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Jalasamvad

A Dialogue on Water

Editors: Dr. Datta Deshkar, Shri Satish Khade

Marathi issue of Jalasamvad for the month of June 2022 was a special issue on **Shri Vilasrao Salunke** - a noted water activist from Pune. He propagated the philosophy of equitable water distribution to farmers. Not only that, he developed some villages on that line. After his demise, his family members and friends continued that work under the banner **Gram Vikas Pratishthan** having its Office at Khalad, a small village in Purandar Taluka , Dist Pune. This issue was published at the hands of **Shri Popatrao Pawar** on 11th June 2022.

Here are some of the photographs taken on that occasion.

The Cover of the Marathi Jalasamvad issues publiushed

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Jalsamvad

Mouth Piece of Bharatiya Jala Sanskriti Mandal

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Demand from agriculture to be treated as industry

Demand from agriculture to be treated as industry is increasing day by day. Unfortunately, in our country agriculture is being treated as a way of life. The cultivator does not follow any commercial principle while cultivating the land. He does not take the review of the market before selecting the crop and faces the music later when he does not get good price for his product. Cost, price, competition, size of the unit, return on investment, finding better markets for the crop, purchase of inputs, value addition, branding of the product, marketing strategy, maintaining the accounts are some of the factors which need attention in any economic activity. But the cultivator is miles away from these considerations.

One thing needs to be remembered that the supply of agricultural products is greatly inelastic. They cannot be increased or decreased as per the will of the supplier as it is the Nature which controls the supply. Industries enjoy this benefit as it can change the supply at will. This situation creates a great handicap for the cultivator as he cannot adjust the supply to the demand from the market. If the cultivator wants to exercise any control over the supply he has to take resort to the technology of green house so also of the cold storage. One stabilizes the production and the other regulates the supply. Both Green House so also Cold Storage facility need huge investment which the cultivators are unable to do.

Grain farming, fruit farming, forest farming, protein farming, fodder farming are some of the common practices of cultivation. Even when so many avenues are available, he selects only grain farming where the end products are grains and fodder for the cattle. When all the cultivators select the same product, the supply increases so much that prices fall down in the beginning of the season as all the farmers make a rush in the market to sell their produce. They cannot hold the produce for some days because they need money for satisfying their urgent needs. The middlemen take full advantage of the situation and purchase the whole bulk at a very low price, store the produce in the godowns and sell the same over the year at better price. Person who takes all the efforts of cultivation does not reap any benefit whereas the person whose efforts are minimum gets maximum reward.

There are some cultivators who treat agriculture as industry are really rewarded. Near Pune, there is one activist who has organized hundreds of cultivators who get nearly Rs.8,00,000 from one acre of land every year mainly because he has full control over the product and the market. He takes full advantage of grading, branding, delivery at home in time. Linkage with the customer does this magic. Foreign market in food products is very lucrative. Rewards are definitely more than the efforts. But we do not find such entrepreneurship elsewhere.

Control over price depends upon how much control you can exercise on the total supply in the market, i.e. how much market share you have at your command. If farmers come together in large numbers, then only such control over supply is possible. People in Maharashtra, in particular, have lost faith in the cooperative movement because of its misuse by the politicians and out of that fear their coming together is not possible.

When all such factors go against the farmers, we fear that such demand from cultivators to be treated as industry is a distant possibility.

Dr. D. G. Deshkar
Editor

Story of Water. Part 12 - Institutional Structure for Water Governance and Administration

Shri Chetan Pandit - (M) : 9423174594

Putting the water in the rivers to use, by construction of dams, barrages, hydro-power stations, canals, city water supply systems, etc. involves a lot of engineering, and financial investment. In this part 12 of the Story of Water, I will explain the institutional structure, i.e. the different departments and other organizations, that deal with planning, management, and development, of water resources.

I had explained in the part 11, that the Constitution places "Water" in the State List and therefore it is for the State Government to plan, construct, and operate the projects for water supply, irrigation, drainage, embankments (for flood control), water storage and hydro-power etc. The Ministry and the Departments in the Central Government have a very limited role of overall planning, coordination amongst the states, and such.

Till about 1985, water wasn't seen as a resource in itself, and there wasn't an independent ministry in the Central Government to deal with water. Administration of water was determined by its use, primarily for agriculture. There was a department for irrigation and it kept shuttling between different ministries from time to time. However, the Department of Rural Development administered the rural water supply, and Ministry of Urban Development administered the urban water supply and waste water treatment.

If we go back in time, in late 1800s irrigation was in the Public Works Department (PWD). Under the Government of India Act 1919, irrigation became a Provincial subject and the Government of India's responsibility was limited to only advice, co-ordinate the activities, and settlement of inter-provincial disputes. In 1923 the Department of Industry was merged with the Public Works Department and the combined department known as 'Department of Industries and Labour' looked after the subject of 'Irrigation and Power' also.

In 1951, a new Ministry of National Resources and Scientific Research was set up and it took over the subject of 'Irrigation and Power' from the Ministry of Works, Mines and Power. However, this was short lived and in 1952 a separate Ministry of Irrigation and Power was set up and irrigation was handed over to it. In November, 1974 the Department of Irrigation was placed under the Ministry of Agriculture and Irrigation.

In January 1980, Department of Irrigation came back under the new Ministry of Energy and Irrigation. On 09.06.1980, the then Ministry of Energy and Irrigation was bifurcated and the erstwhile Department of Irrigation was raised to the level of Ministry with a view to having a coordinated and comprehensive view of the entire irrigation sector. In January 1985, the Ministry of Irrigation was once again combined under the Ministry of Irrigation and Power.

It was only in September 1985, that the then Ministry of Irrigation and Power was bifurcated and the Department of Irrigation was re-constituted as the Ministry of Water Resources.

It is not as if this lack of understanding of water as a resource by itself, was only in India. At international level also, there is no UN organization to deal with water as such. The Food and Agricultural Organization (FAO) deals with water for irrigation; the World Health Organization (WHO) deals with drinking water and particularly

the quality, as it affects the health. The World Meteorological Organization (WMO) deals with atmospheric phase of water cycle, the rainfall and cyclones, and such. There is no "Word Water Organization" that would deal with water in its totality. By the time this was realized in mid 80s, the global political situation was not supportive to create a new UN organization for water. As NGO called International Commission for Irrigation and Drainage (ICID) had been existing since 1950. Though its name sounds like a UN organization, actually it is an NGO. The ICID, to some extent, deals with water the way a UN organization for water would have one.

The Union Ministry of Water Resources was renamed as Ministry of Jal Shakti in 2019. Soon thereafter the Department of River Development and Ganga Rejuvenation; and the Department of Drinking Water and Sanitation; were shifted to the Ministry of Jal Shakti.

The role of the Union Ministry of Jal Shakti is primarily of administration and policy making. The actual work of the planning and development of water resources is done by various organizations under the ministry, and I will introduce each of these.

CWC : Central Water Commission is the main technical arm of the Ministry of Jal Shakti, and the premier technical organization in the country for all aspects of surface water resources. The CWC is divided in three "Wings".

- The "Water Planning and Projects" wing looks after over all water resources planning; examination of the project proposals by the states, inter-state issues, monitoring of projects being implemented by the states, and such.
- The "Designs and Research" wing is the premier expert unit for designs of river valley projects.
- The "River Management" wing looks after hydrologic observations all over India, water quality monitoring, and flood forecasting.

Head of the Wing is called the "Member". I was Member, Water Planning and Projects, in 2012. The head of CWC is called Chairman. CWC is essentially a technical organization, and the Member and Chairman and all other officers, are all engineers. Mostly civil engineers, but some mechanical engineers too. CWC has its HQ in New Delhi, but has offices in all the major states.

I said the D&R Wing is the premier expert unit for designs of river valley projects. But what is "designs"? Let me explain that with a simple example, of a small building. The apartment or the bunglow in which you live, is made of vertical pillars, called columns; horizontal beams; and slabs; that take all the load. How thick is the slab? Perhaps 6 inches. Have you ever wondered, why 6 inches ? Why not 5, or why not 7 inches? And who decided it should be 6 inches, and on what logic? Surely you have seen a building under construction. The columns and beams and slabs have steel bars embedded in them, called reinforcement. How many bars? Of what diameter? And at what spacing?

All this is determined by the various loads on these components – the vertical load comprising their own weight and the weight of various goods in the building; the horizontal loads comprising earthquake forces and wind forces, etc. The structure should be safe, but also economical. The process of determining all these details is called "engineering design", or simply "designs". Designs is a major part of all engineering practice. Designs of a dam, barrage, power house, canal, is a very complex task and involves high level engineering, because the structures are far more complex than an apartment building; the forces exerted by the nature are much larger; and the stakes are very high. Failure of a dam due to earthquake would be a huge disaster.

In the years immediately after the independence, the states were yet to develop the capability for designs and the design of most projects was done by the the CWC. In due course, some of the larger states developed their own designs units. But the smaller states get the design of the projects done by the CWC even now. And for very large projects like the Sardar Sarovar, or Tehri, even the larger states continue to rely on CWC for

project designs.

Many years ago CWC did construction work also. The Hirakud dam on Mahanadi river in Odisha was constructed by the CWC. But the states soon developed construction expertise and approximately in 1978, the few construction projects still with CWC were taken over by other agencies. Now CWC does not do any construction.

CGWB : Just as the CWC is the premier technical organization in the country for all aspects pertaining to surface water resources, likewise the Central Ground Water Board is the premier technical organization in the country for all aspects pertaining to ground water resources. Like CWC, the CGWB also has its HQ in New Delhi, and offices in all the major states.

NWDA : The National Water Development Agency was established in the year 1982 to carry out detailed studies, surveys and investigations for inter-basin transfer of water, popularly, thought incorrectly, known as Inter Linking of Rivers, or ILR. I have explained the ILR concept in detail in part 7 of my "Story of Water". NWDA is under the administrative control of Ministry of Jal Shakti.

CW&PRS : The Central Water and Power Research Station at Khadakwasla, Pune, is a research institution for water and power engineering. The CW&PRS also conducts model studies for the projects. The hydraulics of various water projects is very complex and can not be completely analysed mathematically. Viz. what will be the forces generated on the spillway of a dam by the flowing water, can not be completely analysed mathematically. We need to make a physical scale model of the spill way, make real water flow over it, measure the forces generated on this model, and from this infer the forces that would be generated on the real spillway. Such model studies are conducted by CW&PRS.

NWA : National Water Academy, also at Khadakwasla, Pune, and adjacent to the CW&PRS, is a training institution for water resources engineers not only from all over India, but also for engineers from other countries. However, NWA is not an independent organization, it is a part of the CWC.

CSMRS : Central Soil and Materials Research Station at New Delhi conducts research and engineering studies in the field of soil mechanics, rock mechanics, various materials used for construction, etc.

NIH : National institute of Hydrology at Roorkee, is an institute for research in hydrology.

WAPCOS : Water and Power Consultancy Services is a public sector undertaking (PSU) of the Ministry of Jal Shakti, for providing consultancy in water and power engineering. In water resources engineering India is at par with rest of the world. In all other engineering domains – electronics, aeronautical, chemical, mechanical – there are technologies that are not yet acquired by India. But in water resources engineering we can do everything that any other country can do. We can design and build large dams, tall dams, barrages, huge underground power houses, canals that are large than some European rivers, we can do everything. WAPCOS is the agency through which the expertise developed by Indian engineers is made available to other countries, and also states in India. WAPCOS has some engineers as their own permanent employees, and takes on temporary deputation experts from CWC, CGWB, CW&PRS, CSMRS, etc. depending on the needs.

NHPC : National Hydro Power Corporation is a PSU under the Ministry of Energy for hydro-power projects. NHPC not only does construction of projects, but also owns and operates hydro-power projects.

These are the major organizations under the Ministry of Jal Shakti. There are some river boards for management of a particular project or river; and there are some smaller organization for very specific tasks, like the Tungabhadra Board, for operation and management of Tungabhadra project, or the Farakka Barrage Project, for operation and management of Farakka Barrage on Ganga.

IMD : India Meteorological Department is the premier scientific organization for meteorology, also called atmospheric physics. Note, it is India

Meteorological Department and not Indian Meteorological Department. IMD carries out meteorological observations all over India, rainfall forecasts, cyclone forecasts, etc.

IITM : Indian Institute of Tropical Meteorology, at Pune, is a research organization for meteorology research. The IMD and IITM both are under the Ministry of Earth Sciences.

NWRC : National Water Resources Council is a very high level policy making body. Hon'ble Prime Minister of India is the Chairman of NWRC, and the members comprise Chief Ministers of all states, Lt. Governors of all Union Territories, and the Ministers of some water related central Ministries. This must be the highest power committee in the Country.

WRDs : That was about the water governance structure in the Center. At the state level, in every state government there is a Water Resources Department, or WRD for short, that carries out the tasks of planning, construction, and operation of various structures like the dams, barrages, irrigation canals, hydro-power stations, flood control, and such. As in center, earlier this was a part of PWD, but is now an independent department.

Some states had also established a hydro-power research station, on the lines of CW&PRS at Pune, though on a somewhat smaller scale. The prominent amongst these were in the states of Maharashtra at Nasik, in Karnataka near Krishnarajsagar dam, in Gujrat, Vadodra, in Uttar Pradesh near Haridwar, in Punjab in Amritsar, and West Bengal near Kolkata. However, now onlythe institutions in Maharashtra, Karnataka, and Gujrat, are somewhat functional. Most others are dysfunctional.

Urban and Rural Local Bodies : Almost every CWC engineer, some time or the other, has been asked by his relative/ friends/ neighbours "the water supply in our home is very low pressure. Can you do something?". The answer is No, CWC officers can not help you. CWC, in any case, has no authority to actually do any work, because water is a state subject. But even the state WRD officers also can not help you. The water supply, and also waste water treatment, is done by what is known as urban and rural local bodies. These can have various names, typically municipalities or municipal corporations in urban areas and Gram Panchayat in rural areas.

To understand this, think of the state WRD as whole seller of water, and the municipality as retailer. The Maharashtra WRD gives a certain bulk quantity of water from Khadakwasla dam to the Pune Municipal Corporation, PMC. It is for the PMC to treat that water and deliver it to you home.

WALMIs : Water and Land Management Institutes were established in the year 1980 in many states for taking water management to field level. While the NWA at Pune is for training the engineers, the WALMIS were mean to train the field level officers and also the farmers. These were set up with foreign funding and while the funding was available, these flourished. However, once the foreign funding ended, most became dysfunctional. The ones in Maharashtra, at Aurangabad; in Telangana, at Hyderabad, in Madhya Pradesh, at Bhopal; and in Kerala, at Kozhikode, are somewhat functional but that too not too well. And the rest have almost shut down.

Water Regulatory Authorities : The idea of "independent regulators" is relatively recent. A regulator is a high-power authority that regulates the behaviour of a sector. The Telecom Regulatory Authority of India (TRAI) regulates the telecommunications sector. Likewise, we have regulators for insurance, banking, stock-market, etc.

Likewise, the idea of a water regulator was proposed. An independent water regulator will be particularly necessary if the private sector is to have any role in operation of water projects. In August 2005 Maharashtra became the first state to set up a Maharashtra Water Resources Regulatory Authority. Some other states followed the suite.

However, it did not yield the desired results. An independent regulator can function only if he is truly independent. But the "independence" is not something that can be bought from the market. It is

to be conferred on the Regulator, by the Government. If the Government continues to interfere in Regulator's decisions, then the Regulator will become an extension of the Government. That is what has happened, the water regulators have not been given the necessary independence by the Government.

CWES : Just as there is IAS cadre for administration, IPS cadre for policing, likewise Central Water Engineering Service is the cadre in the central Government, for water engineering. Engineers to CWES are recruited by UPSC, through a competitive examination and an interview. The officers of CWES are posted mostly in the CWC, but also in the Ministry, and other organizations under the Ministry.

The next part will be about India's Water Management Paradigm. As I write this part on 7th June 2022, Covid cases have started rising again. Take care, and stay safe.

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Stockholm Water Prize 2002
Ignacio Rodríguez-Iturbe, USA
Gajanan Deshpande
(M) 9822754768

(An article series has been launched in August 2020 to learn more about the World Water Prize winners and their work.)

The intense desire to understand "how nature works" became a major professional inspiration for Professor Ignacio Rodriguez-Iturbe. It was this passion that helped Professor Rodriguez-Iturbe to reach the pinnacle of his chosen hydrology. Born in Venezuela, Rodriguez-Iturbe became the first South American to receive the Stockholm Water Prize.

The scientific contribution of Professor Rodriguez-Iturbe has significant theoretical and practical importance for the development of hydrology as a planetary science. He added that knowledge about the planet's meteorological system, in which water circulation plays a crucial role. His research has shed more light on climate and hydrological events - such as floods and droughts, which can lead to environmental and economic damage. In the 1970s, Professor Rodriguez-Iturbe developed a mathematical model for such long-term environmental phenomena. Its formulas are widely used around the world, for example - to predict changes in river flows and water levels.

In addition, Professor Rodriguez-Iturbe contributed greatly to the development of methods for determining the accuracy and value of hydrologic data. This concept is now accepted in hydrology and meteorology services. It has been used in the US, Canada and England to evaluate the usefulness of data collection systems.

In the mid-1970s, Professor Rodriguez-Iturbe first implemented the "Bayesian approach" to improve various models for river flow and to predict the probability of hydrological phenomena. (This is a mathematical tool for gathering information from many different sources) This type of approach is now accepted in many planetary sciences. For example - it acts as a way of integrating output from different climates or weather models or as a way of integrating models and opinions for environmental risk assessment.

In the 1980's and 1990's, Professor Rodriguez-Iturbe and his colleagues refined the theory of river basin formation from a geographical point of view (Geology is the science of the Earth's surface). Nature carries water and silt out of the watershed with maximum efficiency, he was able to establish an equation that, once resolved, the nature would create a drainage system that would form different climatic and geographical conditions.

Professor Rodriguez-Iturbe's mathematical representation of precipitation in an active point method makes it possible to predict precipitation over many years from different periods, create sequences that mimic how nature will behave in the future, and it is possible to use

the results in engineering design or analysis.

Recently, Professor Rodriguez-Iturbe defined the concept of natural hydrology to explain the interaction of climate and hydrology with vegetation and soil. In-depth study of this new field now forms a new scientific front in hydrology and ecology, and the results of research in this field will be important for understanding the differences between the global carbon cycle and climate.

Professor Rodriguez-Iturbe's passion for teaching is well-known, as it provides him with dynamic answers to problems. He is a well-known lecturer and author of many scientific articles and books.

In all of his work, the strongest motivation for him is to understand "How nature works".

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Organization- Safe Water Network

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Safe Water Network is a non-profit organization co-founded in 2006 by actor and humanitarian Paul Newman along with other civic and business leaders. The organization believes water is a fundamental human right. Safe Water Network works with the private and public sector to overcome the obstacles to local sustainability and scale. They empower communities, work with national, regional and local government authorities in India & Ghana. Organization also works with NGO partners, private sectors companies and foundations. In 2008 Safe Water Network established field offices in Accra, Ghana and India. For organization it's not just to about building wells, installing toilets and setting up pumps but to create long-term sustainable changes. Local water experts of organization lay groundwork for an approach to developing the community capability to own and manage safe Water Stations. Today team of Safe Water Network host forums and workshops about their work. Despite the challenges of COVID-19 pandemic organization continued working with their three programs to increase safe water for millions of people in underserved communities. Three programs of Safe Water Network are,

- Field Implementation.
- Technical Assistance.
- Sector Engagement.

With their above three programs safe water is flowing in over 500 communities in Ghana and India. Organization also launched 20 new safe water stations. To meet the global water crises organization is working with their partners, international institutions to develop advance tool, policies and necessary training. Kurt Soderlund is CEO of Safe Water Network. Ravi Sewak is Director Of Safe Water Network in India.

During the COVID period in Ghana and in India Safe Water Network was working closely with governments at the national, regional and local levels to serve the communities with uninterrupted safe water delivery essential for millions. Safe Water Network added 400+ hand washing stations, 15 water knowledge resource centers. Organization also raised fund of $400000 as a COVID fund to maintain sustainable operations of water stations in India. Safe Water Network also kept reliable water flow at water stations with properly functioning over 90% of time during COVID crises in Ghana and in India.

Organization's safe water stations are branded locally to support communities engagement and their active participation to communicate the value of affordable, reliable, safe water. Stations in Ghana are branded as H2OME and in India as "iJal". These stations are owned by social industrialists or women led community groups. 28% of water stations are managed by female groups in India. In Ghana water stations are owned by community but are operated by ladies vendors. They dispense water, maintain water stations and handle payments. Water stations of Safe Water Network now supports over 500+

communities that provides safe access to over 1.7 million people. In India Safe Water Network is having alliance with 18 partners across 23 states. And partners are Bala Vikas, Community Pure Water, Drinkwell Systems, JanaJal, Josab Water Solution, Maithri Aquatech, Naandi Foundation, OCEO Water, PHED Haryana, PiLo, Piramal Sarvjal, Rit Water Solutions, Safe Water Network India, Sahara Water Technologies, Smaat India Private Limited, SWEM Water Tech India, Water Health India and Waterlife.

Achievement of Safe Water Network,

- With 448 Safe Water Stations 1.7 million people have access to safe water.
- 481 communities have 2439 pipe connections.
- 100 % water tested for water quality for microbial and physio-chemical contaminants.
- 6000 people have safe water at their home.
- 44 million liters of water delivered directly to home, schools and clinics in 2020.
- 10 health care centers connected to reliable water supply.

In India Safe Water Network operates in Karnataka where it provides technical assistance to Karnataka Government to upgrade reliability and performance of water purification plants across water stress districts of state. Now the question is why in Karnataka? Many parts of India are water stressed which impacts millions of people. Karnataka state also has source water contamination and also have challenge of safe water access for underserved communities(populations that do not have adequate access like elderly, low-literacy and poor population). The state has one largest water purification system that serves 40 million people. Safe water Network is deploying its technical and management expertise to help improve the performance, reliability and affordability of this system. 18000 water purification plants in Karnataka are supported by Safe water Network. With their active support 40 million people gaining access to reliable safe water through state government's decentralized water purification system. In addition to Karnataka Safe water Network works in Telagana, Maharashtra, Rajasthan and Uttar Pradesh to reach millions of people in need of safe water.

1700 team members (Ghana 690 and 1011 form India) of Safe water Network, community members, local leaders, technicians and full time staff are working together for three step organization's programs i.e. Field Implementation, Technical Assistance and Sector Engagement to solve global water crises. They also promote their program through publications, workshops and other events. Safe water Network gets support from some of their partners like Merck & Coo., PepsiCo Foundation, Conrad N. Hiltom Foundation and Newman's Own Foundation.

Around the globe 2.2 billion people do not have access to safe water and for India figure is 100 million. Nearly 75% of India's surface water is contaminated by human, animal, agriculture and industrial waste. Groundwater also contains high level of fluoride and other contaminants. Water from sanitation also contributes sanitation related illness and in the range of 70-80% of the country's disease. Drought and lack of education and poverty make situation more complex. Progress to resolve this issue is hampered by poor education and lack of support from local level. About the failure of

rural water system in India, Safe water Network is of opinion that inadequate operational controls and maintenance programs and lack of skill to manage their water system makes water issue more complex.

Brand name for distribution of water in India is "iJal". To increase and sustain demand for safe water they created 'ijal' Brand. iJal means "My Water" that represents a healthy Tomorrow". All Safe Water Stations in India are having a brand name 'ial'.

Safe water Network is helping the people of Bhandara District of Maharashtra. Maharashtra is India's second most populous state. It is India's wealthiest state yet many do not have access to safe drinking water. In 2006 the Ministry of Panchayati Raj named Bhandara as one of the country's most backward districts where over 1.2 million people live. With the help of 14 water station Safe Water Network made access to safe water to 60727 people of Bhandara district.

Similarly in Telagana Safe water Network has installed safe water station around Warangal, Karimnagar and Mehboobnagar districts. Organization uses cost effective technology to manage groundwater issue like fluoride, Nitrates and other dissolved solids. With 190 safe water stations Safe water Network provided safe water to 659126 people above mentioned districts of Telangana.

With the help of their partners namely Merck Foundation, PepsiCo Foundation, Dialouge factory and IMRB, Safe Water Network conducted consumer research to understand why many people rely on unsafe water sources. They came to conclusion that reliability, convenience, taste affordability are the factors that contribute people to continue with unsafe water sources. From this analysis their team took the following action,

- Refreshed their iJal brand.
- Improved the existing public display boards at their safe Water stations.
- Trained their operators to advocate for their safe water.
- Developed a series of standardized messaging as part of marketing campaign. Etc.

Above program was rolled out in 2013 which worked all across Telangana. The campaign was recognized by Rural Marketing Association of India. For this innovative approach Safe Water Network was awarded with three Rural Marketing Flame awards. Customer base is important for successful long term operation of any system. For keeping price affordable it is necessary that enough households should buy water from Safe Water Stations. Generated money through this can be utilized for operation and maintenance of Safe Water Stations so that water can flow for generations to come. Secondly this also requires participation and support from organizations of private and public sectors as well as from local and regional government said Safe Water Network.

Safe Water transforms lives of people but for better livelihood more industries, more agriculture also require more water. Climate change is also a concern now which negatively impacts watershed. Safe Water Network is working in minimizing these environmental impact so that future generations have abundant safe water.

Safe Water Network has a innovative idea of using Sun to power safe drinking water as many stations are in remote places where electric supply cannot reach. In addition to reliability price rise of electric charges increases operational charges of their water stations. Installing solar panels at a station provides reliable and predictable energy source to run water stations without break. In 2013 they installed first of this type of station in Ghana. They have reduced 20 % of operational cost by

installing these solar powered water stations which intern increased affordability.

Here is a story of villages of Ghaziabad India where people suffered from water related diseases due to contaminated water sources. Families have no choice but to use the unsafe water from hand-pump. Water related sickness became a way of life here. Drinking untreated water leads to illness and sometimes death. Sufferer were children and elderly person. As per data available globally one in five children die before they attain the age five. Here is story of Petri Chaudhari who gave birth to baby child. Within two months baby was suffering from severe diarrhea. Baby was given a temporary treatment from local doctor. After a month or so Petri visited her father's village which was 60 km. away. Before arrival of Safe Water Network here also water was unsafe and dangerous. Safe Water Network installed an iJal in this village in 2011. During her stay at father's house Petri noticed that children here are more active and healthy compared to kids at her home. After drinking this water for few weeks she and her baby felt better. When Petri's parents offered to raise her little daughter, so that she could grow up by drinking safe water. Petri and her husband did not hesitate to accept the offer by realizing that such a move will definitely improve their child's chances of growing healthy. Safe Water Network and it's partners intend to transform more villages with safe water so that mothers won't have to sacrifice that Petri made for the sake of her baby.

India's largest Power Plant equipment manufacturing company BHEL is helping rural communities in Maharashtra by owning and managing safe Water Stations in Bhandara district. BHEL supported iJal station commissioned in Bhandara district of Maharashtra in the villages of Lakhani, Sendurwafa and Murmadi. Each safe water Station provides access to over 5000 people.

Why Bhandara district? Because it is a backward district of Maharashtra where many people of 12 million population of district have no

access to safe water. Safe water Network operates 68 safe water stations providing nearly 300000 people affordable safe water access.

Safe Water Network is a Liaison Office of Safe Water Network, USA in India. It provides technical and supervisory support to agencies that deliver safe, affordable drinking water in India. It is registered under section 12A and 80G of Income Tax Act 1961. It can receive grants from International donors as it is registered under Foreign Contribution Regulation Act.

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Jeevitnadi : Activities for the month of May 2022

Smt. Shubha Kulkarni

(M) : 9930809046

Spreading awareness against the proposed River Front Development :

• Ecological Society, Pune having completed 25 years of its course, had a huge alumini meet organized on 1st of May. Founder members of Jeevitnadi appealed to the whole group to join in the movement against the current River Front Development being proposed.

• There was an interaction with kids from the economically deprived section, where we talked about the river, through a story telling activity of Mutha river. The program was organized by a laughter club of B.T. Kavade Rd.

• Another program was organized at Thorat Garden, Kothrud by spreading awareness about the current River front development to the common citizen who came to garden for various activities. We realized citizens had no knowledge about this project which is going to be endangering the rivers. All expressed that the PMC must keep the natural sanctity of the river, and just start STP's, stop solid waste which should also be done for Ambil odha, Bhairoba Nallah, Ram nadi etc which are in pathetic state.

• On the occasion of World Tea Day, May 21st, we held a session by eminent activist Sarang Yadwadkar, where he addressed the group about the realities of the proposed River Front Development. The idea continued to connect the citizens to the river through our Nature walk and River walk.

• Another awareness creation session was organized at one of the residential societies at Warje. And also another at a garden where retired Central Excise members got together.

Walks, talks and clean ups!

•Shailaja Deshpande, our Director conducted a session on river revival in the urban context, at the Nadi ki Pathshala: organized by Vanrai, Japbiradari

and College of Agriculture. The team also visited the Ramnadi Mula confluence for a Nature walk.

• We conducted a Toxin Free Lifestyle session with the Rotary club west group on May 27th

• A group of enthusiastic employees from HSBC, joined us for clean-up and watering activity at the Aundh, Rajiv Gandhi bridge location, this month.

• The Ram Mula Confluence stretch conducted two Nature walks this month or two teams of Rotary

members of that city.

• As an internship project, we began a Tree Mapping project at the Ram Mula confluence stretch. We hope to carry this forward and complete the google mapping of the entire stretch soon!

• Regular clean ups at all the stretches continued through this month.

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World Water Day -2004

Water and Disaster

Shri Gajanan Deshpande, Pune (M) : 9822754768

(A new series of articles has been launched from August 2021 to learn more about the importance of World Water Day and the various water awareness programs implemented every year.)

The main theme on the occasion of World Water Day-2004 was "Water and Disaster". Natural and catastrophic disasters such as hurricanes, floods as well as droughts and unhealthy living conditions cause huge loss of life and property. In 2004, the idea of how to set up a proper global mechanism for paying close attention to such incidents, anticipating their movements and giving timely warning to the people was inculcated in the minds of the people.

The UN International Strategy for Disaster Reduction and the World Meteorological Organization organized various events in this regard. The main message conveyed to the masses was that the climate and water resources could have detrimental effects on socio-economic development and human health.

Water is so pleasant for life; however, it can also make you cry. Every year around the world, many big storms and heavy rains are constantly disturbing the society. The tsunami that struck Japan a few years ago and its aftermath are still troubling the Japanese government. The tsunami that hit the east coast of India is still not forgotten by the people there. Dry and wet droughts come regularly after the onset of rains; this is something India cannot forget. Due to all these reasons, the government has to face the emergency situation. Therefore, the importance of paying serious attention to what can be done to address these issues, was inculcated this year. Many things invite many emergencies. Such as -

The effects of climate change include global warming, changes in rainfall pattern, increasing frequency or intensity of weather events, and rising sea levels. These effects endanger your health by affecting the food you eat, the water you drink, the air you breathe, and the weather you experience.

The severity of these health hazards may depend on where a community lives, how sensitive it is to health hazards, how it copes with the effects of climate change, and how well the community is able to adapt to these changes.

People in developing countries are considered the most vulnerable to such health risks globally. But climate change poses significant health risks even in rich nations.

Safe drinking water is important for public health and well-being. Public health is endangered when water supply is disrupted, as drinking water supply is threatened in addition to sanitation and hygiene.

The catastrophic consequences of a natural disaster can be avoided by planning ahead for disaster management. They are instrumental in raising awareness about the effects of water-related disasters on a region and reducing its negative impact, and this is what has been encouraged through World Water Day-2004 theme to make greater efforts to promote the implementation of such plans and programs.

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Damned by pollution, doomed by beautification

Taken from India Water Portal

The River Front Development project planned by the PMC is nothing but a cosmetic makeover for the already choked Mula Mutha river in Pune, argues Dr Gurudas Nulkar while speaking to the India Water Portal.

Pune has been a water rich city and the Mula and the Mutha rivers that flow through the city are tributaries that join to form the Mula Mutha river in the city that joins the Bhima and then later, the Krishna river.

However, the city is increasingly getting water stressed with its growing population, rapid urbanisation, depleting groundwater levels and the poor state of its rivers. In fact, rivers in Pune figure among the 300 most polluted rivers of India.

The Pune Municipal Corporation (PMC), Maharashtra Pollution Control Board (MPCB), Maharashtra Water Resources Department (WRD) have been blamed for this increasing pollution and neglect of the rivers in the city. Illegal construction of roads and townships through the river bed and the recently proposed Pune Metro through the river bed have also spelled doom for the city's rivers.

As if this is not enough, a recent initiative by the PMC proposes 'rejuvenation' of the 'neglected rivers' through the Pune Riverfront Development Project (PRDP).

The project has been designed by the HCP Design Planning & Management Pvt. Ltd (HCP) from Ahmedabad by Bimal Patel, the consultant that designed the Sabarmati Riverfront Development Project (SRFDP), which has been touted as a successful attempt to develop the Sabarmati riverfront.

Citizens, activists, environmentalists, scientists and experts across the city vehemently oppose the Pune RFD project and argue that this effort is merely cosmetic and will do nothing to change the state of the river. Many have questioned the underlying assumptions upon which the project has been designed.

What is the peculiarity of Pune city and its hydrology? What are the problems that the city has been facing in recent years in terms of the state of its rivers, biodiversity?

Pune receives medium rainfall, but is located at the foothills of the Sahyadri mountains that form the source of major Indian Peninsular rivers. The mountains received over 6000 mm of rains in the monsoon. The Sahyadri divides this precipitation into two regions, one half being diverted to the Arabian sea and the other draining in to the Bay of Bengal. Most of the rainfall to the East of the Sahyadri is dammed. However, there is enormous land in the free catchment which still reaches the rivers.

Pune city has five rivers, Mula, Mutha, Ramnadi, Devnadi and Pavana that join up to form the Mula-Mutha. In short, water flows into Pune from 5 different catchments and there is only one outlet to that, the Mula-Mutha river. Pune's topography is saucer shaped, which leads to water gushing down from different directions from the catchments when it rains heavily. This water must normally reach the rivers, but the urban sprawl has now changed the natural contours and flows due to which the water does not reach the river. This is a major reason for the frequent flooding in the city.

And the frequency of flooding is on the rise in Pune over the last few years as urbanisation is leading to more changes in the land use,

destruction of natural habitats and landscapes, and the obliteration of first and second order streams. At the same time, rainfall patterns are also changing due to climate change, leading to more rainfall in shorter time spans. This too has added to increased incidences of flooding in the city.

The rivers in Pune are monsoon fed so they are not full of water all the year round, they do have small flows due to the streams and springs that feed them. However, we have turned them into perennial rivers that overflow with untreated sewage from the city. This has given the rivers in Pune the distinction of being the most polluted in the country, and exposed the population in the vicinity of rivers to health hazards. Similarly, this has had a detrimental impact on the river ecology and the biological diversity around the rivers.

What is the River Front Development (RFD) project? Why was it proposed? What are some of the features/objectives of the project ?

The River Front Development (RFD) project has been proposed by the Pune Municipal Corporation (PMC) on the 44 kilometre stretch of the Mula Mutha river to deal with its poor state and prevent flooding in the city. The Detailed Project Report (DPR) of the RFD says that the project aims at preventing floods, reviving and rejuvenating rivers and developing a link between the river and its citizens. But the reality is very different. The RFD does not look at the river as a living ecosystem, it looks at it just as an economic resource and carrier of water.

What are the problems with the RFD project? Why are citizens, activists, environmentalists, ecologists, experts, organisations in Pune opposing it?

In reality, the RFD project is more about artificial beautification of the river, not rejuvenation at all. It involves channelising and converting the river into canals by constructing walls (embankments) on the riverbed using cement, tar, paver blocks, rock pitching and other material. This will involve straightening of the river banks, which is an ecologically disastrous idea. Making the banks permanent with any such material, including concrete, is disastrous for the river.

And mind you, a river is a living system. It has different water velocity at different points; such as high velocity at the source, medium in the plains

and very slow at the end of its journey. The river takes different paths, picking up sand, pebbles, silt and organic matter as it snakes through different landscapes.

The river bank is never a straight line and never permanent, but is flexible and depends on the river flow and forms a gradual gradient where water touches and mixes with the soil on its banks and supports different kinds of plants and animals depending on the habitat created.

One of the main consequences of river straightening is that it can become shorter and steeper. We have already channelised the river - narrowing it further will result in faster flow and higher water levels when it rains heavily leading to floods. This is exactly what is seen from the DPR.

This can also lead to more erosion of the river banks and increase in siltation and turbidity affecting all animals living in and near the waters. This could lead to irreversible damage of the river ecosystem. River straightening can also reduce the river's self-purification capacity because of shortened contact of the water, lesser oxygen mixing, which affects life in the river bed.

The RFD embankments will be constructed inside the floodlines, which will narrow the cross section of the river. The Water Resources Department has defined the floodlines for the river and warned the PMC not to reduce the cross section of the river . Apart from the embankments, three barrages are planned to be constructed two on the Mutha and one on the Mula Mutha river. These will stagnate the already polluted river leading to drop in oxygen levels. This will further deteriorate the biodiversity and allow invasive species like hyacinth to cover the water. We have seen this phenomenon in the Sabarmati RFD project.

The RFD project report mentions that the Central Water and Power Research Station (CWPRS) has given approval to this project after in depth hydrological study of the rivers. However, the CWPRS has categorically stated that they have not studied the RFD nor are they the approving authority. Both these letters are available with the PMC .

Environment clearance obtained for the RFD has been taken from the State Environment Impact Assessment Authority (SEIAA) but there are several questions arising in the approval.

The DPR of the RFD has no mention of climate change in any of its sections, nor any consideration of the changing rainfall. Everyone knows how the rainfall is affecting rivers and floods.

Also, in the entire project, there is no mention of purifying or cleaning the rivers. How can there be rejuvenation without clean water, one wonders? This is not about river rejuvenation at all as there is no consideration for the river ecology anywhere in the report.

As citizen, we must take the blame, since we are responsible for the sewage. Our rivers are no longer living entities, but for us, they are just bridges to be crossed. The RFD does not address the critical need to change human-river relations. The project will bring along huge earth moving equipment that will change the river bed, the banks and the course. Cement, tar, paver blocks and lawns will change her banks. In all this activity, there is no room for community participation. Is that what we want for our river? We really need to think hard.

The project consultant has the experience of the Sabarmati river model. Why do you think the Sabarmati model is not appropriate for cities such as Pune?

Comparing this with the Sabarmati model is not at all appropriate as the hydrology and the topography of both the cities is totally different. For example, the Sabarmati river originates in the Aravalli mountains, where the rainfall is less than about 1000 mm. The Sabarmati flows through Ahmedabad and then goes to the Gulf of Khambat, so the RFD project is not at the source region, but near the mouth of the river, where it is slow and wide. This is not the case with the Mula Mutha that originates from the Sahyadris where the rainfall is around over 7000 mm and the project is planned near the source where the rivers are very fast. Moreover, we have huge dams a few kilometers

upstream of the planned RFD project.The two situations cannot be comparable.

What do you think needs to be done to change this situation and improve the state of rivers in Pune?

We argue that the rivers have been polluted for many years now and it is the primary responsibility of the Pune Municipal Corporation to keep them clean. We want the people of Solapur to support this demand as they are the ones who suffer when the polluted Mula Mutha water goes into the Ujani dam which feeds the city.

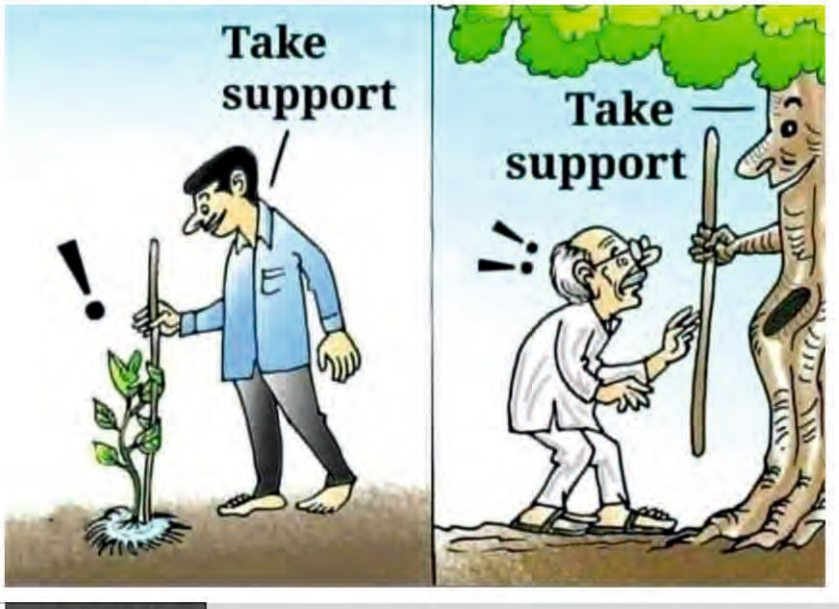
Even in 2022, a large portion of Pune city is not supplied with drinking water. The sewage treatment capacity is woefully inadequate. When these critical functions in city administration are dysfunctional, how can the PMC spend 4400 crores on 'beautification'? Why can't they spend this money on making the city tanker-free and its water safe and secure?

Even if all other problems are taken care of, thinking of the river as a living entity and thinking of its ecology is the critical part here. Restoration should first involve cleaning the river and letting it be on its own, nature has a tremendous capacity to revive itself. We must prevent filth from entering into the river.

As citizens, we must connect and involve every Punekar in the care for the river. It is important to spread the knowledge of river ecology, its life-giving functions, and how it can be truly rejuvenated. Ecological restoration should be understood by citizens – they are the beneficiaries who are not involved in any decision making regarding the river. We still follow the colonial model. Indians managed their own water resources before the British took control.

We argue that restoration and revival should look at the river as a living entity, we as citizens would like to see a living river, with undisturbed banks not cemented ones and clean, free flowing waters that harbour rich flora and fauna. The River Front Development project does not meet any of these requirements in its present form.

Dr Gurudas Nulkar, Professor and Head of Symbiosis Centre for Climate change and Sustainability, and a member of the board of Ecological Society speaks to the India Water Portal on the background to the RFD project and why it is being opposed by environmentalists, experts, activists and citizens alike, in Pune.



Why we can't lose hope :

Dr. David Suzuki speaks out

Taken from google

▪ Suzuki on hope: "I can certainly see that people in the environmental movement are being disheartened... [but] we've all got to do our little bit... Actually doing something invigorates you."
▪ On politics: "In many ways, the election of Trump was dismaying, but it has galvanized Americans to oppose him and to get on with reducing carbon emissions."
▪ The big problem: "[T]he values and beliefs we cling to are driving our destructive path... You can't change the rules of Nature. Our chemistry and biology dictate the way we have to live."
▪ The solutions: "We need to enshrine environmental protection in our Constitution... [A]s consumers, we've got a big role to play, [and] we've also got to be... much more active in the political process."

Dr. David Suzuki: "We're in a giant car heading towards a brick wall and everyone's arguing over where they're going to sit... We must reinvent a future free of blinders so that we can choose from real options." Photo courtesy of David Suzuki

To many who grew up with the environmental movement, Dr. David Suzuki is a legend. He has always been there — a guiding light. A pragmatic scientist, he has never sugar coated the difficult truths regarding carrying capacity, tipping points, climate change, over-consumption, population, and pollution. But he has also never been a doomsayer.

Suzuki, a Canadian geneticist and biologist, has always been about solutions, both societal and individual. And though he became an icon of television, radio, the lecture circuit, and the Internet, and has written more than fifty books, he isn't just a talker. As co-Founder of the David Suzuki Foundation he seems to be everywhere: meeting with First Nation leaders, surrounded by children or by performers like Neil Young and Gordon Lightfoot as he promotes the Blue Dot Movement and seeks to enshrine the right to a protected environment in the Canadian Constitution.

Dr. Suzuki is over 80 years old now, but shows no sign of slowing his advocacy for the Earth or his zest for life. If anything, he has become more frank, more outspoken, in the face of the world's deepening environmental crisis. Recognized as a world leader in sustainable ecology, Suzuki is the recipient of UNESCO's Kalinga Prize for Science, and the United Nations Environment Program Medal, and in 2009 won the Right Livelihood Award — considered the Alternative Nobel Prize.

In this exclusive Mongabay interview, Dr. Suzuki speaks his mind, clearly defines the big problems we face, offers up the big solutions we urgently need to pursue, and tells us why we must have hope.

David Suzuki arrives by canoe at Porteau Cove, British Columbia, November 2014 to celebrate an environmental victory. Photo by Lisa Wilcox, Squamish Nation

AN INTERVIEW WITH DAVID SUZUKI

Glenn Scherer for Mongabay: You've seen a lot of ecological damage in your 80+ years on the planet, what can you say to those who are losing heart?

David Suzuki : Yes, I think it's a very depressing time; especially when you look at the record of our coming to see that there are problems decades ago, and our inaction. It was in 1988 that environmental issues had really risen to the top. I remind you, there was an election in 1988, and a candidate said "if you vote for me, I will be an environmental president." Do you know who that was?

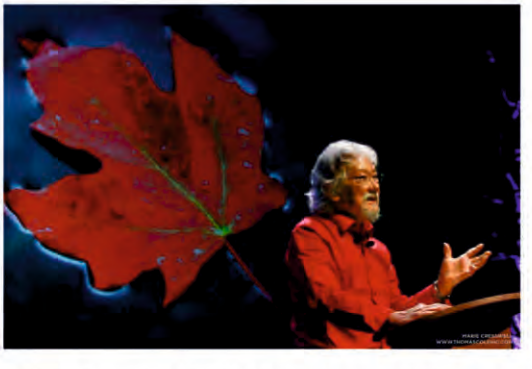
Mongabay: I don't.

David Suzuki : It was George H.W. Bush. There wasn't a green bone in his body, but he said it because Americans had put the environment at the top of its agenda. And Margaret Thatcher, in 1988, was filmed picking up litter in London, and she turned to the camera and said: "I'm a greenie, too!" The environment had reached great heights in the late 80's, but then there came a slight recession and immediately, whenever it's a matter of the economy and the environment, the environment loses every time. So the environment "protectors" disappeared, and we saw the right wing think tanks, and people like the Koch brothers, begin to pour tens of millions of dollars into a campaign of disinformation. So the result is that while Americans, in 1988, were very concerned about the environment is much less.

The denial of climate change, for example, is still a significant part of North American society. So I can certainly see that people in the environmental movement are being disheartened, because we're going in a very depressing direction. My answer to that is twofold : one is: you have no choice! What is the alternative to the situation, do you give up? I think it's hard to give in to despair, but there are a lot of people who are despairing. The other thing is: we've all got to do our little bit, whatever it is. Actually doing something invigorates you, it makes you feel better to be doing something. So yes, these are discouraging times. I look at the Trump election, for example, with dismay. But at the same time, I lived in the United States for eight years, going to university, and I was really impressed that when Americans get something into their minds that they want to do something, they REALLY do something.

Trump has presented us with a really, really bad situation that will arouse people to rally people against him. If you look at what the mayors, and over 600 cities, in the United States, and others, like Governor Jerry Brown of California, are saying it is: "to hell with Trump, we're going to go out and do our best to meet the goals of the Paris Climate Agreement."

So, in many ways, the election of Trump was dismaying, but it has galvanized Americans to oppose him and to get on with reducing carbon emissions.



Suzuki is famous for his lectures, many of which are available on YouTube. Photo by Marie Cressell courtesy of David Suzuki

Mongabay : Relating to the political situation, you endured a lot of anti-environmentalism in Canada with Prime Minister Stephen Harper...

David Suzuki : Nine and a half terrible years.

Mongabay : Considering what we're facing in the States with Donald Trump, and in places like Brazil with Michel Temer, and in India with Narendra Modi, what can you tell us about what you learned from the Harper experience?

David Suzuki : I think the big lesson for Canadians was that, we had been building a movement, ever since Rachel Carson, in 1962, when her book, Silent Spring came out. That was the galvanizing beginning of the environmental movement. We saw a huge growth in environmentalism then.

When Carson's book came out, there wasn't a single department of the environment in any government on the planet; but because of her book and the galvanizing of an environmental movement, we had the laws protecting air, water, soil and endangered species; millions of hectares of land was set aside as parks. It was a very, very powerful and successful movement in the early decades.

But all of that painstaking progress that we made in Canada, such as acid rain agreements with the United States, agreements to protect the Great Lakes, greater energy efficiency; all of that, when Harper was elected, went right out the window. He overturned decades of hard won action and legislation and Trump is doing the same now.

The thing that's astonishing to me, now, is that the media is focused, primarily, on the Russian connection, which is a very important issue. But meanwhile, Trump is undermining the energy department, NOAA {the National Oceanic and Atmospheric Administration], undermining science, undermining the Environmental Protection Agency. All these things are going on that are being ignored because the media is being overwhelmed with the issue of Russia.

So, terrible things are going on in America that went on in Canada, and it says to me that we need to enshrine environmental protection in our Constitution.

After years of campaigning, David visits the people of the Grassy Narrows and nearby Wabaseemoong (Whitedog) First Nations on the day the Ontario government promised $85 million to clean up the mercury-contaminated Wabigoon River. Photo courtesy of the Suzuki Foundation

For three years now, we've had what we call the Blue Dot Movement to raise public concern and to demand that our legislators enshrine the right to a healthy environment in our Constitution. In other words, as a Canadian, we believe it is our right to clean air, clean water, clean soil and biodiversity. Enshrining those rights in the Constitution means that any flyby political party that happens to get in power can't just toss out those rights, in the way that we've seen. We're putting a lot of focus, right now, on getting that into our government's legislation, as a right.

The response from the public has been overwhelming. We've been traveling across Canada and recruited singers like Bruce Cockburn, Neil Young, Gordon Lightfoot, and Tanya Tgaq, poet Shane Koyczan, and others who have joined us. We've got Margaret Atwood, the writer, and the Royal Canadian Ballet composed a piece to dance to.

We've made it into a popular movement to support the right to a healthy environment. We have 153 cities and municipalities, including Toronto, Vancouver, Montreal, that have now passed local legislation to a right to a healthy environment. We're taking it, now, to the federal level, and trying to get federal government politicians to support it.

It's been a very, very exciting thing. We can no longer tolerate the damage that George Bush and Dick Cheney, and Donald Trump and Stephen Harper have done.

Mongabay : What do you see as the most significant environmental challenge humanity must face in the next 10 years?

David Suzuki : People always ask me that, and if it's not climate change, it's species extinctions, or it's the state of the oceans, or the loss of forests, or toxic pollution in our air, water and soil. There are a number of HUGE issues; any one of which can be catastrophic, ARE being catastrophic. But I see the biggest challenge being the values and beliefs we cling to that are driving our destructive path.

So to me, right now, the biggest enemy is capitalism and the concept of corporations that are now driving things. The ten biggest corporations are bigger than the vast majority of countries in the world. When you look at the amount of money they're pouring into political campaigns in Canada and the United States, you realize that we elect people to run on a "corporate agenda." Corporations exist for one reason, and one reason only: to make money. It may be that the way they make money is very beneficial or useful to society; but the reality is their driving, sole purpose is to make money.

Right now, it's clear that it is the commitment to economic growth, and to the economy above everything else, that is destroying the planet.

David on the Blue Dot Tour in Hamilton, Ontario. Photo courtesy of the Suzuki Foundation

We had a Prime Minister, Stephen Harper, who said, over and over again "we can't do anything about global warming! If we start reducing emissions, it will destroy the economy." And we elevated the economy above the very atmosphere that keeps us alive!

So long as we continue to think we're so smart — planning our way into the future — and, that if we have a problem, we can solve it with technology; we're in deep, deep trouble. We haven't really come to grips with that.

Naomi Klein in her book, This Changes Everything, puts her finger right on the problem; and that is capitalism; the construct that we've made. And yet, capitalism, the economy, markets, corporations — these are human creations. You can't change the rules of Nature. Our chemistry and biology dictate the way we have to live.

Yet — national borders, economies, or concepts like capitalism or communism — it's crazy to act as if these things come before everything else. We can change those things; we can't change Nature.

So I think (the greatest challenges facing humanity is this whole attitude that we have, that we're the dominant species, and it's our right to go and exploit Nature any way we can; and the belief that we're so smart that we know how to manage our way into the future.

David taking a break from building his grandsons a tree house, Haida Gwaii, August 2014. Photo courtesy of David Suzuki

Mongabay : So what are the big solutions? What is the alternative to capitalism?

David Suzuki : I tell a story that I believe shows what

the challenge is: in Canada we've been fighting for years against the tar sands oil operations in Alberta. We believe it's just far too polluting a source of energy and that it's got to be shut down.

I got a call, four years ago, from the CEO of one of the largest companies in the Alberta tar sands, and he said "can I come down and talk?" I said "Of course. We've been fighting. We can't afford to fight anymore, because in a fight there are winners and losers, and we can't afford losers." I said "I want to work together with everyone to try to find a way to a different path."

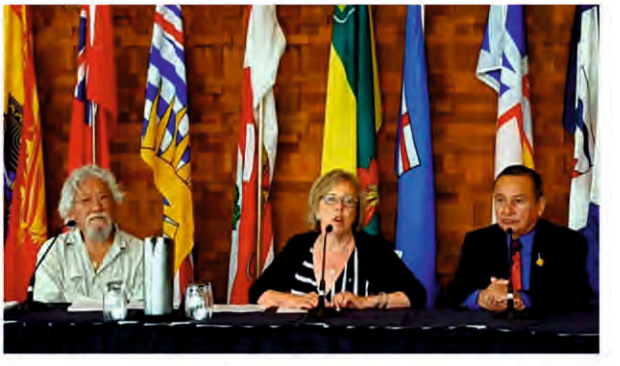
He was at my door the next day, and I told him how thrilled I was, that I was honored, delighted and thanked him for coming. But I said "Before you come in my office, I want you to leave your identity outside the door. I don't want to know that you're the CEO of an oil company. I want to meet human being to human being. Because, I said, I'm not interested in talking about oil and energy and all that until you and I agree upon what the fundamental basis is for all of humanity — how we have to live on Earth."

That, I believe, is the challenge for all of us. We have got to start from a position of agreement. If we're fighting, then what the Hell, we're all over the place. We don't have a groundswell or a foundation of agreement, and that, I believe, is a challenge for us. So give this guy credit, he came in through the door, but very reluctantly.

I said, "Look, I know this is awkward for you. You came to meet me as the CEO of an oil company and I disarmed you on that. Let me tell you what I'm thinking. We live in a world that is shaped by laws of Nature and there's nothing we can do about it. We have to live within the limits. Physics tells you, you cannot build a rocket that moves faster than the speed of light. The speed of light is a limit set by physics. The law of gravity says that if I trip on the stairs, I'm going to hit my face on the floor. That's gravity, and there's nothing you can do about that. First and second law of thermodynamics tells us you cannot build a perpetual motion machine. So physics tells you the kind of world that we live in and we accept that.

Chemistry tells you the same. The atomic properties of the elements dictate the freezing point, the melting point; and dictate the diffusion constants and reaction rates. All of these properties of atoms are dictated and inform us. We know, through the laws of chemistry, what we can or cannot make in a test tube, and we live within those laws. And in biology, it's the same. Biology dictates that every species has a maximum number where they can be sustained in an ecosystem or habitat. That number is dictated by the carrying capacity of that ecosystem or habitat. Exceed that number and your population will crash.

Humans aren't confined to an ecosystem or a habitat, but to the Biosphere, the zone of air, water, and land where all life exists. That's where we live, and there is a maximum carrying capacity in the Biosphere, for human beings. That's dictated by how many humans there are and by our per capita consumption. And that will tell you whether or not we can maintain our population.



David Suzuki, Canadian Green Party leader Elizabeth May and Grand Chief Stewart Phillip. Suzuki has been speaking out for the Earth for more decades and is an icon of the environmental movement. Photo courtesy of the Suzuki Foundation

Every scientist that I've talked to agrees: we've already passed the carrying capacity for our species because of the hyper consumption of Western society and the sheer bulk of numbers in the developing world. That adds up to more than the planet can carry indefinitely. We're going towards 8 or 10 billion, and as we do that, we maintain the illusion that everything is okay by using up what should be the rightful legacy of

future generations.

We're using it up now. And you know that. Talk to any elder in any area and ask them: "what was it like when you were a kid?" and they'll describe a world that is completely changed. It's gone. So carrying capacity is what dictates how many humans can live on the planet and whether it's sustainable. As well, biology tells us we're animals. And, as biological beings, I said to this guy, "What do you think is the most important thing that every human being needs?"

Instead of answering directly, like any child would, I could see the thinking; he said "well..." and I realized he's thinking "money, a job, a business" and I said, "Look, if you don't have air for three minutes, you're dead. If you have to breath polluted air, you're sick."

So surely, as a human being, you would agree with me. Clean air is the highest need every human being has, and we should be protecting it above anything else. And then I said, you and I, we're 60 to 70 percent water by weight. The body needs water for our skin and our eyes, and so on. Water, Mr. CEO, if you don't have water for three to six days, you're DEAD. If you have to drink polluted water, you're sick. So clean air, and clean water, should be the highest need of every human being and we should protect them above everything else. Food is different. We can live for four to six weeks without food, but eventually we die. If you have contaminated food, you sicken. Most of our food comes from the earth, so I said clean food and soil have to be there with clean water and air.

Finally, I said, all of the energy that you and I have in our bodies, that we need to grow and move and reproduce and do work, all of that energy is sunlight captured by photosynthesis. We then convert it into chemical energy and we get it by eating plants or animals that eat the plants and we store the energy in our bodies. When we want to work or move, we burn those molecules and radiate the energy of the sun back out throughout our bodies. Photosynthesis joined with clean soil and food, clean water and clean air: those should be the foundation of every society on Earth. Protect the air, the water, the soil, and photosynthesis.

David being welcomed by the Squamish First Nation, Porteau Cove, British Columbia, November 2014. Photo by Lisa Wilcox, Squamish Nation

The miracle, to me, of life on Earth, is those four elements which Indigenous peoples call Earth, Air, Fire, and Water. Those four elements, should be sacred and they are cleansed, replenished, created by the web of living things. It's all the plants that take carbon dioxide out of the air and put oxygen back into it, for us. It's all the plants that photosynthesize to capture the sun's energy. It's life that creates the soil where we grow our food. It's life that filters the water so that we can drink it. So biodiversity is as important as Earth, Air, Fire, and Water.

I said to him that other things, like the borders that we draw around properties, states, or countries, capitalism, corporations, economies, markets, these are NOT forces of Nature. They are human constructs and they have to be changed in order to fit the demands of the real world — to fit into the forces of Nature.

I said, Mr. CEO, if you will shake hands with me, and agree with what I have just said, I will do everything I can to help you and your company, and I believe that's what we have to do. What do you think he did?

He couldn't. He couldn't shake hands with me, because if he did, and went back to his shareholders and said "I had a discussion with Suzuki and I agreed with him, whatever we do, we can't mess with the air, water or soil," he would get fired so fast because that's not his job. His job is to make money.

Mongabay : Does it come down to a problem with Western Science and it's compartmentalized, component parts view? Do we need to come back to a more holistic, Indigenous view of the Earth?

David Suzuki : Oh, Absolutely. This is why my wife Tara and I have worked with Indigenous people for over thirty years. They're the only groups, all around the world, with a track record of living sustainably. They've lived in their places for literally thousands of years. When the Europeans came to North America, for example, they looked down at these people as primitive savages. Yet the Europeans didn't realize that the riches of forest, and fish, and rivers had been used by cultures for thousands of years. Look at what we've done, to our forests, our rivers, and our fish in just the last hundred years. You know it's completely unsustainable.

These are people for whom the land is sacred, who have come to understand that Earth, Air, Fire and Water are the very source of our livelihoods, and our lives, who have developed rituals to give thanks for Nature's abundance and generosity, who promise in their ceremonies to care for Nature, to ensure Her continued abundance — You're damn right we've got to learn those back! We've forgotten that kind of connection very, very recently.

David with Chief Simon Fobister at Grassy Narrows. Photo courtesy of the Suzuki Foundation

Remember, the big revolution that happened to human beings was not the Industrial Revolution, although that was big, it was the Agricultural Revolution ten thousand years ago. With the Agricultural Revolution, people could settle down with a reliable source of food and develop permanent homes, and then alternately, villages, cities, and all of the complexities of modern civilization, were made possible by the Agricultural Revolution. And farmers understand, very well, the importance of weather, climate, of water that comes from the snow in the winter, of pollination from insects, of nitrogen fixation through plants. Farmers understand very well that we are dependant on Nature for our wellbeing.

I believe a really big change happened about a hundred years ago. In 1900, there were one and a half billion people in the world, but only fourteen cities with more than a million people. London was the largest, with six and a half million people. Tokyo was the seventh largest, with one and a half million people. The vast majority of people in the world lived in rural village communities because they were involved in an aspect of agriculture. Shift a hundred years, to 2000. In the year 2000, there were now four times as many people, six BILLION people, with more than four hundred cities with more than a million people. Tokyo was the largest, with 26 million people.

The ten largest cities in the year 2000 all had more than eleven million people. In countries like Canada, the United States, Europe, most people, 80-85 percent of the population, now lived in big cities. In a big city, surrounded by other people, where Nature is not very obvious, your priority becomes your job. You need a job to earn money to buy things you want. The economy, then, to urban people, seems to be the first thing that matters. And we put all our emphasis, then, on the economy. We no longer see the connection between the way we live and the forces of Nature.

Mongabay : Is this why almost half of your books have been directed towards young people?

David Suzuki : Yes, I don't think we have time for young people to grow up and replace us. We've got a very, very narrow window of opportunity to change things, now.

What I've found is that when people go through university, and they get out of university

and get a job, and they get married and buy a house, and have kids, and then an environmentalist comes along and says "Look, you've got to change the way you're living," they get pissed off. They've invested a lot of effort to get to where they are. They don't want to change. This has been the biggest challenge. You can talk to people, you can reason with them, but they've put a lot of effort to get to where they're comfortable and they like their lifestyle. It's very hard to convince them they have to change.

I believe that's where children come in. Children say "Mum, Dad, I'm worried, what kind of a future are you leaving for me?" Adults, if they really love their children, have no choice but to think hard about what they're leaving and act on that. That's the primary reason I've written the books for young people. Of course, they have to change the way they look at the world, but they're the ones who will influence their parents.

Surrounded by hope. Almost half of David's books are written for children. Photo courtesy of the Suzuki Foundation

Mongabay : What's the one thing the average person can do, every day, to make an environmental difference?

David Suzuki: Everybody's looking for the magic bullet. There is no magic bullet. The fact is that the current crisis is one of over-consumption. We're all just using up the Earth. Everything we buy comes out of the Earth and when we're finished with it, we throw it back into the Earth.

The absolute epitome of this hyper-consumption and destruction, are blue jeans. Now, people pay hundreds of dollars for brand new blue jeans that already have tears and rips in them. What is that telling us? That we're so wealthy we can buy a piece of clothing that is clearly just for show, for a fad, that is not going to be reusable or recyclable and going to end up in the garbage.

All scientific seriousness aside, David becomes one with the water element. Photo courtesy of David Suzuki

That is the epitome of what a crazy, destructive society we're in now. We actually pay money for something that is not durable or passed on. Now, I gather, men can buy blue jeans not only with the rips, but pre-dirtied, with the dirt built into these blue jeans. If this isn't the height of flaunting our crazy wealth, what is? It just makes me sick to see this crazy fad spreading throughout society today. To me it's the example. Anyone buying these blue jeans and wearing them clearly is saying "I don't give a shit about the state of the Earth."

Mongabay : It's thoughtless...

David Suzuki : That's the problem! Everything we do, we've got to be thoughtful about it.

If people buy a cotton shirt, how many people think, "Gee, cotton is one of the most chemically intensive crops that we grow, is this organic? Where was this cotton grown? What was the affect of the cotton growing on the people growing and harvesting it?"

You're putting out money to buy a cotton shirt has HUGE repercussions. Same thing for buying a car, a computer, a television set. There's a lot of metal in these things. Mining is one of our most destructive activities. Where are the metals in these products coming from? What was the impact of the mining on the people that worked there? What about the ecosystems where the mines are dug? We don't ask

any of those questions, because, quite frankly, we don't care because we've been so disconnected we don't see it.

We think, "Well, I've worked hard, I've got the money, I can buy it!" Well, your buying it has repercussions that reverberate around the planet.

David lunching on a fishing boat with grandson's Ganhlaans and Tiisaan, July 2014. Photo courtesy of David Suzuki

My parents got married during the Great Depression, and that was a critical teaching moment in their lives. They taught us, and said over and over, "Live within your means, save some for tomorrow, share, don't be greedy, work hard for money to buy the necessities in life. Don't run after money; it won't make you a better or more important person." Those are lessons they taught us because of the hardships they experienced in the Depression.

But now, 70 percent of the North American economy is based on consumption. Walmart is the epitome of that consumption demand. Go through a Walmart and ask, "What in this vast array of products do I consider a necessity for me to be able to live at a decent level?" I'd say 95 percent of what you buy in Walmart has nothing to do with the necessities of life. They're all frills that are there to get you to spend your money.

So yes, it's true, as consumers, we've got a big role to play. So we've got to look at the way we're living. But the reality is, all of our impact as consumers is nothing compared to the impact of corporations. I believe that in a time, in a country, where we have democracy, we've got to be, as individuals, much more active in the political process.

In Canada, something like 62 percent of Canadians go to the polls and vote locally, but at the provincial and municipal level, way fewer than that go and vote. [An estimated 42 percent of eligible voters stayed home in the Trump / Clinton 2016 election.]

So we're not playing a really important part in telling people that we elect to office to do something about the state of the environment; to bring corporations under control; to stop the destructive practices that these corporations are doing. I believe we need way more democracy, and you only get that when you have a very active and committed civil society.

Suzuki is a big proponent of human powered solutions, including bicycles and democracy.

Mongabay : You say there are no silver bullets, but there are those who believe otherwise. What, for example, do you think about geoengineering?

David Suzuki : Geoengineering is the ultimate expression of the problem we face. We know exactly what the problem with climate change is: the emission of greenhouse gases exceeds the capacity of the biosphere to re-absorb those greenhouse gases, so they're building up.

We also know what the solution is: we have to "green" the planet so that the best thing Nature developed, namely plants, will remove more carbon dioxide and we've got to get off the use of fossil fuels that contribute to that excess. That's the problem, and the solution.

But we use all kinds of excuses to avoid taking that path to that solution because, they say "it will destroy the economy," or "it's impossible to convert from fossil fuels to renewable energy; that's crazy, we can't do it!" That's also what they said about having planes that could fly!

We use the current situation as a justification for not doing anything. Then we say "but we're so smart, we'll solve it by geoengineering."

Geoengineering is based on the same assumption that led us into using DDT as a pesticide, that led us into nuclear energy as a bomb, that led us into CFCs in spray cans.

Each one of these things: nuclear weapons, when they were exploded in Japan, we didn't know there was such a thing as radioactive fallout. When DDT was used, we didn't know [the dangers, and instead], we gave a prize to the guy that found out that DDT worked as a pesticide. We didn't know about bio-magnification up the food chain. When CFCs began to be used in the millions of pounds, we didn't know that chlorine would break off CFCs and scatter the ozone.

Over and over again, we opt for the apparent benefits of the technology without the humility to realize we don't know enough to anticipate all of the unexpected consequences. So we're jumping into artificial intelligence, we're jumping into genetic engineering, we're jumping into nanotechnology, and we're jumping into geoengineering. We are totally ignorant of history if we think these are going to be solutions without costs. So geoengineering is just crazy; it's crazy to keep pitching more technology when technology has created the greatest problems that we already confront.

Mongabay : What gives you hope for the future?

David Suzuki : Hope is all I have. And it's not a Pollyannaish, "oh don't worry, good things will happen, or they've always happened," or anything like that. I believe that we're so ignorant we can't even say "it's too late." A lot of my colleagues are saying it's too late; we've passed too many critical tipping points to go back, and all of the signs on the curves are very, very dire.

I use, as an example to support my hope, the most prized species of salmon in the world called Sockeye salmon with the bright red, oily flesh that we love to eat. The largest run of Sockeye salmon in the world is in the Fraser River in British Columbia, where I live. We like to have a run of 20 to 30 million Sockeye in a year. That's a strong run, even though it's well below what it used to be before Europeans came, but 20 to 30 million is a lot of fish.

In 2009, just over one million Sockeye came to the Fraser River. I remember, distinctly, looking at my wife and saying "it's too late, there isn't enough biomass to get those Sockeye up to the spawning grounds. They've had it." A year later, 2010, we got the biggest run of Sockeye in a hundred years. Nobody knows what the Hell happened. Nature shocked us, and we still have a federal committee trying to find out what the Hell is going on with the Fraser River Sockeye. Nature showed us that, if we can pull back and give her a chance, she will surprise us in many ways.

I believe that that's the challenge: to give Nature the chance, not impose human technology, and try to manage our way into the future. Give Nature — which has had 3.8 billion years to evolve — give Nature a chance, and my hope is that she will be far more generous than we deserve.

Thanks to the Creating Equilibrium conference for facilitating the connection with Dr. Suzuki.

David Suzuki speaks on the Blue Dot Tour. Photo courtesy of Desmog Canada

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Award-Winning Farmer Earns Rs 30 Lakh/Year

With Unique Method that Saves Space & Water

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Award-Winning Farmer Earns Rs 30 Lakh/Year With Unique Method that Saves Space & Water

Akash Chaurasia from Madhya Pradesh has won over 20 national awards for pioneering the concept of multilayer farming. Here's how it has helped him and other farmers earn better.

Over the past few years, a new farming model has slowly been spreading to the country's small towns, giving farmers better yields and a more regular, weekly income.

Called multilayer farming, it allows for more crops to be grown on lesser land. Spearheading this movement is the pioneer Akash Chaurasia. With over 20 national awards to his name, the 32-year-old has given practical training to about 80,000 farmers and educated around 12 lakh others about multilayer farming.

Born to a family of beetle nut farmers in Sagar, a small town in Bundelkhand, Madhya Pradesh, he grew up nurturing the dream of becoming a doctor. "But I thought about how illnesses, doctors, and the number of hospitals are all increasing," he tells The Better India. "I realised that the root of all illnesses is what we eat and drink. And I decided to deal with the root of the problem through farming."

Discovering multi-layer farming

Once he committed to farming, Akash spoke to several farmers and started thinking about all the different problems they face today, from water and fertiliser-related issues to climate change and insect attacks to marketing and sales. So in 2014, as a solution to all of these problems, he came up with the idea of planting multiple crops on the same piece of land.

He started with two layers of crops, one underground and the other on the surface. His first crops were tomatoes and bitter gourd, and he experimented with other combinations as well.

Akash soon ran into his first challenge – grass and weeds. "The seeds lead to a lot of grass, which weakens the crop. And removing them is costly." To combat this, he introduced leafy crops like the ones to be planted on the surface — spinach, coriander, fenugreek and others. By planting leafy crops, which grow fast, there's automatically lesser space for grass. "Within this model, the grass is about 80 per cent controlled."

His next challenge was a lack of space. "Earlier, I didn't have land myself so I knew its value, and how tough it can be." Besides, most farmers today only have marginal farms, meaning "a land holding of

two to five acres". One generation later, as that land will get divided, each farmer will have even lesser. So he pushed himself to think of a way of growing more on lesser land.

The inspiration came from the city's multi-storey buildings. "I liked the idea that in less space they arrange for more people to stay." His multilayer model also relies on vertical space. At a height of 6.5 feet, he built a structure out of bamboo and put a jaali on top, so the structure was partly exposed to sunlight and partly shaded. On this he grew creepers, introducing a third crop to the space.

There's also a fourth crop, which includes seasonal fruit trees like mango, papaya, or sapota (chikoo), the tallest component of the multilayer farm.

The many benefits of multilayer farming

The several layers of crops prevent water from evaporating. "About 80 per cent of the water is saved, compared to an open field." He adds that while an open field uses 100 litres of water for one crop, a multilayer farm uses only 30 per cent of that water for four crops. "So each crop grows with about seven per cent water. And compared to an open field fair, about 93 litres of water is saved," he explains.

With the four varieties of crops, the farmer is also earning a parallel income from each. For instance, from March to July the leafy green vegetables, in this case, spinach, offer income to the farmer. From April to November, the creepers, like scarlet gourds, are fruiting. In August, the underground crop like ginger matures and makes itself available for selling. And from December to January, the papaya tree gives its fruits. "There isn't a single week in which our income isn't being generated," he adds, talking about how this model makes farmers more economically independent. Akash himself has an annual income of Rs 30 lakh, he shares.

This is also a more sustainable model since the bamboo or sticks the farmer uses are bio disposable, for which the farmer also doesn't have to go to the market or spend money. Compared to a polyhouse which uses carbon dioxide, can't be disposed of properly, and hurts the environment, the farmer, and offers society harmful food, this method is eco-friendly, more profitable for farmers, and offers up good, chemical-free food.

"Good food is everyone's right. So this work gives me hope and energises me. More farmers are doing this means chemical-free food reaches more plates. It feels good when people eat well," he says.

Besides educating people in person, Akash also has a YouTube channel through which he spreads awareness about his work. He has made literature readily available so anyone can practice multilayer farming. "From readying the bed to preparing medicine, all the way till cultivation, I make farmers do all the processes by hand and teach them," he says, adding that farmers don't have to go through the hassle of buying the model from some company of subsidy.

Akash Chaurasia teaching farmers about his multilayer farming technique

And the model is spreading far and wide. For instance, Sorav Patra, from the Nadiya district in Kalyani, Kolkata, has been practising multilayer farming for three months. "Before I could grow only one crop. Now, I can grow more crops at once. By keeping the height [of the structure] at 6.5 feet, I can even grow another crop inside. Even in three months, I am noticing a strong quality crop. Before I had to wait the whole year for the yield. Now it's

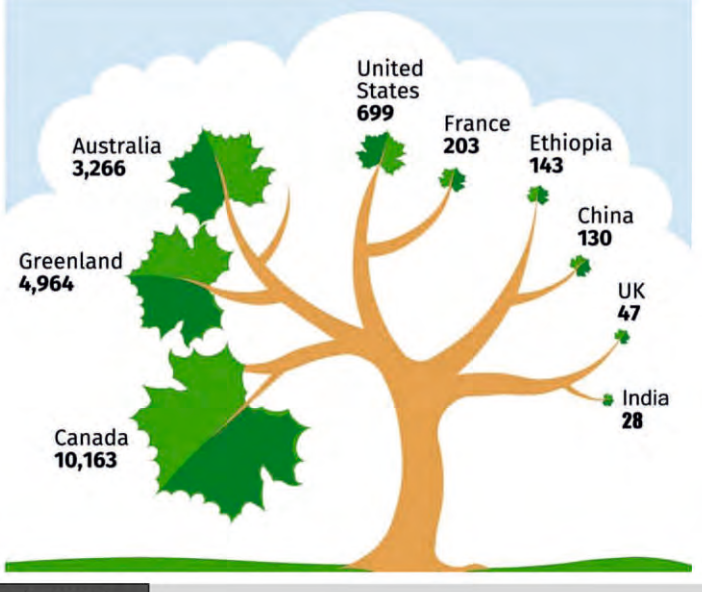
already happening," he says.

Akash hopes that as awareness spreads, more people adopt this model. "Normal farming is easy. Take tractors and sow seeds. In multilayer farming, planning the structure requires a lot of engineering."

And while he continues spreading the word, he's also working on other innovations, in the fields of water, biodiversity, food processing, and more, thinking about the complete agricultural process and how it can be developed.

Edited by Yoshita Rao

Akash Chaurasia's farm



Some photographs from the function of publication of the Marathi issue of Jalasamvad for the month of June 2022 - a special issue on **Shri Vilasrao Salunke** - a noted water activist from Pune.

Shir Popatrao Pawar addressing he gathering

Dr. Deshkar introducing Jalasamvad Magazine

Smt. Kalpanatai Salunkhe welcoming Dr. Deshkar

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