

DATA FOR SOCIAL GOOD HACKATHON

SDG 13 CLIMATE ACTION

TEAM NAME:- CLI_Hacks

Project Description:

Agriculture is pivotal to the state of Telangana as it accounts for 16% of its industry. Due to rapid change in the climate, this is causing there to be a disruption in the weather patterns.

This challenge aims to address the looming issue and to create sustainable plans.

Our team has taken two prompts:

- Write an application or perform an analysis on the causes of or solutions to Climate action
- Target and analyze the rainfall and weather patterns in the state of Telangana?

Causes of climate change:-

The ways by which humans are accelerating climate change:-

1. Greenhouse Gases

Greenhouse gases play a vital role in the earth's climate cycles. As the planet gets hit with the sun's rays, some of the energy is absorbed, and the rest of that energy and heat get reflected into space. Greenhouse gases in the atmosphere trap the reflected energy, redirecting it back down to the earth and eventually contributing to global warming.

Various gases play this role such as :

- Water vapor
- Carbon dioxide (CO₂)
- Methane
- Nitrous oxide
- Chlorofluorocarbons (CFCs)

2. Deforestation

Deforestation and climate change often go hand in hand. Not only does climate change increase deforestation by way of wildfires and other extreme weather, but deforestation is also a major contributor to global warming. According to the Earth Day Network, deforestation is the second leading contributor to global greenhouse gasses.

3. Agriculture

Apart from contributing greatly to India's economy, agriculture is a sector that contributes a great share of the greenhouse gas (GHG) emissions which have been slowly causing climate change over the years. It is rather shocking to believe that these gases have a significantly higher global warming potential than carbon dioxide.

Methane is a gas, which is released from the soil of anaerobic wetland to the atmosphere through the diffusion of dissolved methane, ebullition of gas bubbles, and via plants that, like rice, develop aerenchyma tissue. A very large portion of methane formed in anaerobic soil remains trapped in the flooded soil.

When we burn rice residues such as straw and husks it also contributes to greenhouse gas emissions. In the same fashion, the inefficient application of nitrogen fertilizers in rice production systems makes way to promote the release of nitrous oxide, a potent greenhouse gas, into the atmosphere, becoming a significant reason for climate change.

And the main crop of Telangana is Rice so we have to look into this matter with great serious

Immediate Effects of Climate Change

1. Extreme Weather

Weather changes are perhaps the most noticeable effect of climate change for the average person.

Extreme weather influenced by climate change includes:

- Stronger storms & hurricanes
- Heatwaves
- Wildfires
- More flooding
- Heavier droughts

Long Term Impact of Climate Change

The long-term impact of climate change could be devastating to the planet and everyone and everything living on it.

1. Health

There are many ways in which climate change could impact people's health. Depending on age, location, and economic status, climate change is already affecting the health of many and has the potential to impact millions more.

2. Negative Impact on Ecosystems

Ecosystems are interconnected webs of living organisms that help support all kinds of plant and biological life. Climate change is already changing seasonal weather patterns and disrupting food distribution for plants and animals throughout the world, potentially causing mass extinction events.

3. Water & Food Resources

Climate change could have a significant impact on food and water supplies. Severe weather and increased temperatures will continue to limit crop productivity and increase the water demand.

Solutions for Climate Change:

By taking immediate action to curb climate change, we may never see the worst consequences. Likewise, as the state adopts cleaner, more sustainable energy solutions, there may be thousands of new jobs created and millions of dollars of economic benefits.

- Stop deforestation
- Recycle
- Effective land use
- Need of new irrigation techniques to save water

- Water harvesting
- Effectively sharing underground water

Results, Impacts, and Solutions to the analysis of rainfall and weather data of Telangana

RESULTS:-

- 1) Adilabad, which has the highest rainfall and a great no. of dense forests in the Telangana, has come out as the most vulnerable of all the districts in Telangana when we take all the five factors in the composite index of vulnerability into account. After Adilabad, we have Khammam, Rangareddy, Medak, Mahbubnagar, Nizamabad, Karimnagar, Nalgonda, Warangal, and Hyderabad in the list. (Ref. Final submission.xlsx)
- 2) The unusually excessive rainfall that Telangana has received since October 13, 2020, is most probably because of global warming. (Ref. Final submission.xlsx)
- 3) In terms of absolute rainfall, Kumuram bheem received 374.4mm, which was the highest in the state between the mornings of 23rd July and 24th July 2021. In July, many places were lashed by torrential rainfall. Nirmal district received the highest average rainfall of 18.16mm in July'21. (Ref. Final submission.xlsx)

IMPACTS:-

1. The changes in rainfall like the coefficient of variation for rainfall may fluctuate from somewhere around 30% to +30%. This change will reduce crop yield and many areas will be facing drought-like conditions.
2. Then the loss of trees and other natural vegetation can cause serious climate change, desertification, soil erosion, fewer crops, flooding, increased greenhouse gases in the atmosphere, and a host of problems for the people of Telangana.
3. Extreme weather which is high temperatures and heavy precipitation and wind speed affects land as a result of agriculture. Land degradation threats included wind and water erosion, loss of soil carbon, nutrient decline mass movement, soil structure decline, acid sulfate soils, as well as soil acidification.
4. Deforestation is one of the prominent causes of land degradation which affects agriculture and indirectly affects climate as well. So it's a reverse

process of removing the most important part of nature, the nature will automatically show its worst face which we all fear. So it is high time we should focus on making policies for restoring important components and aspects of mother nature.

5. Each and everything in the environment affects how a plant grows, thrives, and also how it reproduces. When growing plants indoors, climate control is an aspect that is essential to maximize the photosynthetic process. By maintaining an optimal level of relative humidity in a greenhouse and other growing environments, you can ensure optimal plant transpiration, so this is the way it works.
6. Apart from using water and air, plants use light energy for the transpiration process, as it causes liquid water to turn to vapor (evaporation). Greenhouses often maintain relative humidity levels below threshold values during the daytime and night as well by controlling the water content in the air to maintain a minimum transpiration rate for plants.
7. Climate control for plant growth is an essential consideration regarding managing pests and diseases. When the weather conditions are extremely humid, it can promote the growth of mold and bacteria which cause plants to die and crops to fail, as well as may cause root or crown to get rotten. Humid conditions also become an invitation to the presence of pests, such as fungus gnats, whose larva feeds on plant roots and prospers in moist soil.

SOLUTIONS:-

- 1) Organic farming should be promoted among the farmers. Certified training courses for free should be made accessible to the farmers with less income. Carbon dioxide released from the fertilizers increases the CO₂ levels in the atmosphere, hence contributing to climate change. The manure in organic farming has materials like husk, vegetable and fruit peels, cow dung, etc. The atmosphere is not affected at all while growing fruits and veggies in such soil. In addition to this, fruits and vegetables grown in organic soil are beneficial for health.

Here inspiration can be taken from Purvi Vyas, a young environmentalist of Ahmedabad, Gujarat, who teaches people to do organic farming.

- 2) Another way to counter Telangana's climate change is the usage of agrocrete in construction. Let me tell you about this magical material in detail

Founded by Tarun Jami, GreenJams is the cleantech startup behind Agrocrete, which is an innovative carbon-negative brick made from agricultural waste like husk, dung, peels, etc. that cuts down construction costs and time.

Called Agrocrete, the product is made of upcycled material and can reduce construction costs by 50%, increase thermal insulation by 50%, and cut down the time required for constructing buildings, founders say. It is way better than conventional brick

Tarun Jami, the co-founder, and a civil engineer says he became aware of the role of concrete in the climate crisis during his academic days. In 2013, during his graduation, he came across the material Hempcrete and was in light because of its carbon-negative qualities and thermal capabilities. Called Agrocrete, the product is made of upcycled material and is capable of reducing construction costs by 50%, increase thermal insulation by 50%, and in addition, it would cut down the time required for constructing buildings, founders say.

‘Better than a conventional brick’ we believe.

The government of Telangana should motivate people to switch towards an environment-friendly lifestyle. The agrocrete construction material is way more sustainable and environmentally friendly, also convenient to apply and finish. This technology is new and the government should give it recognition and should promote its usage among the masses.

Agrocrete, made from agricultural residue and industrial by-products. It is collected from residue from farmers and chop and process. The residue is mixed with our innovative product BINDR, a 100% up-cycled low carbon replacement of Portland cement made from industrial by-products of steel, paper, and power industries. As it comes in powder form it is easy to apply and finish.

3) Some of the great solutions against deforestation are :

★ Law and Regulations

Due to the nature and extent of forest destruction, efforts to stop human activities can be complemented by laws and regulations at governmental and organizational levels. As much as people increasingly become aware of deforestation’s consequences, some people focus more on the immediate economic gains at the expense of the long-term environmental damage. Therefore, stopping deforestation and preserving the natural vegetation demands rules, laws, and regulations from organizations and governments to aid in enforcing forest preservation policies.

★ Community Forestry

Community forestry is whereby local communities together with their local government and other local organizations such as schools, corporate, and

universities join hands to start localized tree planting programs and management of their local forests. On various occasions such as public holidays, opening ceremonies, environment days, or other periodic localized activities, concerned local citizens can create awareness and plant trees. This can be done within the surrounding areas as a method of boosting environmental sustainability and keeping the local forests viable. All local learning institutions, hospitals, local government headquarters, and the rest of the community can ensure trees are planted and the local forests are protected against damage as a way of finding solutions to the deforestation menace.

★ Land Use Planning

We are seeing that Cities and urban centers continue to grow day after day as more and more people claim to live in cities and urban areas. Agricultural practices are also continuously expanding as farmers and consumers demand better productivity and quality food products respectively. Therefore, the urban encroachment and agricultural expansion have kept on clearing forests to create more space for their respective activities to be carried out smoothly. As a response to this condition, the creation of proper land use planning techniques can offer the quickest and the most efficient solution to deforestation. Land-use planning that focuses on environmentally friendly development techniques such as urban agriculture and lessening urban and suburban encroachment can considerably reduce the cutting down of trees.

(All the graphs and tables are there in the Final submission.xlsx file)