.1 WATER QUALITY STANDARDS - JOB MICHAEL LIECH (KENYA) - ERIK CENTENO MORA (COSTA RICA)

Current and future water quality standards: should there be any changes? How does old infrastructure affect drinking water, recycling, and discharged water?

4.2 LEAKAGE - SHILPI JAIN (SOUTH AFRICA) - JOB MICHAEL LIECH (KENYA)

Old infrastructure leaks. How leaking is currently controlled? How that attempts against sustainability.

4.3 FLOODING – ERIC MUGAMBI (KENYA) – NAILANTEI MAPELU (KENYA)

Climate change and the highest frequency of unusual events render many cities' infrastructure obsolete. Flood control structures are missing, or they become ineffective.

4.4 FLOW AND PRESSURE VARIATIONS, WATER SOURCES – FRANCISCO GRIMALT (ARGENTINA)

Many cities do not provide reliable water sources, and flow and pressure can vary even within the same day. Most importantly, the fresh water sources are limited and in many cases show decays.

5.0 INFRASTRUCTURE FOR THE FUTURE

5.1 DEMAND-CONTROLLED SUPPLY AND CONTROLLED DEMAND

The water supply must always match the demand to reduce the system's costs and provide a reliable water source.

5.2 SMART CONSUMPTION – RICARDO CALZARETTO (ARGENTINA)

Users should use all the water they need, but they should not use more than is necessary—concept of smart consumption.

5.3 RESILIENCE (CLIMATE CHANGE, NATURAL DISASTERS) – DARÍO CANDEBAT SÁNCHEZ (CUBA)

Vulnerable infrastructure cannot ensure a reliable water source or quality. Infrastructure needs to endure changing and extreme situations as much as possible. How do we set up new standards? What would be the implications?

5.4 TECHNOLOGY DEPENDENCY – MARCELO CAMMISA (ARGENTINA), SOLANGE ERLIJ (ARGENTINA), WALTER ADAD (ARGENTINA)

The smart world is technology-driven. Taking advantage of technological advances is necessary to achieve most smart cities' goals. Which are these technologies?

5.5 INTELLIGENT CONTROL AND MONITORING SYSTEMS

Monitoring quality standards of the source, the treatment plant, the distribution network, the tap water, the sewage system and the discharge. Tools available. Incorporating technology into the network.

6.0 WATERFRONT SMART CITIES

6.1 FLOOD CONTROL AND MANAGEMENT – HECTOR FARÍAS (ARGENTINA)

6.2 EROSION CONTROL – HECTOR FARÍAS (ARGENTINA)

6.3 PORTS, BRIDGES, WATER INTAKES, DISCHARGES - JORGE E. ABRAMIAN (ARGENTINA) – NAILANTEI MAPELU (KENYA)

6.4 TOURISM

Tourism infrastructure of smart cities: future sea walks, fishing piers, beaches, parks – **JUAN YACOPINO (ARGENTINA)**

7.0 ADAPTING TO THE FUTURE

7.1 DESIGN – RAFAEL MURILLO MUÑOZ (COSTA RICA); RAFAEL OREAMUNO VEGA (COSTA RICA)

New standards for design: how do they differ from the current ones?

7.2 MANAGEMENT AND MAINTENANCE RAFAEL MURILLO MUÑOZ (COSTA RICA); RAFAEL OREAMUNO VEGA (COSTA RICA)

The technology-driven infrastructure requires additional maintenance efforts. However, new sensors and survey technologies help to identify problems more accurately. Also, new technologies and materials enable repairs that were considered dangerous or costly.

7.3 CONVERTING OLD INFRASTRUCTURE - JAMES MUIGAI (KENYA)

Is it possible to make a traditional system a smart one? What will it take?

8.0 CONCLUSIONS

MISSING

3.3 COSTS AND FINANCING

Is smart water more costly? Sustainability implies financial soundness. How could everyone access water in smart cities?

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