INDIAN WATER WORKS ASSOCIATION, MUMBAI CENTRE

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DROPLET

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from Chairperson Desk

Hello IWWA Mumbai Centre members,

Water supply through soils is vital for both plants and soil organisms—they need water to survive. Soil water contains nutrients that move into the plant roots when plants take in water. Soils are the fundamental resources enabling land to provide a wide array of benefits. Humans and wildlife alike rely on soils for the production of life-sustaining nourishment and shelter. Soil is important to society because it supports plants that supply food, fibers, life-saving drugs and other essentials and because it filters water and recycles wastes. Soil and water underpin forest ecosystem productivity and functions. Forest ecosystems play an important role in the regulation of surface and groundwater flow and, together with associated aquatic ecosystems and clean water, they are essential to the quality of human life. The interaction of soil, water and topography influence the character and health of streams and rivers flowing through and from forests.

Soil and water are fundamental natural resources for the agricultural production system as well. Human caused and undesirable natural activities are key reasons for the deterioration of natural resources. Soil erosion is one of the serious threats for the deterioration of soil and water resources. In India, substantial area has been degraded by the water erosion process. Severe agricultural practices accelerate the soil erosion process. Holistic management of soil and water resources is must for

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Editor Brief

In any water supply system for rural areas or cities, the pipeline network carrying water from Source/Master Balancing Reservoir (MBR) to distribution reservoirs constitute large diameter pipelines. The water network downstream of service reservoir is known as water distribution networks which delivers water to consumer premises. The pipelines carrying water from source to consumer end constitute the major investment. The cost-effective design of pipeline network is important for the minimization of network cost and maintaining the overall project budget.

The planning and design of water network systems involves selection of pipeline routes, hydraulic design and sizing of water mains and distribution pipelines. These are mainly pressurized pipes flowing with full flow conditions. The networks being large in size and complex in nature, Design Engineers use various softwares available in the market for the sizing of pipelines. The softwares were developed by various agencies in last three decades for the use of Water Engineers. Dr Prasad Modak, IIT Bombay along with World Bank had developed Branch for the optimisation of branch water networks and LOOP for the design of looped distribution networks. Both softwares were available FREE to all. Tata Consulting Engineers had NWTRPH and OPTREE for the design of Loop and Branch networks respectively. These softwares have been extensively used by Government and Private consulting firms. However, these softwares are not in working condition due to required up-gradations or change in software platforms. EPANET is freely available software for the analysis of water network. The commercially available software includes Bentley,s Watergems for the design of water networks.

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Expert's Article

WATER FOOTPRINT A TOOL TO ASSESS & REDUCE GROSS WATER CONSUMPTION

Prof . Rajendrakumar V. Saraf , Chairman, Viraj Envirozing India Pvt. Ltd

Water Footprint term was introduced in 2002 by Hockstra. It refers to total water consumption in raw material - product - consumer supply chain. This term is similar to Energy & Carbon Footprint. Water Footprint is consisting of Green, Blue & Grey Water Footprint.

Green Water Footprint : It refers to the precipitation on land that doesn't run off or recharged as ground water but it is stored as soil moisture or remained on top of the soil for vegetation. The Green water is used directly by the crop.

Blue Water Footprint : It refers to naturally & manmade stored Green water. The Blue water is being used all over the year. This volume can be measured & assessed for different type of activities in all the segments.

Grey Water Footprint : It is defined as the volume of fresh water required to assimilate the load of pollutant base on prevalent water quality standards. This also expresses the water pollution in terms of volume of water required to dilute to the harmless level.

Water Footprint of Manufacturing Process

Different unit processes work together to give finish product from raw materials. This may be straight chain from raw material to finish product. However, in some of the process one of the input is separately processed & then it is added to the main chain at the required unit process. Calculating Water Footprint of a product is easier for straight chain & branch chains if fully understood with their water consumptions. Water Consumption can be metered or numerically calculated by mass balance. Water Footprint of a product can be calculated by the summation of Water Footprint of various inputs (Raw material/ job/ activities) required in the process to manufacture the product.

Issues in Water Footprint calculation

- The water consumption data are not available for agriculture produce & the industrial products.
- Exclusively for agriculture produce the Blue water consumption is very difficult to assess because of use of different type of crop pattern, geographical location, climatic conditions & irrigation practices.
- For a product value can widely differ because of different types of the process or system followed.
- Water consumption is not yet metered in all sectors of agriculture, domestic & industrial. The water consumption may vary from 90 to 220 LPCD.
- The characteristics of receiving water body changes geographically. A few rivers in India are perennial. Some of rivers virtually carry waste water during the summer. Therefore the calculation of dilution water required to bring down the pollutant level to the natural level in the water body after considering its self-purification capacity is very difficult in India.
- A mathematical model is to be developed to assess Grey & Blue Water Footprint where reuse & recycle are being practiced.
- When waste water from one industry is used for other industry, it will need detail calculation to compensate the value against the Blue water.

Lots of efforts are being made in European country to find out the global average value. However the application in India cannot be considered as it is.

Water Footprint of Agriculture Produce

Indian farming is traditionally rain fed. Because of construction of dam & exploitation of underground water there is increase in land under irrigation resulted in increase in Blue Water Footprint of agricultural produce.

Water is used for the growth & gets incorporated in produce as moisture. There is loss of water by natural evaporation & evapo-transpiration.

Water Footprint of Water

The water is pumped from the source to the Water Treatment Plant (WTP). From WTP it goes to the tap of consumer through water distribution system. The water is lost in pipeline leakages, drain out from sedimentation tank, backwash from the filter. The leakage varies from +0 to +25 % depending on the location.

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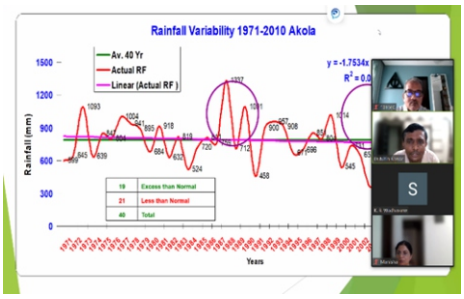
World Environment Day Celebration - Webinar on "Soil and Water Security under changing climatic conditions" 12th June 2022

The rapid urbanization is leading to scarcity of water all over the world and impacts on soil cover are visible due to deforestations, use of chemical fertilizers and change in land use patterns. Soils are a fundamental natural resource and are the basis for all terrestrial life. The Indian Water Works Association, Mumbai Center has organized a webinar on the eve of celebration of World Environment Day (5th June) on 12th June 2022. The Webinar was focused on Soil and Water Security under changing climatic conditions.

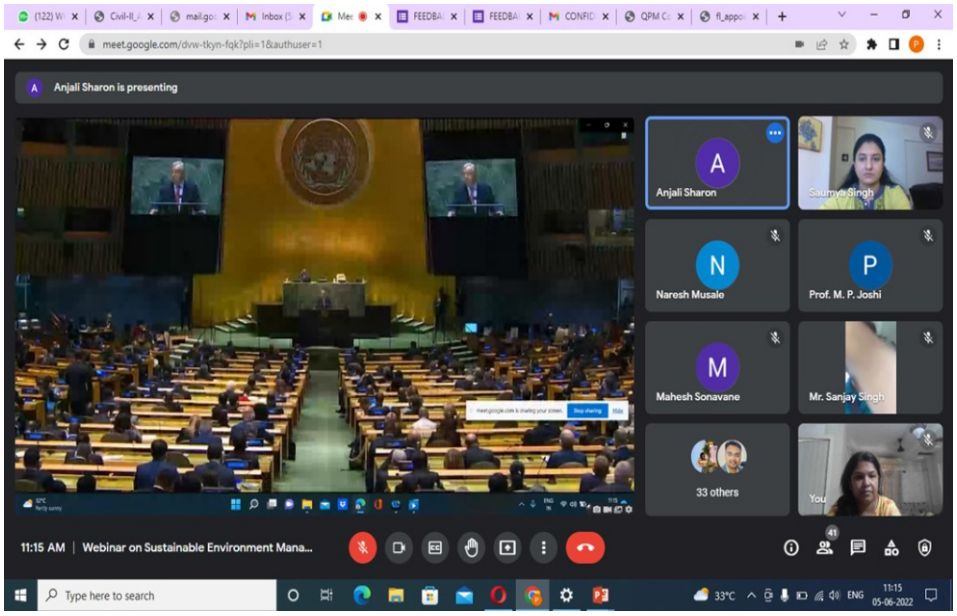


The webinar covered a presentation by Dr. V. K. Kharche, Director of Research & Dr. Nitin Mukund Konde, Assistant Professor from Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The speakers presented on healthy soil, water retention capacity, soil health indicators, declining soil health, imbalanced fertilizer use, challenges of sustainable soil management, rainfall variability, predicted climate change impacts on agriculture, water resources in India, changes in precipitation patterns, water degradation etc. Avoiding soil degradation is crucial to our well-being.

The webinar had presence of students, engineers and professionals from reputed institutions and organizations.

World Environment Day Celebration - Webinar on "Sustainable Environment Management Practices" 12th June 2022

Civil Engineering Students Association (CESA) from Saraswati College of Engineering in association with Youth Forum and Students Chapter for Water of Indian Water Work Association (IWWA) has organized a webinar on the occasion of World environment Day on 05/06/2022 on the topic "Sustainable Environment Management Practices". The webinar was delivered by Mr. Naresh Musale, EHS Leader, Owens-Coring (India) Pvt. Ltd. Mr Musale Covered a) environmental management system b) benefits to business or organization c) How to start with ISO 14001:2015 d) Why was ISO 14001 revised . About 45 participants attended this Webinar including dignitaries from Indian Water Work Association, Institute Faculties and students. Prof Pooja Somani, HOD presented concluding remarks and vote of thanks.



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Editor Brief

Recognizing the need for a freeware platform from the users from academic institutions, government offices and other institutions, the "JalTantra" system has been developed by IIT Bombay. Jal Tantra optimises Branch water distribution network and available to all at No Cost. Users, Design Engineers may use good softwares for the optimum cost solution of pipeline network leading to saving in investment on water projects.

- ***Er. Dilip Sonwane***

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Discussions on Water Footprint

So Blue Water Footprint of supplied water will be 1.25 l/l. It excludes Water Foot print of energy and chemicals used & Grey Water Footprint caused because of waste water generated.

Water Footprint of Urban Dweller

As per National Building Code water supply for urban dwellers is 135 liter/capita/day (LPCD). Green, Blue, & Grey Water Footprint are calculated as below,

Green Water Footprint, LPCD (Direct rain water is not used) = 0

Water supply as per National Building Code, LPCD = 135

Blue Water Footprint of Water, l / l of water = 1.25

Blue Water Footprint = 168.75

Sewage Generated, % of water supply = 85

BOD of Untreated Sewage, mg/l = 200

Gray Water Foot Print

Water (Gray) Required To Dilute BOD to 5 mg/l, LPCD = 4475.25

Total Water Footprint, LPCD = 4644

This excludes Water Footprint of energy, chemicals, food & other consumables used in a day.

Item	Water Footprint
One cup coffee	140
1 T- shirt	2700
One slice of Bread	40
1 kg paper	350
Potato chips 100 gm	185
1Lt milk	1000
Chicken 1kg	3900
1 kg of Banana	790
Rice 1 kg	3400
1 kg chocolate	17196
Wheat 1kg	1300
1 kg cabbage	237

Water Footprint Response Option

- Indian farming is rain fed. Therefore efforts are to be made to optimize the use of Green Water Footprint & minimize the Blue Water Footprint for agriculture.
- Similar to Energy Foot Print the product shall be assigned the value of its Water Footprint & consumer shall be motivated to buy product of least Water Footprint.
- The financing authority shall give weightage to Water Footprint value of the said project.
- Manufacturer shall allot the fund & act to increase Green Water Footprint, Reduce Blue Water Footprint & Treat & reuse waste water to reduce Grey Water Footprint
- Water Footprint of consumer, community, business & nation shall be determined to get gross water consumption. This help to assess the water sustainability for required for development.
- The efforts of reduction in Water Footprint from product, consumer & finally to Nation shall be shared at all the levels.
- Planner shall consider total Water Footprint for proposed development plan.
- Interlinking of Water, Ecology & Carbon Footprint of Product is must.
- Water Footprint is to be integrated with Material Flow Analysis (MFA) & Life Cycle Analysis (LCA)

Water Footprint can be used as Tool to assess total water requirement and reduce water consumption and combat the pollution and climate change.

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from Chairperson Desk

agricultural sustainability as well as for the protection of the natural ecosystem. Agronomic agricultural and agroforestry, Contour farming, crop rotation, crop cover and organic farming are the few measures for soil-water conservation.

IWWA Mumbai center recently conducted a webinar on this subject for spreading awareness. We always welcome and encourages deliberations, discussions and awakening on diversified subjects associated with the water world.

- Er. Maniessha Palande