

**7th World Water
Summit**



Nature Based Water Solutions – SPONGE City Concept

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Dutta

FICHTNER GROUP – TRULY GLOBAL

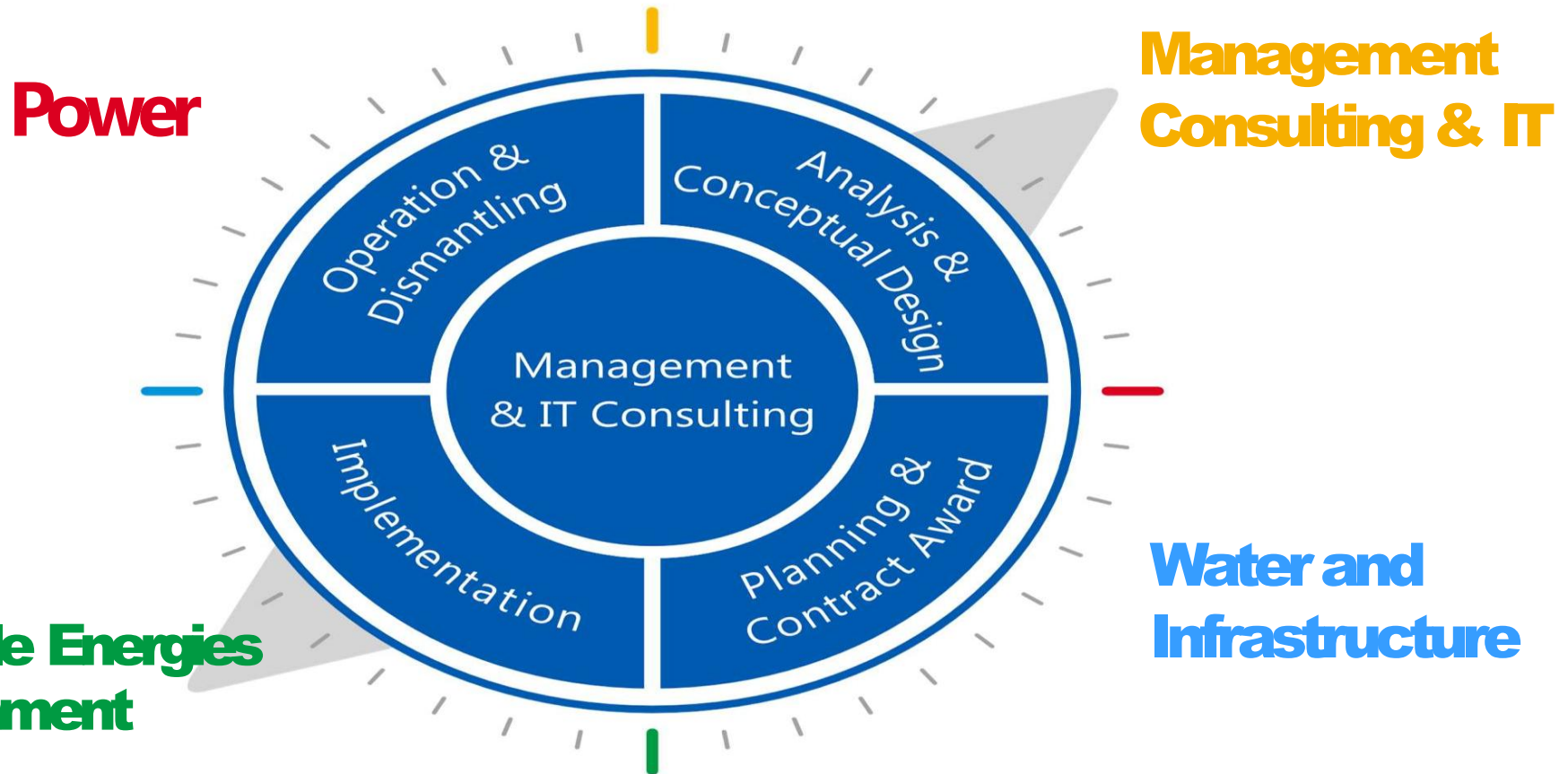
130+ locations

60 countries

61% export share

100 Years into Operations | Home office in Stuttgart, Germany | Present in 60 countries worldwide
Represented at over 130 locations by subsidiaries and affiliates, branches and project offices
61% of Group revenues generated outside of Germany

FICHTNER INDIA - SERVICE SECTORS



Planning and consulting in all project phases for technically and economically sound solutions

Situation As Is..

- ❑ Heavy rainfall in northern India caused widespread **flooding, landslides, and significant damage to homes, structures, and food supplies.**
- ❑ Yamuna River water levels had also reached an all-time high of **208.65 meters**, surpassing the danger mark by **3.32 meters.**
- ❑ Raises concerns about the **preparedness of cities** to handle such **large-s**



Some Data Points

- ❑ **80%** of all natural disasters are caused by **Floods and Storms**
- ❑ Agriculture accounts for **70% of global water withdrawal**
- ❑ **84% decline in Fresh-Water Biodiversity** since 1970
- ❑ **More than 2 billion** people lack access to **safe drinking water** and **more than double that number** lack access to **safe sanitation**
- ❑ **50% increase** in global water demand by **2030**.
- ❑ **Water ranked** as a **Top Risk** for business and economic development
- ❑ Around **2/3rd of Forests and Wetlands** have been lost or degraded since the beginning of the 20th century.
- ❑ Wetlands are **disappearing 3 times faster** than the forest
- ❑ Since the 1990s, water pollution has worsened in almost all rivers in **Africa, Asia and Latin America**. Being a vital public resource, urban water bodies are **transforming rapidly into wastewater-carrying** systems
- ❑ **More than half of urban residents in Asia and the Pacific** live in **flood plains and low-lying coastal zones**—including in such major cities as Bangkok, Dhaka, Guangzhou, Ho Chi Minh City, Kolkata, Manila and more
- ❑ Around **30%** of the **global population** is estimated to reside in areas and regions **routinely impacted** by either flood or



WHY is this Happening ?????

Inadequate Drainage Infrastructure

Encroaching Natural Spaces

Impervious Soil due to Building Material Choices

Unregulated Construction

Unplanned Urbanization

Terrain Alteration

Overburdened drainage

Our Land policy has not effectively managed or controlled the recurrence of significant floods in urban areas

Lax Implementation

FOOD for THOUGHT...

- ❑ **Living with Floods is Inevitable**
- ❑ Growing Need for **Pro-active Measures** to Prevent Disasters
- ❑ **Business-as-usual** approach will not work
- ❑ **Need For Holistic Engagement** - Urban floods of this scale cannot be contained by the municipal authorities alone. Floods cannot be managed without **concerted and focused investments of energy and resources**. The **Metropolitan Development Authorities, National Disaster Management Authority, State Revenue and Irrigation Departments** along with **Municipal Corporations** should be involved together.
- ❑ **Mission-Mode Approach** with active participation of civil society organisations on the **metropolitan scale**.
- ❑ Today, more than ever, we must **work with nature**, instead of against it
- ❑ Identify the most appropriate, cost-effective and sustainable balance between **grey infrastructure** and **nature-based/Green solutions**



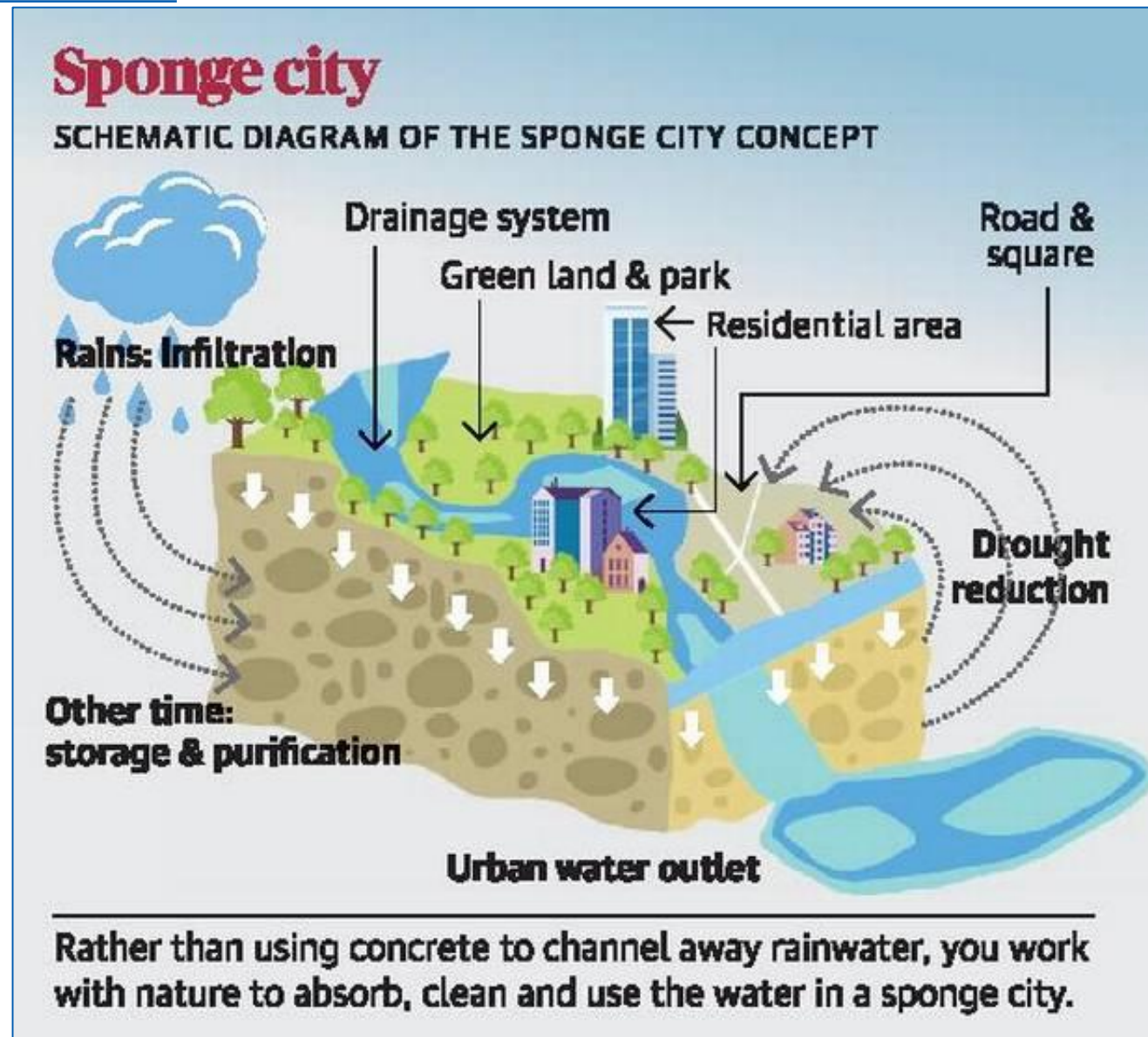
I do not argue that nature-based solutions are a cure to all our problems, but our conclusion is clear -- they are one of many important tools to shift to a more **Holistic Approach**

Can Sponge Cities be the solution to India's or Asia's increasing flooding problems?

Picture a whole city that **Absorbs, Harvests, Stores, Filters, Purifies,** and slowly **Releases Rainwater - like a SPONGE.**

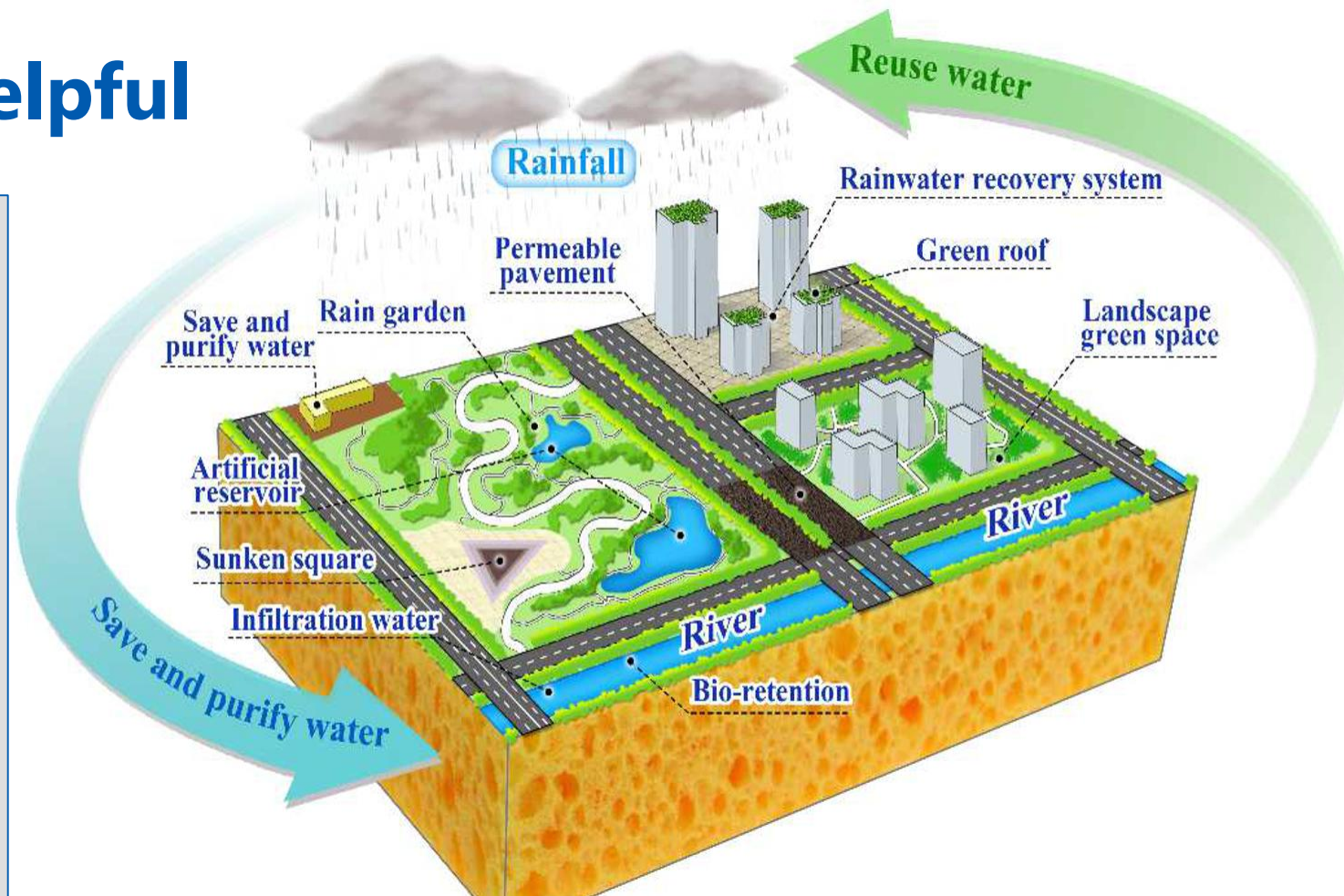
Rainwater is retained, naturally filtered and cleaned, and then slowly discharged into rivers and drained into the soil. This in short is the **principle of the sponge**

If we can make the storm water flow through soft **blue green land areas** before overflowing into the city drain, we harvest rain-water and at the same time **reduce the pressure on the drain capacity.**



How will it be Helpful

- ❑ Every raindrop is captured, controlled and reused.
- ❑ It helps in recharging the depleted aquifers or irrigate gardens and urban farms.
- ❑ Water saved can be used to **replace the drinking water** which is used in flush toilets and for cleaning purposes.
- ❑ Water can even be **processed further** to make it clean enough to be used **for drinking**.
- ❑ This allows for the extraction of water from the ground through **urban or peri-urban wells**.



- ❑ World Economic Forum (WEF) found that 'nature-based solutions to climate change' were up to 50 per cent more cost-effective than engineered alternatives.
- ❑ In a report on sponge cities and their adoption in Chinese cities, the forum also added that this nature-based approach **added 28% more value than grey infrastructure**.

Case Study of Qunli Stormwater Park

- ❑ **Sponge City Concept** was proposed by Chinese researchers in 2013 and **Professor Kongjian Yu** is the mastermind behind it.
- ❑ Yu is an ecological Urban Planner and Landscape Architect.
- ❑ The **34-hectare 'Qunli stormwater park'** in the city of Harbin in northern China is one example of a **successful sponge city** concept.
- ❑ It collects, cleanses and stores stormwater, while also protecting the native natural habitat and providing a beautiful green public space for recreational use



Haikou Meishe River - before and after shots of the 'sponge city' hotspot. - Turenscape

The Chinese government has already chosen **16 pilot cities** and allocated to each of them between **400 and 600 million yuan (around €55 million)** for the implementation of **Innovative Water Management Strategies**.

Zhuhai, China – A Case Study

Zhuhai, is not what you might picture a city at the heart of the **world's most populous** area to be.

- ❑ With **708 urban parks**, tree-lined waterfront promenades, and a **connection between sea and mountain**, Zhuhai is a tourism destination and is known as a **forest city**.
- ❑ Beyond the **mountain-sea-city landscape**, Zhuhai has rapid economic development and a thriving arts and



- ❑ The **green-blue infrastructure** development has been no impediment to the **city's continued growth**.
- ❑ This world-class example shows the **multiple benefits achieved through sponge cities**

Zhuhai, China – A Case Study –

How sponge cities are beating Urban Heat in China

- ❑ Zhuhai wasn't always so leafy.
- ❑ In 2014, with 30 national pilots, China pushed this Urban Design Concept to prevent flooding.
- ❑ Transformed hard surfaces, roads and pavements), into permeable surfaces that can absorb, seep, purify and store water, & later release stored water for use. Thus, their drains are never under pressure or choked.
- ❑ Co-Benefit - Successful in mitigating not just urban flooding problems; but also instrumental in reducing urban heat deaths.
- ❑ Constructed about **115 Sqkm** of sponge city infrastructure since 2016, accounting for nearly one quarter of the total urban built-up area.



- ❑ Zhuhai boasts of **Porous Brick/Concrete Pavement, Porous Asphalt Roads, Green Roofs, Green Verges, Bio-Retention Basins, Ponds, Rainwater Wetlands, Grassy Swales and Vegetation Buffer Zones.**
- ❑ Assisted by the ADB loan of \$150 million, the **Pingxiang Integrated Rural-Urban Infrastructure Development Project** is another such example aiming to address in a connected manner key challenges of flooding, river pollution, untreated wastewater, and lack of rural-urban linkages.

Chennai – will be India's 1st SPONGE City

- **Chennai, Mumbai and Kochi** are currently studying and planning to develop a sponge city roadmap to tackle urban flooding.
- **Chennai Metropolitan Development Authority** has decided to create **sponge parks and restore wetlands** that would be able to absorb the floodwater during torrential rains.



Water Resources Department is mulling over possibility of digging **recharge shafts** in smaller waterbodies in and around the city. These recharge shafts, that could be dug up to a **depth of 80-90 feet**, will help replenish water table.

ACTION TIME & Time to Pledge... NEED of the Hour

- Transform our cities into sponge cities,
- Can all be delivered effectively by an urban mission along the lines of **HRIDAY, AMRUT, and Smart Cities Mission.**
- Create an **enabling environment for change**, including suitable **legal and regulatory frameworks, appropriate financing mechanisms and social acceptance.**
- I am confident that, with the **Political Will** to do so, current obstacles, such as the lack of knowledge, capacity, data and information about NBS for water, can be effectively overcome by an effective **ACTION Plan**
- Although primarily targeted at **national-level decision-makers and water experts**, I hope that this summit will also be of interest to the broader development community, as well as academics, professionals and anyone interested in building an **equitable and sustainable water future** with the support of NBS.
- Steps of Augmentation – it is My House, My City, My Water and hence, My Responsibility**
- Change the Mindset** – where water is seen as a





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