

URVARA

Greening Mother Earth



Adhi Daiv



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ABOUT THE AUTHOR



Adhi Daiv is a student of The Shri Ram School in Gurgaon and studies in Class 10. He is an active cricket player and science enthusiast who was concerned about the growing desertification and water scarcity issues in his home state of Rajasthan since childhood. These pressing concerns forced local rural communities to migrate or abandon their homeland .

Adhi wanted to help them . Thus he raised funds in 2019 to provide water wheels (devices to help carry water easily) to Rajasthani rural women who along with their minor daughters had to walk miles every day in order to fetch water for their families. Though this brought temporary respite, it did not offer a long-term and sustainable solution, which was his goal.

His subsequent research guided him towards recharging the ever-depleting groundwater table by planting native trees, preventing soil degradation and enhancing biodiversity as a long-lasting solution to fight problems like growing desertification and water scarcity. He travelled across the rural areas of the state - meeting farmers, local village council leaders and elderly members - to find suitable indigenous solutions to this problem.

In 2020 ,Adhi started project “Urvara-Greening Mother Earth” at the age of 14 years. Urvara is a unique initiative that brings the light of hope in Rajasthan to turn it into a green state by ensuring optimal use of water resources. The meaning of Urvara is Fertile Land which is what the project aims for. Adhi initiated this movement that is now adopted by masses of committed volunteers and teams who work to mobilize the rural

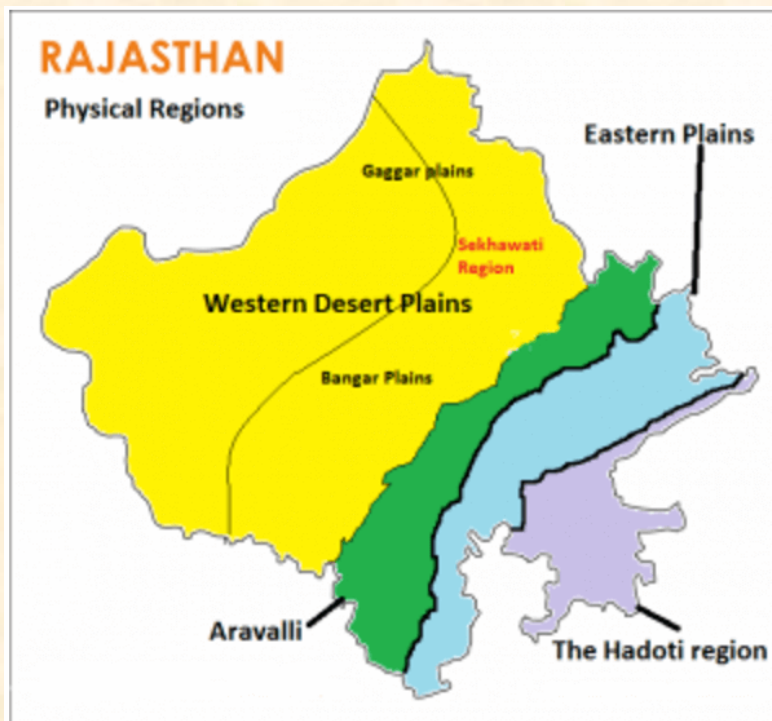


communities. It is now a big community working on ground to change the situation at the grass-root level and create awareness on this parched land's water issues and its related problems. The project follows the motto "Shasya Shyamala Mataram- Greening Mother Earth", and has brought in an impactful positive change in the land and the lives of the people of Rajasthan. He firmly believes that greening arid and desert regions, which constitute a third of the earth's surface area, has the potential to solve problems associated with access to water, food and energy for all.



CHAPTER 1

Geographical Factors



Rajasthan is that the largest state in India with the Aravali mountains that runs from northwest to southeast. This divides the state diagonally into the western arid and eastern semi-arid regions. The western part takes up over 61 per cent of the state, the desert.

The reasons for the frequent droughts in Rajasthan .

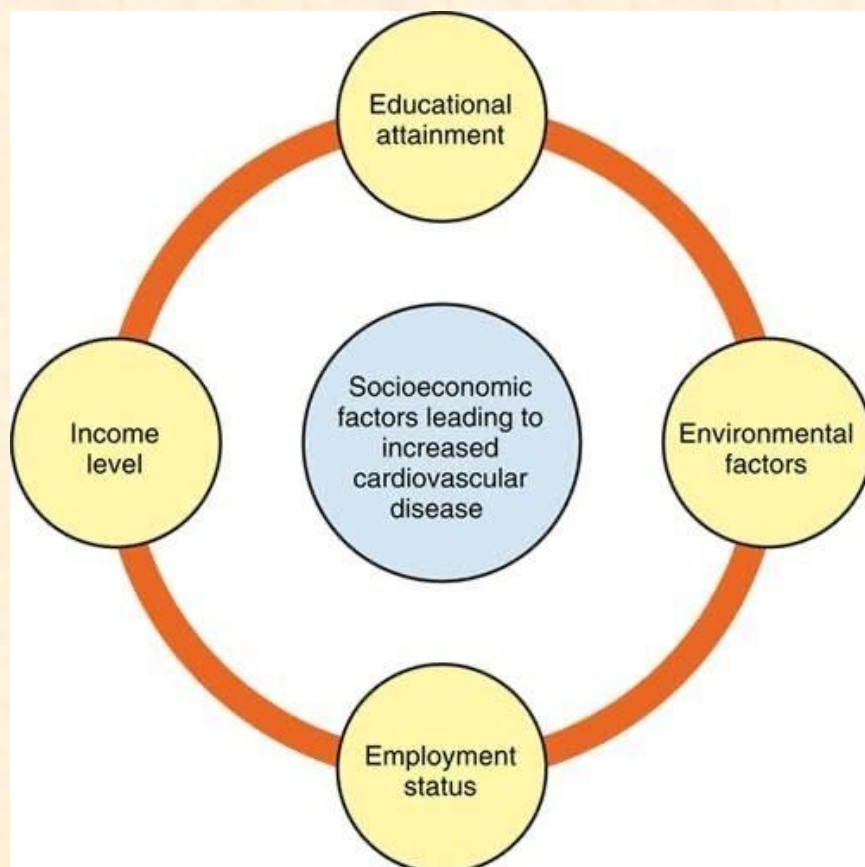
- .It has solely one percent of the complete country's water resource
- .Thirteen rivers of the state are non-perennial, apart from Chambal.
- .The only source of of annual renewable water is thin precipitation.



CHAPTER 2

Different Socio-Economic And Environmental issues faced by the people of Rajasthan

Rajasthan faces numerous environmental, social, and economic challenges. It is important to address them on an urgent basis for the equitable and sustainable growth in the state.



Water inadequacy



The growing water crisis in Rajasthan could be a direct results of 3 factors, namely:

- I. Drought prone,
- II. Scanty and inconsistent rain,
- III. Minimal sources of surface waters like stream basins.
- IV. The shortage of water and its inefficient management has caused overuse and wastage of water within the state.

Deforestation

Another major issue troubling the state is the exploitation of forests.

Causes:-

- 1) No balance between the exploitation and conservation efforts that helps in maintaining natural resources which preserves the biodiversity.
- 2) The lack of necessary water and agriculture resources which result in poor yield forces the farmers to sell their land to the industrialists .This results in deforestation.
- 3) Use of wood as a fuel in rural areas.



Effects:-

The loss of trees and different vegetation cause climate change,desertification,soil erosion,low farm yield,flooding,increased green house gasses in the atmosphere,loss of fodder for animals,displacement and many such problems faced by the rural communities.

Illiteracy

As per National Statistical Office (NSO) report of 2017-18,Rajasthan is the worst-performing states with 69.7% literacy rate. Only 57.6% of the feminine population within the state is literate, creating Rajasthan rank highest in female illiteracy.



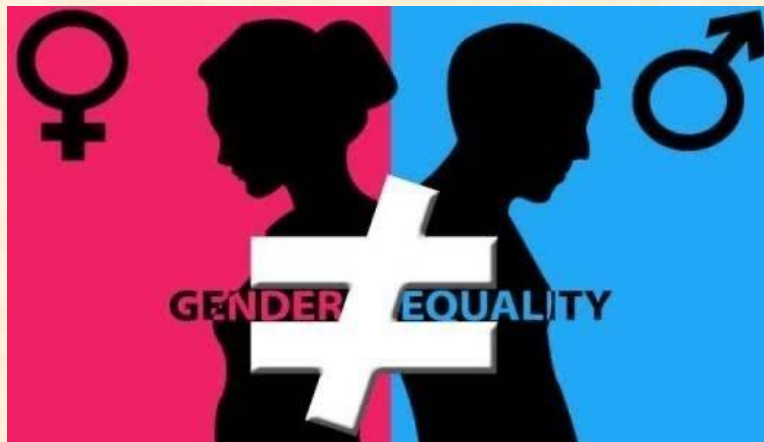


Reasons:-

1. Hours spent by young women and girls everyday to fetch water or work in the field.
2. Poverty
3. Undiagnosed learning disabilities
4. Inability to attend college due to geographical difficulties,
5. No support or counselling from the family members etc.
6. Gender Inequality

Gender Inequality

Rajasthan has traditionally been a patricentric community. With customs and social practices passed down from generations that have accepted the discrimination against women as a part of life.



- Rajasthan has the highest rate of married females within the 10-14 age group.
- The state has lowest female sex ratio.
- Celebration of girl child birth is avoided .They are forced to drop out of schools at a young age so that they facilitate with daily house chores.
- There is a problem of child marriage and dowry system and keeping women in purdah, that is directly linked to Gender Inequality .



Unemployment

Unemployment is a massive issue in Rajasthan

The unemployment rate in Rajasthan is recorded at a high of 28% in December 2020. Rural population constitutes for 75% and with 61% of the state area being an arid region, it becomes absolutely necessary that we work for rural empowerment and prosperity.



CAUSES

1. Agriculture which is the largest contributor to rural development, is suffering due to lack of water resources.
2. Poverty which leads to poor economic growth results in hinderance in education.
3. Lack of education directly impacts the optimum utilization of natural resources thus resulting in unemployment and loss of job creation in the community.
4. lack of innovation and entrepreneurship skills.



Population Growth

Population Growth, which is one of the biggest problems in the world, has led to rapid increase in the pressure on its natural resources. This worrisome situation will have severe impact on our future generations.





CHAPTER 3

DESERTIFICATION



Desertification is an alarming and most important issue in Rajasthan that requires utmost effort and rectification. Two-third of the state is completely barren or desert.

Human activities that contributes to growing desertification include the expansion and intensive use of agricultural lands,poor irrigation practices,deforestation and overgrazing.These unsustainable land uses place a huge pressure on the land by altering its soil chemistry and hydrology .

4.1.1 Causes of desertification

Over 4 million sq. kilometres of land is degraded each year and 120,000sq. kilometres of land turns into deserts .At this rate, it'll be tough to manage 60% increase in food demand of growing population by 2050.



- a) The growing global climate change,
- b) deforestation,
- c) industrialization,
- d) water scarcity,
- e) excessive use of fertilisers and pesticides



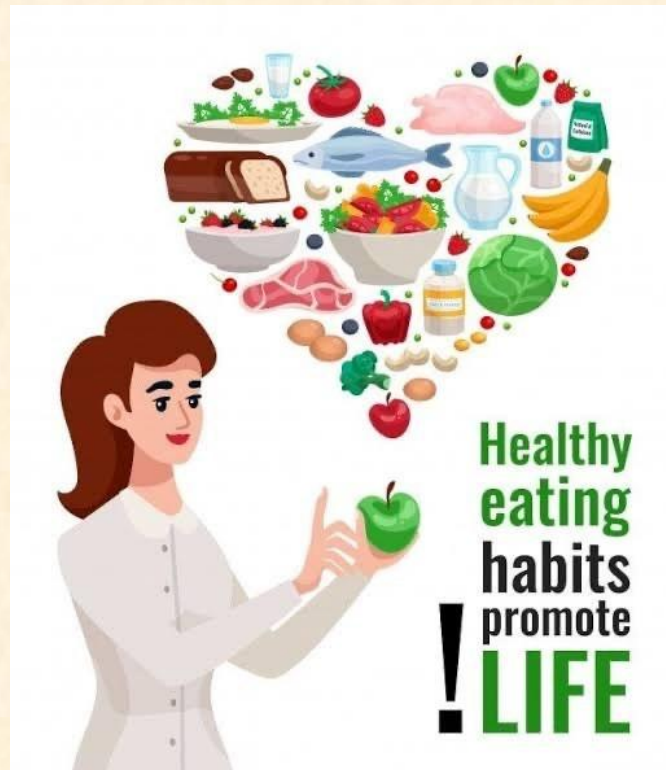
Solution:-

We believe

- a) climate literacy



- b) changing our food habits,



- c) increasing the agriculture land and yield per unit through sustainable methods,improving farming techniques using minimal water , reducing heavy chemical use and protecting the integrity of soil,



- d) Encouraging biodiversity through diversification of crops is the sole solution for food insecurity.



4.1.2 Strategies to reduce desertification

Prevention is way cheaper than rehabilitation. Desertification can be reduced by adopting the subsequent strategies:

- **Planting a lot of trees**

Planting a lot of trees is one among the simplest ways to combat desertification and curb its growth. The roots of trees hold the soil together and helps in reducing soil erosion from wind and rain.

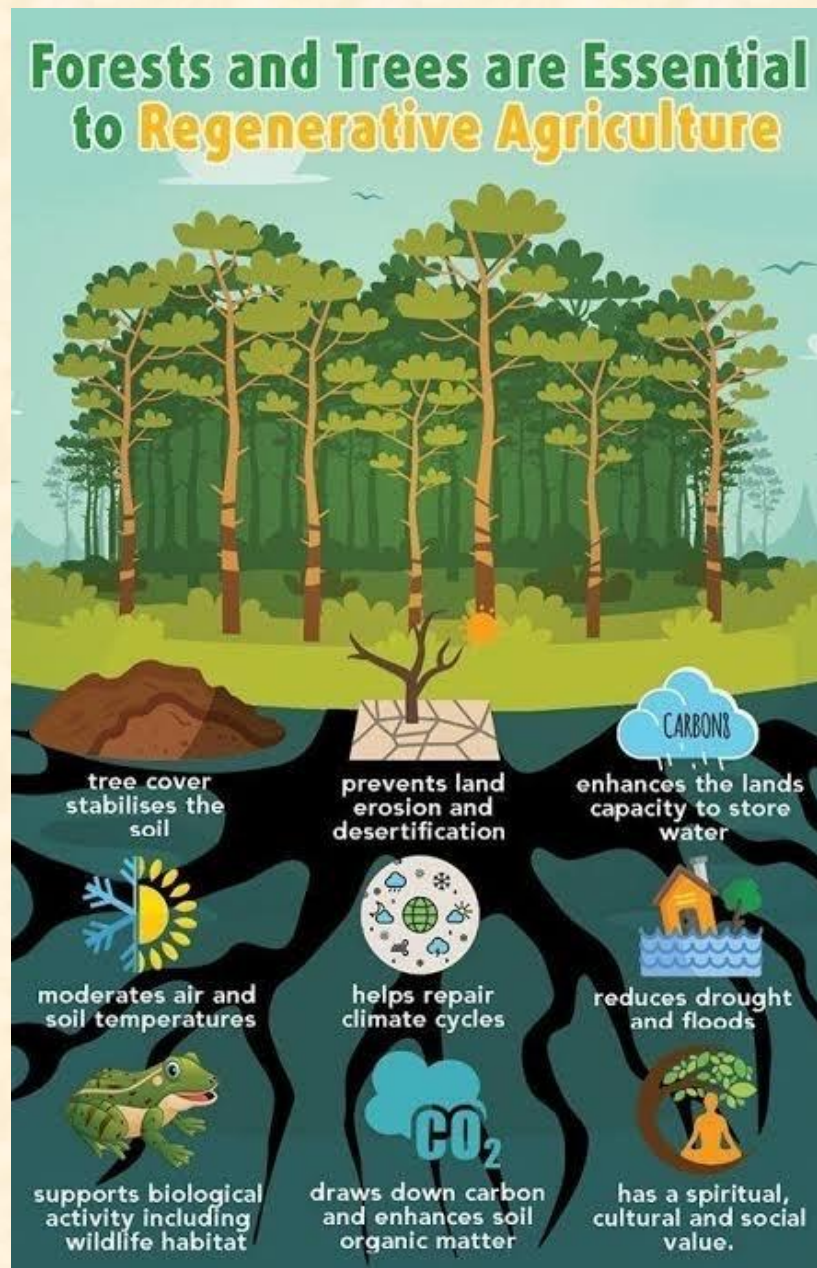




- **Improving the soil quality**

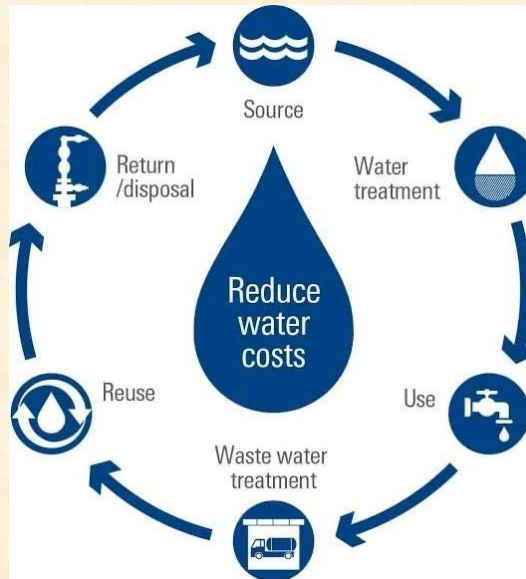
This can be managed by encouraging individuals to cut back on the quantity of grazing animals they need and grow crops instead. The animal manure can be used as a fertilizer for the crops grown.

Growing crops with this approach can improve the quality of the soil as it is held together by the roots of plants and guarded from erosion. This sort of farming is more sustainable.



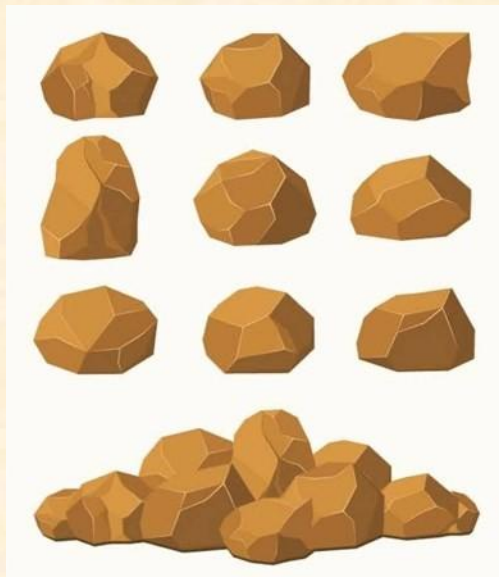
- **Water management**

Water can be stored in dams during monsoons and can be utilized to irrigate the crops in the dry season. This is the best way to manage water supply in the desert region.



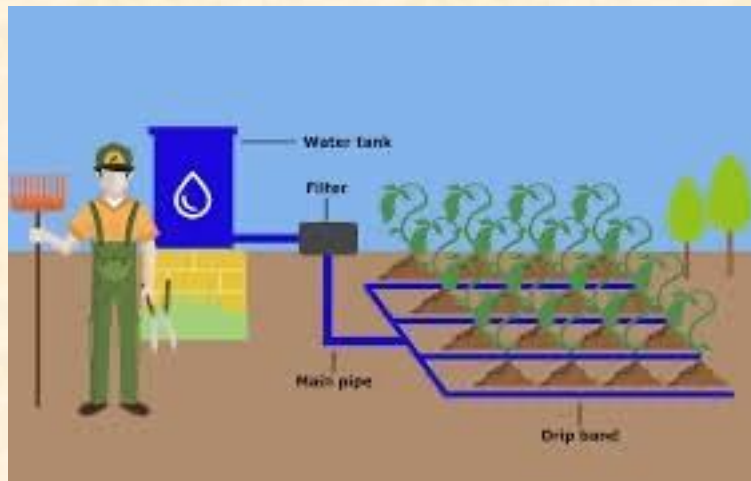
- **Magic stones**

Magic stones (or bunds) are circles of stones placed on the ground to hold water in the soil rather than letting it run quickly over the surface.



- **Drip irrigation**

Drip irrigation is method of watering the plants or crops where water drips slowly onto the ground from a pin-sized hose lying on top of the soil. This minimises water loss, maximises effectiveness and can function through a solar pump.



Afforestation- the Solution

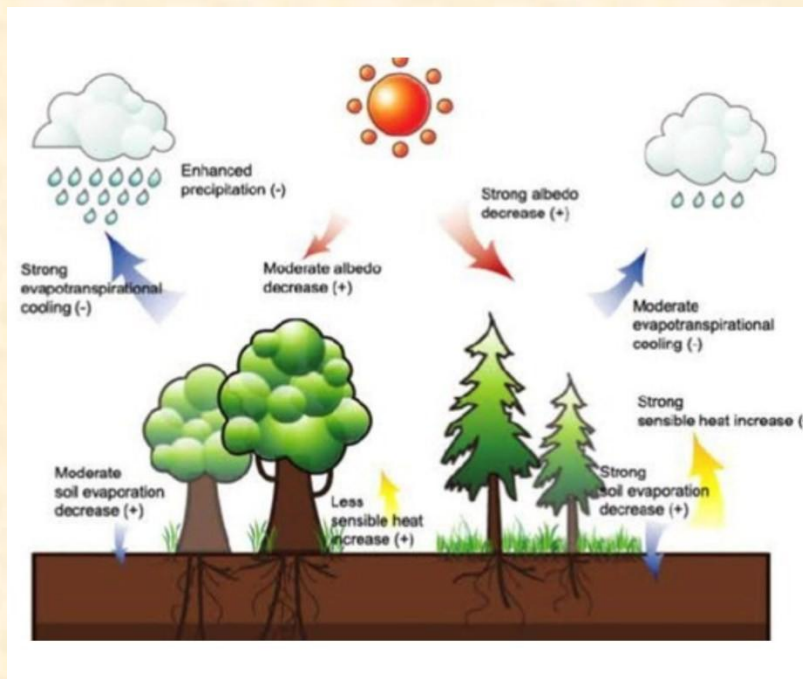
Afforestation is a great tool used for solving climate-related issues by the policymakers.



WHY?

- Forests improve soil health and reverse land degradation and provide clean water through the intensified water cycle. Afforestation helps with the acceleration process of the water cycle. as an example, forest growth of two sq. kilometres will increase the possibility of rainfall.

How Afforestation solves the problem of water?



Water gets transported to the air through trees, and water vapour can move from the forested area to a geographically far-off place. The wind-driven circulation can take it to another area. The precipitation increases in different locations contributing to the water supply in different regions. This is the reason why afforestation brings benefits to the water cycle.

Afforestation is the necessity today, but scarcity of water makes it a herculean task to plant trees in the desert and barren lands of Rajasthan.

70% of the world's fresh water is used for irrigation. We will need 60% more food by 2050, which implies the need for water resources for irrigation can increase. This is where the 1-liter water technique of Dryland Agroforestry will become most beneficial.



This unique technique requires only 1-litre of water to grow any native tree in the arid land .This helps in water and soil conservation that directly helps in agriculture

WATER HARVESTING

Following water harvesting techniques can be practiced by rural communities in the villages:-

1. Water harvesting Dams & Nalla Bunds:-effective in ravine lands.

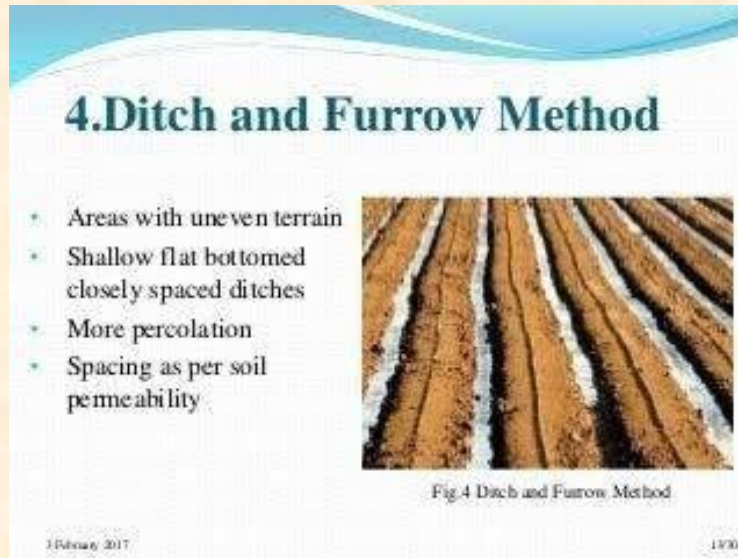
A series of small barriers can be created across Nalla sections of second order in order to block the flow of surface water in the stream channel and also to retain water on the surface for a longer period.

These check dams add as a mini percolation that facilitate within the retention of the silt load,supplement irrigation,contributes to ground water recharge and increased the biomass production of the system.



2. Ditch and Furrow methodology

In with irregular topography, flat bottom, shallow and closely spaced ditches and furrows there is a maximum water contact area to recharge water from source or canal. This technique is less sensitive to silting.



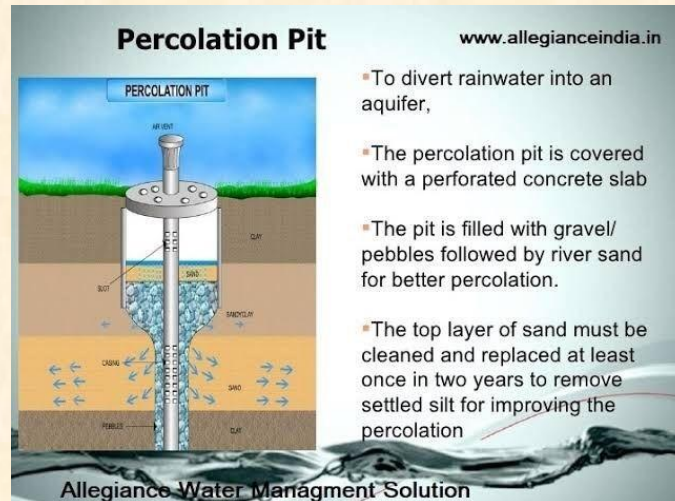
3. Anicut

A small water harvesting masonry dam built across a stream to hold enough water and submerge the upstream area during the rainy season is known as an Anicut. The stocked water is utilized for drinking and recharging the ground water in the adjacent wells. Lift irrigation can also be practiced.



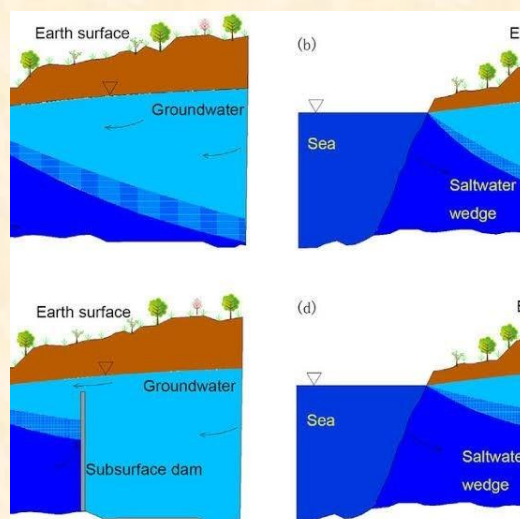
4. Percolation Tanks

Percolation tanks are for impounding surface runoff constructed on tiny streams and adequate catchments. These tanks are more successful in the hard rocky regions that are extremely broken and weatherworn to quickly recharge the bottom water because of low evaporation losses. They can be dug alluvial rock formations as well.



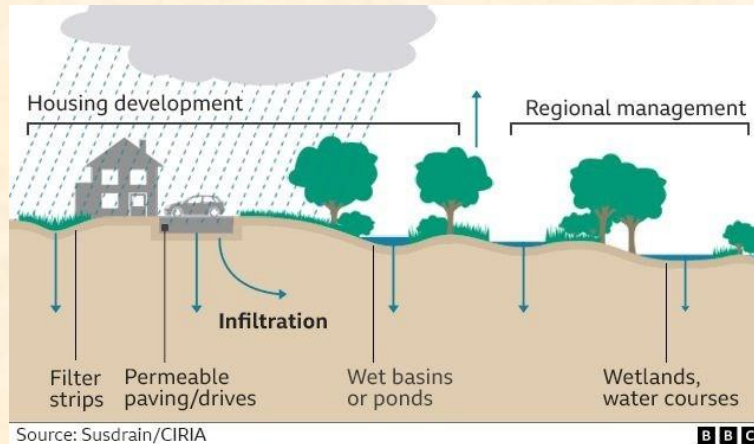
5. Sun-Surface Barriers

In the sandy bed of ephemeral desert streams the sun surface barrier can be an appropriate artificial recharge structure. It is built below the river on permeable sub surface strata and so the structure is secure from flooding and doesn't need periodic de-silting and has restricted evaporation.



6. Harvesting and conservation of Flash floods

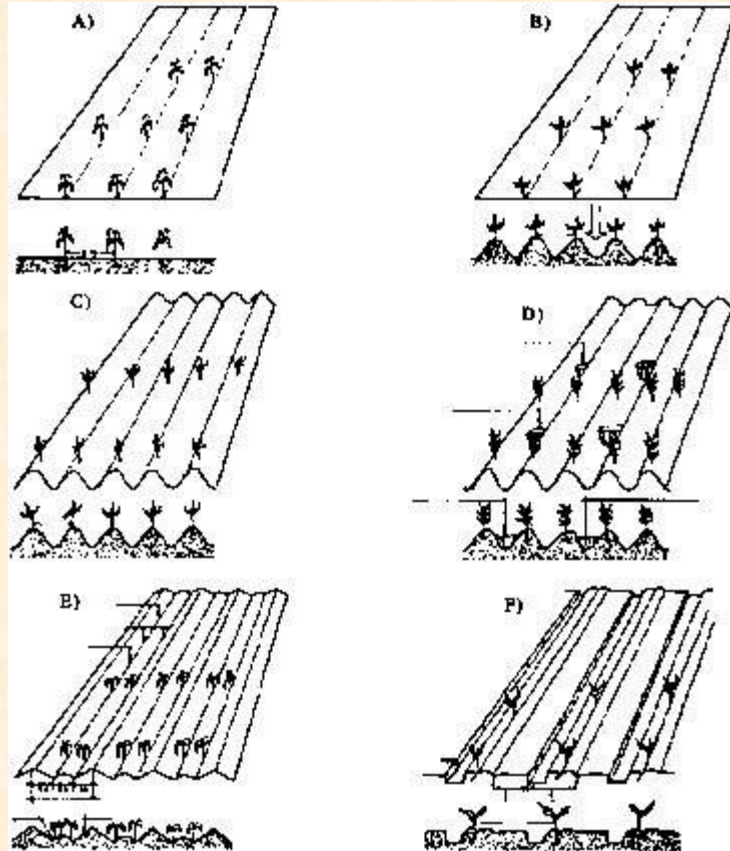
Flash floods occur because of heavy rainfall or a cloudburst of brief period. Over-topping of outlined courses of streams and spreading into flood plains causing immense damage their characteristic features. These waters are allowed to percolate within the already existing aquifers of the water and diverted towards the run-off storage tanks. The water can be purified and used for domestic and agricultural purposes.



7. In-Situ Water harvest and wet Conservation

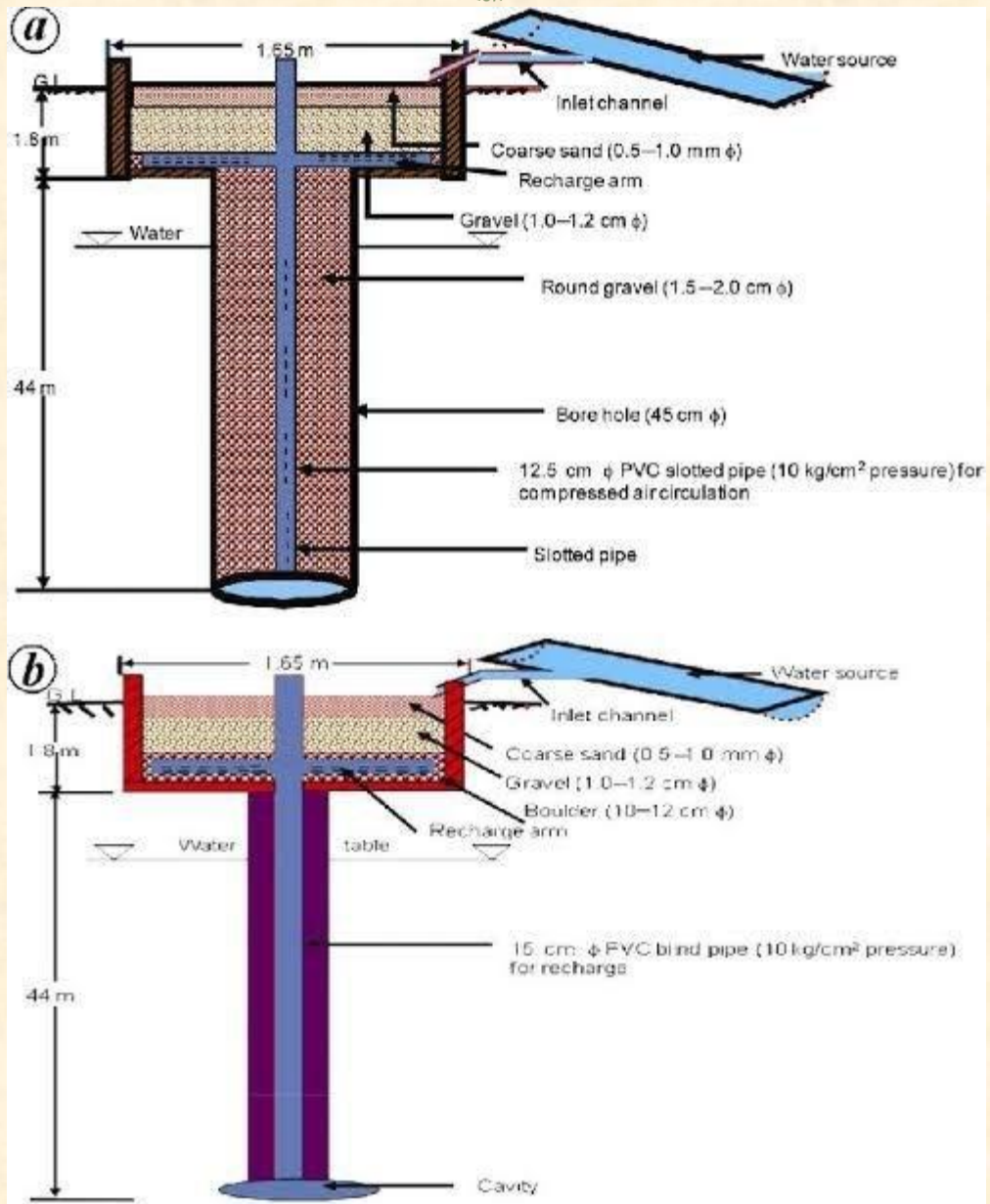
In-Situ water harvest and wet conservation, is very helpful in drought mitigation and in enhancing land productivity which are field based, cost effective, location specific soil and conservation technology. Under this system, Contour Furrowing, is practiced on delicate slopes. Also, a large range of mini storages are created across the slope that alleviates the drought.

Contour binding is recommended in the semi arid region of the state for soil and water conservation in the rain-fed farming regions. Local species of quickly growing perennial grasses with extensive root systems is planted against the slopes to act as contour vegetative barriers. These grasses and shrubs form a dense hedge and conserve soil and water. This low-cost and environmental friendly measure improves land productivity.



8. Recharge Shafts

In the areas which have only seasonal supply of water ,the recharge shaft permits the water to stand in it for an extended period and permitting it to percolate to recharge a close-by well or alternative water body.The recharge shaft is effective and cost-efficient structure to recharge the aquifers directly.





CHAPTER 4

OUR SOLUTION

Sundaram Verma's one litre water technique & Water Harvesting

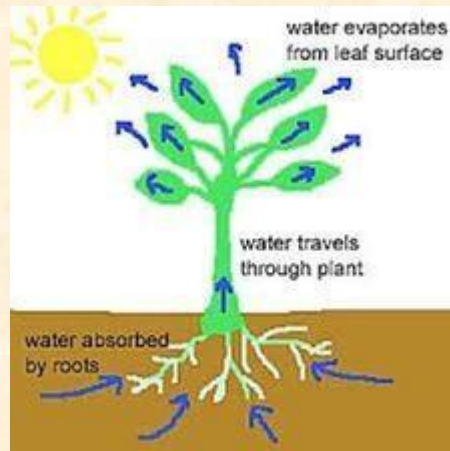


Wonder Man-Sundaram Verma

Sundaram Verma, a 69-year-old conservationist and innovative farmer from Danta village in Sikar, Rajasthan, developed the technique for planting all types of trees in arid regions with simply one liter of water for its entire life cycle.



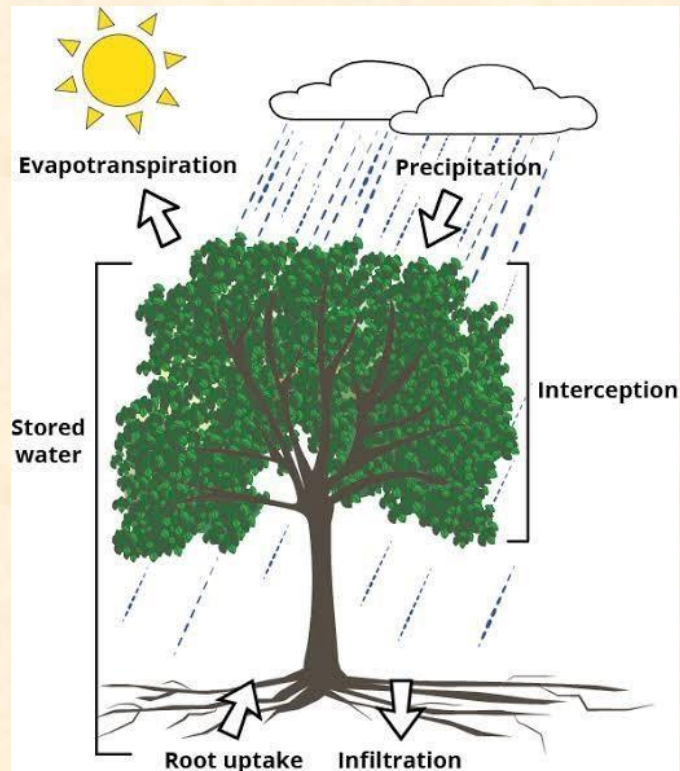
1-Litre Water Technique



Through dedication and experimentation, Sundaram framed these steps for the 1-litre water technique:

- first of all level the land so that the rain water is prevented from draining away.
- Plough the land till one feet deep for 5-6 days -just after the first rainfall of the monsoon season.This exercise helps in removal of seed and capillaries,letting the rain water seep deep into the ground.
- Immediately after the rains are over,deep ploughing the field again.This will turn the upper soil to 10inches deep which will lock the water in the soil.
- After a few days , dig pits of roughly five inches wide and one-foot deep.
- Now plant the saplings in the pit ensuring the roots are at-least 20cm down the surface.Cover with wet mud to lock in moisture for a long period.
- Lastly, pour one liter of water into the pit and let the plant grow.

Scientific discovery through the technique



The moisture from the rain gets easily lost due to the process of evapotranspiration in weeds through the capillary action of upward movement of water in the soil. Sundaram started reminiscing ways to lock this water so that the roots get water automatically.

If the saplings are planted in the last week of September or the first week of October when the temperature is low, this results in the upper soil being cold, so the roots penetrate deeply of the saplings. This leads to roots having a tight grip of the soil till February-March.

When the summer season begins in April, the topsoil begins to dry, letting the moisture content move deep down. It leads the roots to move further down towards the moisture. This makes the plant habitual to absorbing water from deeper parts of the soil and survive even if there is less water on the topsoil.

One point to remember here is to remove weeds from the fields every 3 months, so the nutrients and moisture are not wasted. If the saplings make it through the first two weeks, they will survive for a long time.



Sundaram Verma has planted trees like date palm, jand, neem, babul, indian jujube,rohida,moringa,indian cherry,meswak along with eucalyptus that requires a lot of water by this 1-litre water technique in the arid regions of Rajasthan. The technique is effective in planting different kinds of trees, even those requiring a lot of water for survival. This allows varied vegetation to promote biodiversity in the arid regions of Rajasthan.

The Water Harvesting Technique



People in rural Rajasthan suffer financially due to water scarcity since they have to buy water for farming . To combat this problem the water harvesting technique has been adopted by many farmers in the region. In this specific technique to conserve water, a huge pit is dug and covered with a polythene sheet to collect rainwater. The idea is to collect enough water for minimum one hectare of land.This way you can efficiently utilise the rainwater and create a way to direct it into the farm pond. In many places the entire requirement for water is met through this technique.

This technique is effective which is why rural people in Rajasthan set up a rainwater harvesting system on the rooftop for the drinking water requirement as well. It collects the rainwater on the rooftop and directs it to the tank in the basement for storage.

Sundaram's 1-litre technique of plantation has helped in growing varieties of forest trees, fruit trees, and fodder trees. It is no surprise that this technique is exactly what we need during these times of climate crisis and growing desertification. According to Sundaram Verma, by practising modified traditional farming techniques and Dryland Agroforestry along with opting for water harvesting, we can fight the dreaded water crisis.



CHAPTER 5

Our Model -Green Schools& Green Gaushala

Project-Urvara's Afforestation Model-Green Schools and Green Gaushalas

The concept of **Green Schools and Green Gaushalas** for Afforestation was introduced for the following purpose

- 1) Education & Awareness
- 2) Holistic development
- 3) Reduce impact of Climate Change

The Green Schools





Purpose :-

- 1) To create green playgrounds for children studying in state school located in the rural arid regions.
- 2) To educate ,up-skill and encourage school children to use appropriate skills on environmental, social, and economic issues that require our urgent care and are important for an informed decision.

A green school follows the principles of environmental sustainability. Its role is to create awareness among teachers and students about environmental learning that goes beyond the teachings in class. The sites of green schools provide natural resources for children to have first-hand experiences in environmental sustainability.

Importance of Green Schools

Given below are a few reasons why green schools are important:

- The surroundings of green schools are healthy, clean, protective, and green.
- It promotes the learners and teachers' physical and mental development in the premise.
- It ensures a healthy, hygienic environment like clean classrooms, playgrounds, and parks and the availability of safe water for drinking.
- Healthy practices like no corporal punishment and harassment, no use of drugs, etc., are ensured.
- Proper provision for nutritional mid-day meals and counselling regarding health services. Trees like that of Moringa (nutrient dense and helps in fighting malnutrition) are grown in the schools under project Urvara's .
- Children are taught the unique one-litre plantation technique to green their own playgrounds in school. It creates a learning experience for students and the staff and brings them closer to nature. since most of the children come from agrarian families suffering due to drought or barren lands and lack of resources. Our training and education empowers them for a better future. Hence, they are better informed and environmentally aware of their surroundings.



Children are the future of the world who are going to be global citizens, and holistic ways are required for the children's overall mental and physical development.

GREEN GAUSHALA



Purpose of Green Gaushalas

To provide safe, abundant and reliable fodder for the abandoned and domestic cattle in the villages .The consumption of harmful material and discarded poly bags leads to the untimely and painful deaths of the cattle in the villages.

Problems due to lack of green Gaushalas

- 1) Abandoned cattle raid the nearby farms in search of food.
- 2) Many abandoned cattle die due to the consumption of poly bags while scavenging food in the bins.This could lead to a pandemic like situation someday since the mass carcass burial has the potential to contaminate the soil and groundwater system.
- 3) Improper livestock management is one of the main sources of greenhouse gas emissions, leading to climate change.



- 4) Cattle breeders are often forced to migrate ,families are displaced in search of employment and green pastures. This adds to the constant pressure of making the ends meet and provide for the family.
- 5) Constant movement of the family ,effects the education along with the physical and mental well-being of their children .

How our model helps the villagers?

- 1) Creating a self-sustainable sheds and fodder for ruminant cattle will reduce the problem of cattle raiding nearby farms in search of food.
- 2) These establishments of cow-sheds provide organic fertilisers made with cow dung to the farmers in the village which ensures good agricultural produce and thus the economic growth in the region.
- 3) These cattle rehabilitated in these sheds also provide milk which is an important source of protein among children.
- 4) It also prevents seasonal migration and displacement of cattle breeders who have to constantly move to provide food and water to their cattle.This has a huge impact on the physical and mental growth of their children and families.

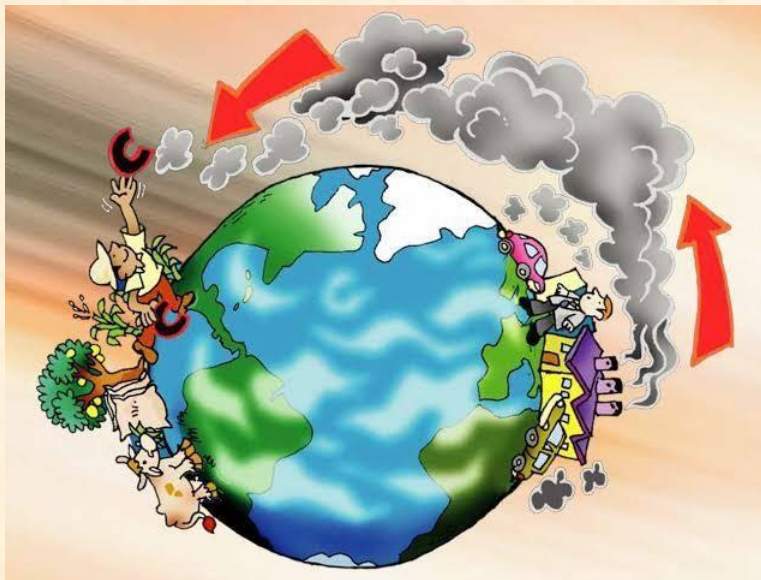
The model of green schools and green gaushalas is essential and effective to solve the problems of vegetation,water scarcity,shortage of green fodder and lack of biodiversity in the region



CHAPTER 6

ACTION AGAINST CLIMATE CHANGE

Climate change is a global issue that is affecting all the countries of the world. It impacts different areas like agriculture, forestry, water resources, human health, etc. The diversity in the impact requires different strategies to combat these issues. The rise in temperature and water scarcity is at dangerous levels that will affect life on the planet in the future.



The journey for revival of soil and reversal of desertification is long, but taking steps at the individual and community level can make a huge impact. Water is life as our livelihood and growth depend on it. Conservation of water is essential for preserving the environment and availability for future generations.



ACTION PLAN

What can be done?

We can take the following steps to solve these issues:

Role of farmers



Farmers are the backbone of the growth and prosperity of a country. They are responsible for growing and maintaining the quality of food we consume. They also form the biggest section of the rural community and rely on agriculture for livelihood. Their farming practices affect the management of natural resources. Creating awareness and teaching them about integrated farming techniques, water harvesting, agroforestry, use of less fertilisers, plantation of native crops will positively affect the water and land resources.

1) Integrated Farming System

Integrated Farming System ensures intelligent use of water and water conservation. It ensures efficient use of animal and farm waste by recycling it by other enterprises. Elements like goats, poultry, rainwater harvesting system, solar energy units, fodder, croplands, biopesticides, and biofertilizers are key elements of IFS.



2) Plantation of Indigenous Native Trees and Crops

The plantation of native trees and crops in Rajasthan is a good way to conserve water. The arid region has made the plants adapt to the scarcity. Plantation of local trees and crops ensures the triviality of local wildlife as they depend on it for food and shelter. They are also low on maintenance costs and improve the climate condition by helping with the natural survival of the local ecosystem.



3) Using organic fertilizers:-

Organic fertilisers are by-products of animal or plant-based materials. The use of organic fertilisers provides better growth results in plants.



Why?

- I. These are gentler than the chemical-based fertilisers that are also harmful to humans.
- II. Chemical fertilisers get washed away during heavy rains and irrigation sessions, but organic fertilisers stick tightly, resulting in less use of fertilisers.
- III. Plants grow healthier with the use of organic fertilisers as they release the nutrients into the soil slowly, maintaining the nutrient balance without the overuse of chemical fertilisers.

Role of Women



Women play an important role in water and land conservation. They hold the key to water management at the household level, educating them with proper water harvesting techniques and teaching them about the efficient use of water is necessary for the conservation process. They can adopt the following measures to help in water conservation in their day to day life.

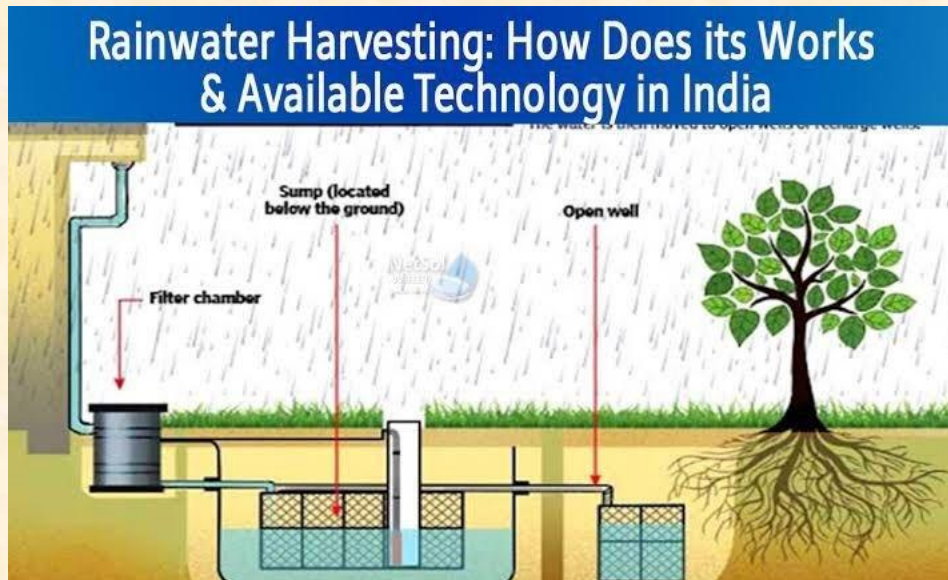
- 1) They can collect water from washing veggies and fruits and reuse it for watering the garden.



- 2) Collect water from your RO filters in a container and reuse it to wash utensils or mop the floor.

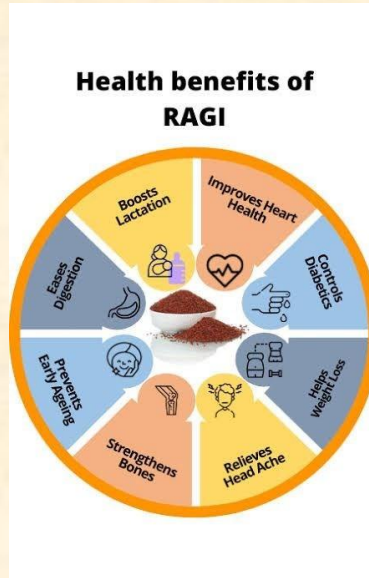


- 3) Trap rainwater by installing Rain Water Harvesting systems and reuse it during summers when taps in many villages run dry.





- 4) Introduce millets in your diet and reduce the amount of water-intensive grains they consume. Millets are nutritionally and ecologically superior compared to refined grains like rice and wheat. They do well in poor soils with low irrigation and zero chemical inputs.



- 5) Turn off the faucet while brushing, washing your face, doing the dishes and so on are the reasons why 360 million litres of water is wasted each day. The best way to forestall this is to be conscious each time you open a faucet.
- 6) Use water aerators to resolve the matter of running faucets. Aerators save nearly 35-40 per cent of water per minute.



- 7) Run your washing machine only when it's fully loaded to save lots of on water and soap. Bonus points if you use eco-friendly, non-toxic detergent for this purpose.



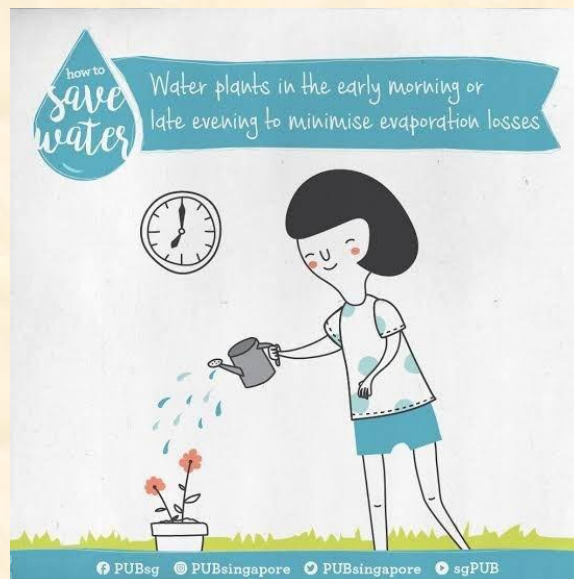
- 8) Use buckets to wash rather than shower which can save 12-18 litres of water every day



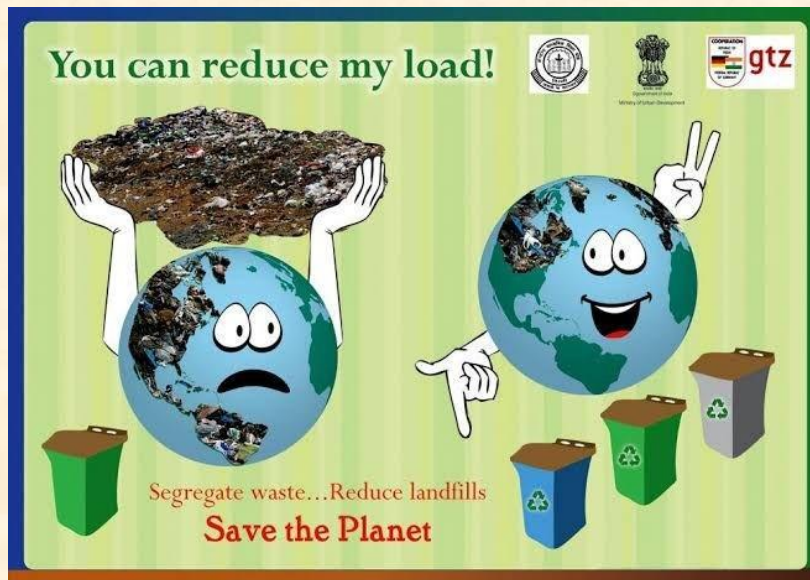
- 9) Check taps and pipes for leaks within the house.



- 10) Native plants use less water than exotic ones. Water your plants in the morning when the temperatures is cooler to minimize evaporation. Drip irrigation which is an extremely economical watering system can also be considered.



- 11) Segregate the dry and wet waste and dispose off account.



EDUCATING CHILDREN

Children are the country's future, so getting them involved with environmental sustainability is important. An initiative like Green School provides values and creates a sensitive approach to the environmental concerns.



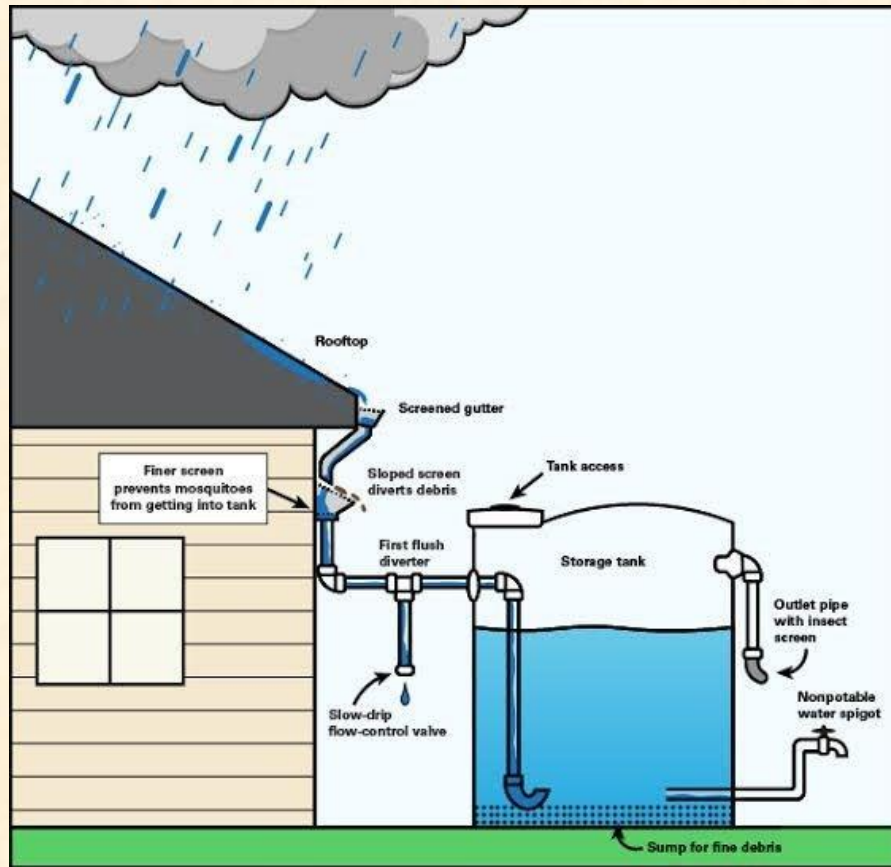
- 1) Practice what you preach. Your children will follow what they see.



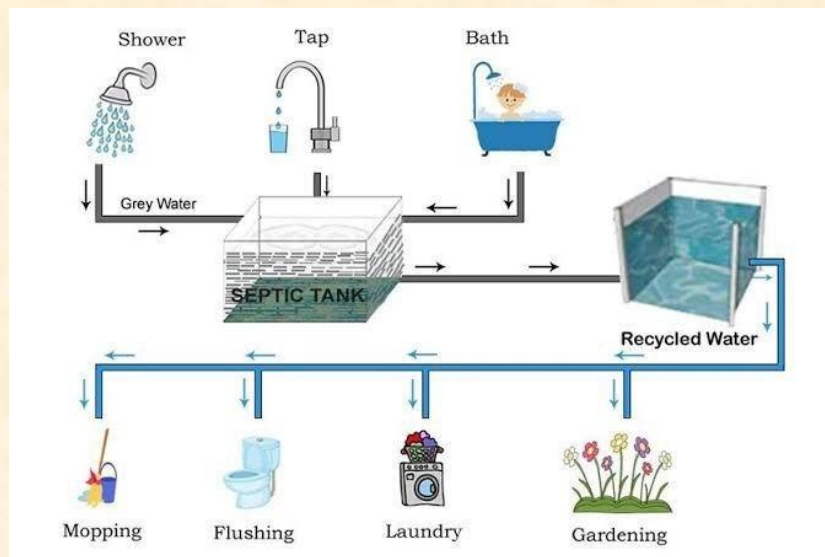
- 2) Teaching children the judicious use of water and electricity in classrooms and at home.



- 3) Installing an effective rain storage system in schools and at home.



- 4) By providing them with active hands-on training for planting trees and teaching them about water conservation techniques like reusing greywater as a part of their school curriculum.



- 5) Organize neighborhood clean-up drives.



- 6) Sensitize your children to good environmental practices by using eco-friendly alternatives to disposable plastics eg :-use of cloth bag instead of the poly bags.



- 7) Instead of discarding single use plastic like plastic bottles, old tins, paper towel, tubes and cereal boxes, encourage your children to get creative and up cycle waste materials.



- 8) Teaching then the importance of eating healthy foods like vegetables and fruits instead of the junk.



Including Local Authorities

It's important to include the local government or authorities in the concerns related to the environment. Creating awareness concerning water conservation with gram panchayats can guarantee higher involvement from the residents. Simple steps can facilitate with the conservation and awareness method.



- 1) Organising tree plantation drives and teaching the local communities about soil and water conservation.





- 2) Teaching the 3 R's - Reuse resources, Recycle materials and Reduce waste.



- 3) Afforestation programs conversion programs in the residential land and nearby barren areas. Adopt trees as a green member of the family.





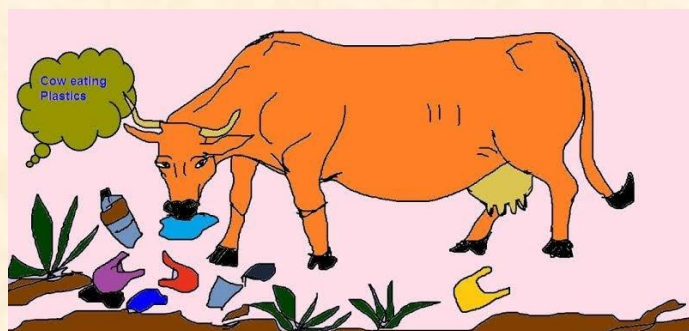
- 4) creating awareness about using greywater for backyard irrigation helps conserve water.



- 5) Cleaning the community area by picking up litter and involving everyone in the village to participate.



- 6) Establishing an effective and efficient waste management system to ensure that no cattle dies due to the consumption of harmful materials and natural resources are well utilized.



7) Hosting workshops in the village to explain waste segregation process .

Workshop on Managing Solid Waste

Expert briefing by CSE's solid waste management team
EXCLUSIVELY FOR GSP FORUM OF SCHOOLS THAT SEGREGATE

DATE	TIME	PLATFORM	LANGUAGES
June 2, 2021	3.00 PM to 4.15 PM	Zoom	English and Hindi

8) Install separate bins in the village for the dry and wet waste .





Activity Time

Let's learn a few fun activities and help mother nature thrive!

1. DIY Water Filtration System

Water is precious, and recycling it will help the earth conserve. How can you do that? Make your own DIY Water Filtration System and turn the muddy water into clean water.



Things you will need:

- Big plastic bottle
- Cotton balls
- One cup of sand
- One cup of gravel
- One cup of activated charcoal
- Plastic cup
- Scissors
- One litre of muddy water (make it by mixing dirt with water)



Let's begin!

- 1) Keep the cap on the bottle and cut the bottom of the plastic bottle.
- 2) Create little holes in the cap.
- 3) Now stuff cotton balls in the bottle's neck by reversing the bottle upside down.
- 4) Take the powdered activated charcoal and pour it into the bottle.
- 5) Now layer up sand on top of the activated charcoal.
- 6) Finally, put the layer of gravel on top of the sand.
- 7) Now put this water filtration system on top of the bottom cut part of the plastic bottle.
- 8) Add muddy water to the top layer of the bottle.
- 9) Watch as the magic happens and see the filtered water running into the bottom cut part of the bottle.
- 10) Do not drink this water as it is not safe for drinking.

Working on the filtration process

This filtration system has three stages for filtration. The first stage has big rocks that filter out the large particles. The sand filters out the smaller particles from the muddy water. The last stage has activated charcoal, where the smallest particles and chemicals are filtered. The cotton soaks up the activated charcoal and, finally filtered out, gets collected. Each step ensures water gets cleaner and cleaner.

Keep in mind this water is not fit for drinking as that requires more steps.



2. Self Watering Plant- Easy DIY

A self-watering plant system is a great way to have a hassle-free plant watering system that doesn't require daily care. It also helps in nutrient retention in plants and encourages healthy root growth.



Things you need:

- Plastic soda bottle
- Yarn
- Scissors
- Nail
- Hammer
- Craft knife
- Water
- Plant
- Soil

How to make a self-watering plant DIY system?

- 1) Cut the top third of the plastic soda bottle using the craft knife.
- 2) Use the scissors to even out the edges.



- 3) Make a wide hole by hammering the nail into the bottle's plastic top a few times. This will provide space for the yarn to go through the cap.
- 4) Put the yarn through the cap's hole. The yarn should be approximately 1 foot in length.
- 5) Put the cap back on the soda
- 6) Fill at least half the bottom part of the bottle with water. Put soil in the top part of the bottle and plant your sapling.
- 7) Now put the top part of the bottle in the bottom part with the string dipped in the water.

How does it work?

- 1) This is an excellent method to use when you need to go on a vacation and can't take your plants with you. This way, you don't have to water your plants every day and can go on without worrying for days. This system works by the yarn sucking in the water from the bottom part to the top part of the planter. There is no loss of ground level moisture through this DIY. Now your plant won't be thirsty and die on you even if you forget to water it for a week.

3. Crossword Puzzle Activity

Forest and Farming Areas In Rajasthan

Give your brain some exercise and test your knowledge about the forests and farming areas of Rajasthan.

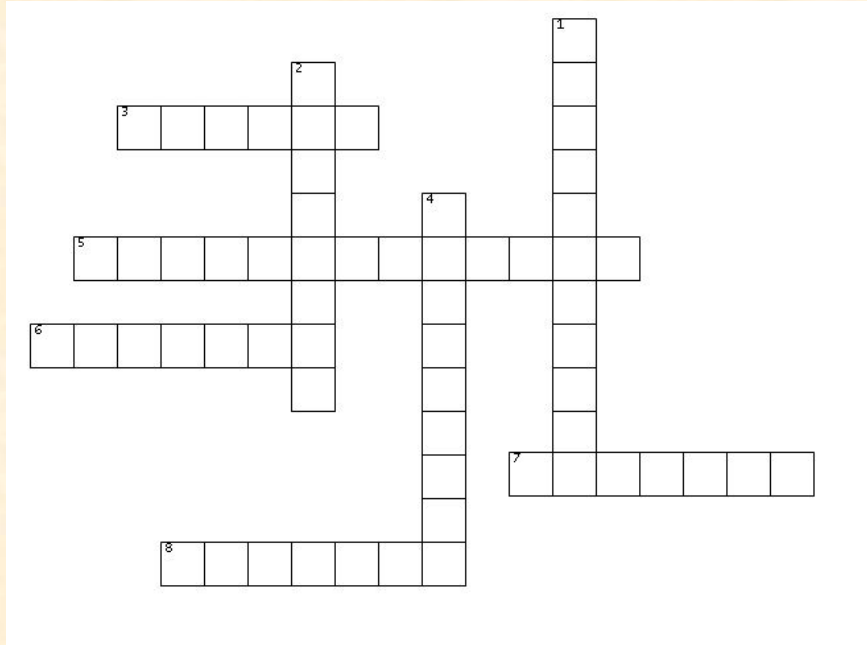
ACROSS

1. Which of the districts in the state of Rajasthan cover the maximum area under forest?
2. The main reason for lack of forests in Rajasthan is_____.
3. Where does the desert tree plantation and research centre located in Rajasthan?
4. Which of the trees is known as Kalpavriksha of Thar?
5. Where is CAZRI (Central Arid Zone Research Institute) located?



DOWN

1. Which of the districts has the maximum of Sagwan forest?
2. On which tree are silkworms nursed?
3. Where is the national desert park of Rajasthan located?



Use the clues to fill in the words above.

Words can go across or down.



Answers:

Across

3. Nagaur, 5. Deforestation, 6. Jodhpur, 7. Khejari, 8. Jodhpur

Down

1. Chittorgarh, 2. Mulberry, 4. Jaisalmer

