MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI.

PROGRAM- Diploma in computer engineering

COURSE- ENVIRONMENTAL STUDIES (22447)
SEMESTER- CO5I

A Micro Project Report On

"To Study effects of Tembhu Dam Lift Irrigation Project on Environment"

Submitted By-

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GOVERNMENT POLYTECHNIC KARAD

ACADEMIC YEAR 2022-2023

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI.

CERTIFICATE

Microproject Assessment at the end of Semester
(By respective Head of the Department & Head of the Institute)

This is to certify that,

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Has successfully completed "**To Study effects of Thembhu Dam Lift Irrigation Project On Environment**" Micro-project of the 5th semester Diploma in Computer Engineering of subject Environmental Studies from Government Polytechnic Karad
Institute with Institute code (0010).

Prof. Mrs. K. K. Gaikwad	**Prof. S. B. Patil**	**Prof. Mr. R. K. Patil**
(Project Guide)	(Head of the department.)	(Head of Institute)

Seal of the institute

ACKNOWLEDGEMENT

We take this opportunity to thank all those who have directly and indirectly inspired, directed and assisted us towards successfully completion of this project report.

We express our sincere thanks to **Prof. R. K. Patil** Principal of Government Polytechnic, Karad and the Head of computer Department **Prof. S. B**. **Patil** for having us allowed to submit this report as a part of our academic learning.

We express our sincere thanks to **Prof. Mrs. K. K. Gaikwad** Lecturer in Computer Engineering, Govt. Polytechnic, Karad for encouragement throughout the project report and guideline in designing and working out this project. We are also grateful to team of "**To Study effects of Tembhu Dam Lift Irrigation Project On Environment**".

Place: Government polytechnic karad
Date:

Yours Sincerely,

2209-Kalyani Shankar Deshmukh
2223-Nirbhay Rajendra Raut
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MICROPROJECT REPORT

TITLE:-

"To Study effects of Tembhu Dam Lift Irrigation Project on Environment"

0.1 RATIONALE :-

The Tembhu Lift Irrigation Project is a water management and irrigation project located in the Satara district of Maharashtra, India. The project is designed to provide irrigation water to the agricultural land in the district, especially in drought-prone areas. The project also provides drinking water to nearby villages. This project consists of two sub-projects the Mhaisal Lift Irrigation Project and the Takari Lift Irrigation Project. The Mhaisal project involves lifting water from the Koyna River using a pump house and delivering it to the Mhaisal village for irrigation. The Takari project involves lifting water from the Krishna River using a pump house and delivering it to the Takari village for irrigation.

Sediment accumulation could alter water quality downstream. Communities might be displaced due to reservoir creation. Temperature changes in water can affect aquatic life. Balancing benefits and impacts is crucial for sustainable development. In this project we will study effects of Tembhu dam lift irrigation on environment.

0.2 AIMS/BENEFITS OF THE MICRO-PROJECT: -

1. To analyse environmental impacts of dam lift irrigation project.
2. To focusing dam lift irrigation effects on aquatic ecosystem, water quality, habitat disruption, and potential consequences for local communities and biodiversity.
3. To Study the effects of the dam lift irrigation project on the environment helps minimize ecological harm, ensuring sustainable water management and community well-being.

0.3 COURSE OUTCOMES: -

c. Conserve Ecosystem and Biodiversity.
d. Apply techniques to reduce Environmental Pollution.

0.4 LITERATURE REVIEW: -

A literature review on dam lift irrigation projects highlights the significance of these initiatives in addressing water scarcity and enhancing agricultural productivity. Research has consistently emphasized their role in optimizing water resource management. The positive impact of dam lift irrigation on crop yields, particularly in arid regions.

Overall, the literature on dam lift irrigation projects underscores their potential for sustainable agriculture and rural development, while also highlighting the need for careful planning, management, and environmental monitoring to address potential challenges and ensure long-term success.

0.5 ACTUAL METHODOLOGY FOLLOWED: -

- We will communicate with each group member.
- From above discussion we will decide the topic of our microproject.
- We will plan the general structure of the whole project.
- Collect information regarding to Tembhu Dam lift Irrigation Project.
- After collecting all the information, we will visit to Tembhu Dam.
- We will prepare a report on basis of this visit.
- After that we will make the Final Project report on our project and we will submit it to our respected subject teacher.

0.6 ACTUAL RESOURCES USED: -

Sr. No	Resources used	Specifications	Quantity
1	Computer system	Dell Inspiron, i5 11th Gen, 8gb RAM.	1
2	Office S/W package	Microsoft Office - 2019	-

0.7 OUTPUTS OF THE MICRO-PROJECT: -

"To Study effects of Tembhu Dam Lift Irrigation Project on Environment"

- **Introduction of Tembhu Dam Lift Irrigation Project:**

The Tembhu Lift Irrigation Project is a large-scale irrigation project in Maharashtra, India. The project aims to lift water from the Krishna River in 5 stages to irrigate an area of 80,472 hectares in the districts of Satara, Sangli, and Solapur. The Tembhu Lift Irrigation Project is a water management and irrigation project located in the Satara district of Maharashtra, India.

The project is designed to provide irrigation water to the agricultural land in the district, especially in drought-prone areas. The project also provides drinking water to nearby villages. This project consists of two sub-projects – the Mhaisal Lift Irrigation Project and the Takari Lift Irrigation Project. The Mhaisal project involves lifting water from the Koyna River using a pump house and delivering it to the Mhaisal village for irrigation. The Takari project involves lifting water from the Krishna River using a pump house and delivering it to the Takari village for irrigation.

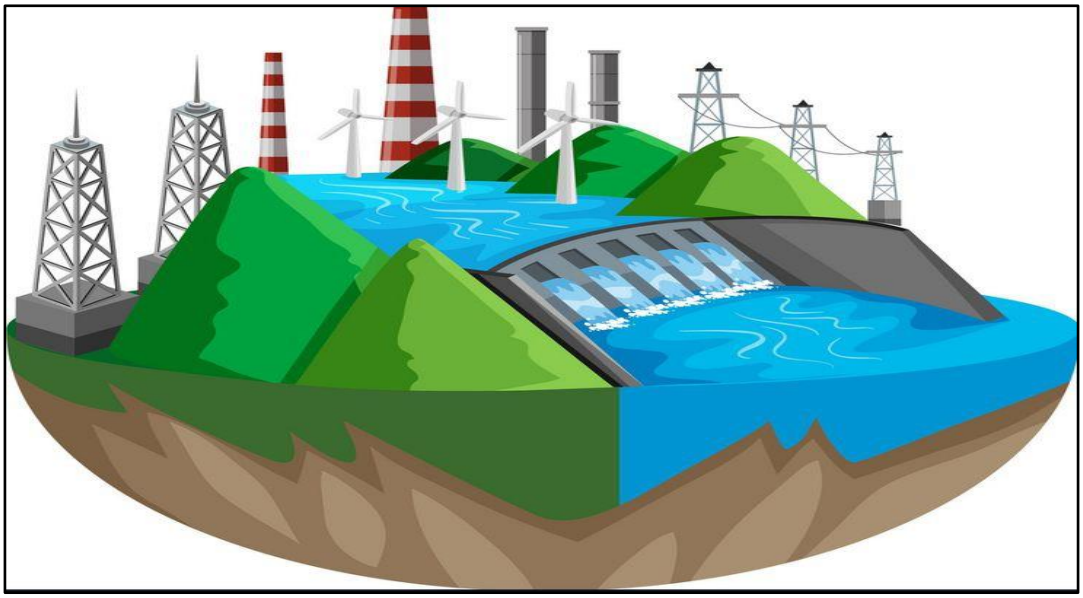
The Tembhu Dam is situated on the Krishna River, which flows through the western state of Maharashtra in India. Like many dam projects, the Tembhu Dam has implications for the local environment, including potential impacts on aquatic ecosystems and downstream areas.

Environmental assessments and management plans may be in place to mitigate these effects. In addition to its utilitarian functions, the dam and the surrounding area have become a popular destination for tourists. The scenic beauty of the reservoir, especially during the monsoon season when the dam is filled to capacity, attracts visitors.

- **Positive Effects of Tembhu Dam Lift Irrigation Project on Environment**

  - **Flood Control Prevention:**

Dams in lift irrigation projects can play a significant role in flood control by regulating the flow of water downstream. This helps in reducing the risk of flooding, safeguarding both human settlements and the environment from the adverse effects of extreme weather events.
Dam lift irrigation projects play a significant role in flood control prevention through strategic water management and engineering measures. Dam lift irrigation projects involve the construction of dams and reservoirs, allowing for the controlled storage and release of water. During periods of heavy rainfall or snowmelt, excess water can be stored in the reservoirs, preventing sudden and uncontrolled downstream flooding. The gradual release of stored water regulates the flow downstream, reducing the risk of floods.



The reservoirs created by dam lift irrigation projects act as temporary storage for floodwaters, mitigating the peak flow during heavy rainfall or storm events. By storing and releasing water at a controlled rate, the project effectively manages the volume and velocity of water downstream, minimizing the potential devastating floods.

- **Support for Sustainable Agriculture and Food Security:**

Enhanced water availability from dam lift irrigation supports year-round agricultural productivity and diversification. Farmers can grow a variety of crops, improving their economic stability, increasing food production, and contributing to overall food security within the region.

Dam lift irrigation projects play a crucial role in supporting sustainable agriculture and ensuring food security by providing reliable and consistent water supply for agricultural activities.

Dam lift irrigation projects ensure a continuous and reliable water supply throughout the year, allowing farmers to plan and manage their agricultural activities irrespective of seasonal variations. This year-round availability is vital for sustaining crops and maximizing agricultural productivity.

With a consistent water supply, farmers can diversify their crops and cultivate a variety of fruits, vegetables, and grains. Crop diversification leads to a more balanced diet and reduces dependency on a single crop, enhancing food security and nutrition.

- **Erosion Prevention and Soil Health :**

The regulated release of water from reservoirs helps prevent soil erosion by maintaining consistent water levels in rivers and streams. This protects the topsoil, enhances soil fertility, and supports sustainable agriculture by ensuring that the land remains productive.

Dam controlled flow helps in preventing soil erosion caused by sudden and high-velocity water movement. Additionally, the reservoirs allow for sedimentation management, where sediment carried by the water can settle, preventing it from being transported downstream and causing erosion.

Properly designed reservoirs in dam lift irrigation projects act as sediment traps, capturing silt and sediments carried by water. This sediment retention helps in maintaining the quality of the soil downstream and prevents excessive siltation, which can degrade soil health.

- **Water Management and Conservation :**

Dam lift irrigation projects allow for efficient water management by storing and distributing water as needed. This controlled distribution minimizes water wastage, enhances water conservation, and ensures a sustainable supply for agriculture, communities, and ecosystems.

Dam lift irrigation projects involve regulating the release of water from reservoirs in a controlled manner. This controlled flow helps in preventing soil erosion caused by sudden and high-velocity water movement. Additionally, the reservoirs allow for sedimentation management, where sediment carried by the water can settle, preventing it from being transported downstream and causing erosion.

- **Habitat Creation and Biodiversity Support:**

The construction of dams and reservoirs, including the Tembhu Dam, can lead to the creation of new habitats and support biodiversity. The reservoir formed behind the dam can serve as a habitat for various aquatic species and sometimes even terrestrial wildlife, depending on the surrounding ecosystem. Additionally, the dam's presence can attract diverse flora and fauna, contributing to increased biodiversity in the region. However, the impact on biodiversity can vary based on factors such as dam design, management practices, and the surrounding environmental context.

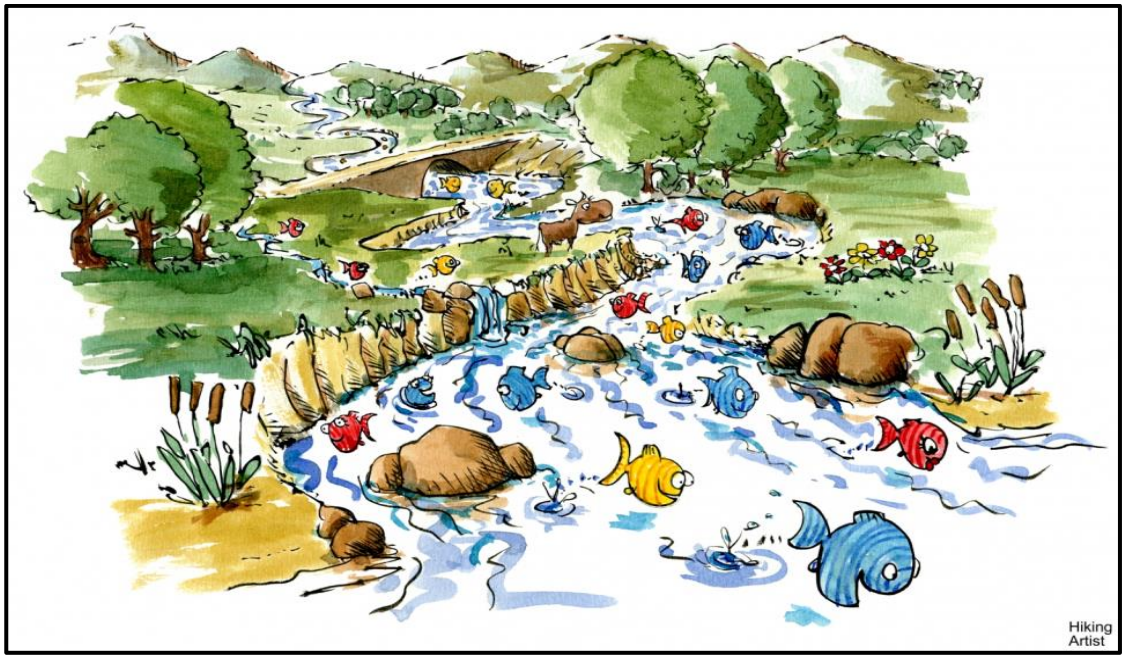
The availability of water from the reservoir supports plant growth along the riverbanks and surrounding areas. This vegetation can provide food and shelter for many animal species, further enhancing the biodiversity in the region.

The creation of a reservoir can lead to the development of diverse ecosystems within the dam's vicinity, including wetlands, marshes, and forested areas. These diverse ecosystems can support a wide array of species, contributing to overall biodiversity.

- **Negative Effects of Tembhu Dam Lift Irrigation Project on Environment:**
- **Disruption of River Ecosystems:**

Dams can disrupt the natural flow of rivers, impacting the ecosystems both upstream and downstream. The altered flow can affect the migration patterns of fish, sediment transport, nutrient cycling, and overall ecological balance. The controlled releases of water can disrupt the natural flow regimes that aquatic organisms have evolved to rely on for their life cycles, including breeding, migration, and feeding patterns.

Natural rivers have seasonal flow variability, with periods of high flow (e.g., during monsoons) and low flow (e.g., during dry seasons). Dams can reduce this variability by regulating water release, leading to a more constant flow. This can disrupt the natural adaptations of flora and fauna to varying flow



Overall, dam lift irrigation projects can substantially alter the dynamics of river ecosystems, disrupting the delicate balance of aquatic life, habitats, and natural processes that have evolved over millennia. Understanding these disruptions is vital for effective ecosystem management and sustainable development

- **Noise Pollution:**

Noise pollution in dam lift irrigation projects occurs primarily due to the operation of various machinery and equipment involved in construction, maintenance, and operation of the dam and related infrastructure. There are different reason for noise pollution like Equipment for Dam Operation, Concrete Mixing and Pouring, Water Release Mechanisms etc.

Noise pollution from the machinery used in dam lift irrigation projects can have several negative impacts on the environment and ecosystem.

Noise pollution can disrupt the natural behavior of wildlife, including feeding, mating, and communication. The loud noise from machinery may startle animals and drive them away from their habitats, affecting their ability to find food and shelter.

Wildlife may alter their activity patterns or migration routes due to the noise disturbance. This can disrupt the natural balance and dynamics of ecosystems, potentially leading to changes in predator-prey interactions and competition for resources.

Beyond wildlife, noise pollution from dam lift irrigation machinery can also affect human health. Nearby communities may experience higher stress levels, sleep disturbances, hearing impairment, and other health issues due to constant exposure to loud noise

- **Deforestation and Environmental Impact :**

Deforestation is a significant negative consequence associated with dam lift irrigation projects. These projects require a substantial amount of space for the construction of dams, reservoirs, access roads, and other associated infrastructure. In many cases, the designated areas for these projects are covered with trees and other vegetation.

Dam lift irrigation projects necessitate the clearing of trees and vegetation from the designated project area. This involves felling trees, uprooting shrubs, and removing other plant life to make way for construction activities. The extent of deforestation can be extensive, depending on the size and scale of the project.

Trees play a crucial role in the environment by providing various ecosystem services, including carbon sequestration, oxygen production, soil stability, water retention, and habitat for numerous plant and animal species.

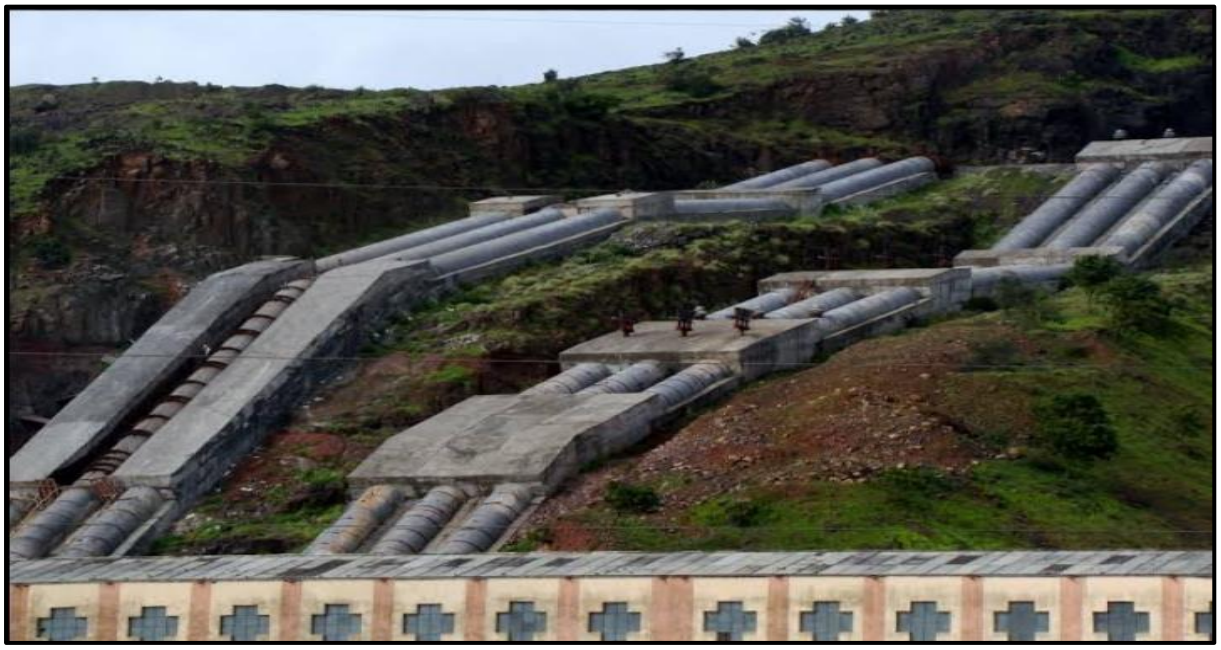
Forests are biodiversity hotspots, hosting a wide variety of plant and animal species. Clearing trees for dam construction results in habitat loss, fragmentation, and displacement of wildlife. This can lead to a decline in biodiversity as species struggle to adapt or relocate.

- **Environmental Impact of Pipeline Installation on Hills:**

The installation of pipelines in dam lift irrigation projects, especially when passing through hilly terrains, can have significant environmental impacts. These impacts are often a result of the excavation, trenching, and earthworks necessary for laying the pipelines.

Excavating hills for pipeline installation can destabilize the soil and rocks, increasing the risk of erosion and landslides. The disruption of natural slopes and vegetation cover can accelerate soil erosion and lead to hazardous landslides during heavy rainfall or seismic events.

Pipelines often necessitate cutting through ecologically sensitive areas, disrupting habitats and ecosystems. The construction process can cause direct habitat destruction and fragmentation, affecting plant and animal species residing in these hills.



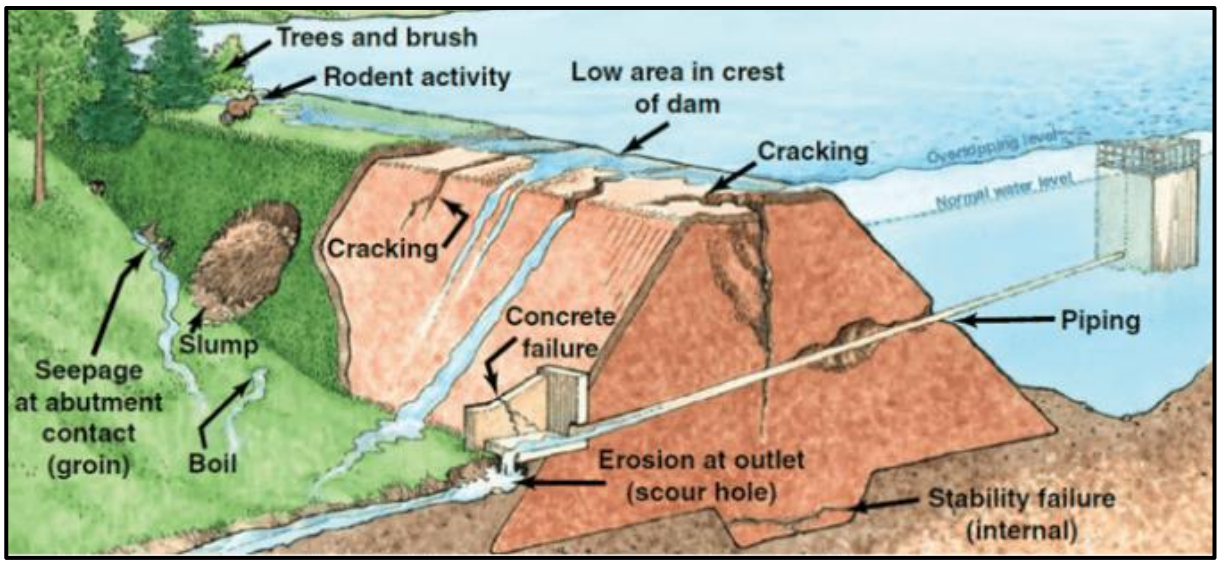
During pipeline installation, vegetation is often cleared and removed to make way for the pipeline route. The loss of vegetation can reduce biodiversity, disrupt wildlife habitats, and affect the stability and health of the ecosystem.

- **Seismic activity and geological instability:**

Seismic activity and geological instability associated with dam lift irrigation projects are primarily linked to the construction, filling, and operation of large reservoirs behind dams.

One of the primary ways in which dam lift irrigation projects can trigger seismic activity is through reservoir-induced seismicity (RIS). The immense weight of the water in the reservoir, especially in large dams, can exert significant pressure on the Earth's crust. This pressure can induce seismic events, including small earthquakes or tremors.

The filling of a reservoir behind a dam leads to an increase in the hydrostatic pressure on the underlying rock and geological formations. If there are existing fault lines or fractures in the Earth's crust near the dam, the added pressure can reactivate these faults, potentially triggering seismic events.

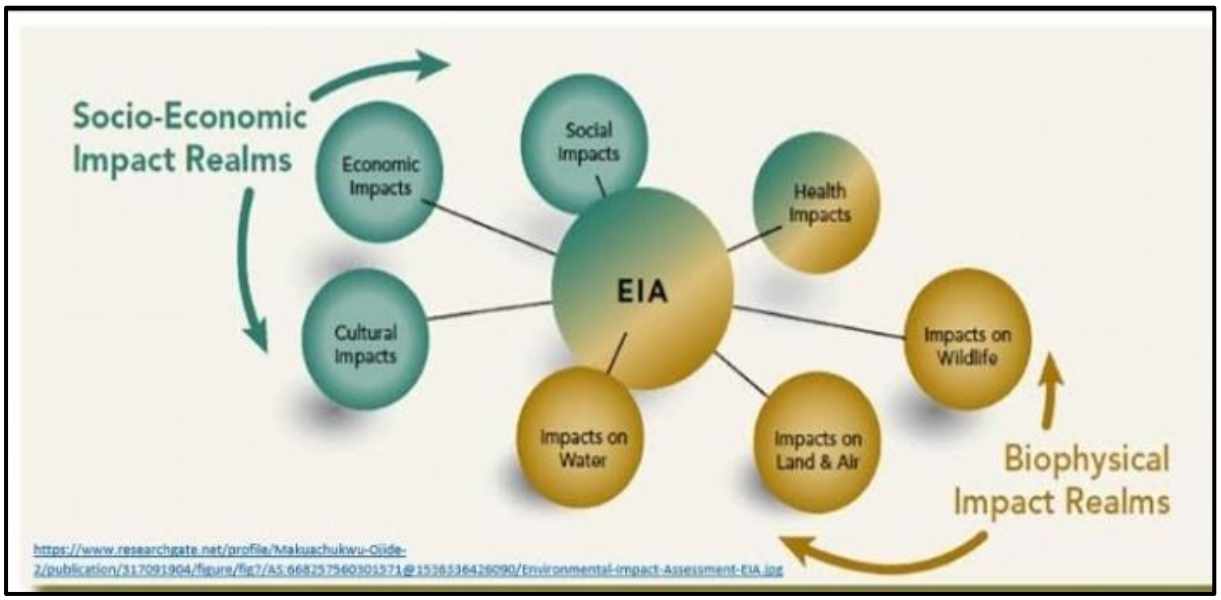


The weight of the water in the reservoir imposes additional stress on the crust beneath. This can change the stress distribution within the crust, potentially activating pre-existing faults or creating new fractures and faults in the surrounding geological structures.

- **How Overcome the Negative effects on the Environment caused by a Dam lift Irrigation Project**

- **Environmental Impact Assessment (EIA):**

An Environmental Impact Assessment (EIA) is a systematic process that evaluates the potential environmental consequences of a proposed project, such as a dam lift irrigation project. The purpose of an EIA is to identify, predict, and assess the potential impacts on the environment and public health, and to propose measures to mitigate or enhance the positive impacts.



Here's how an EIA can work to reduce the negative effects on the environment caused by a dam lift irrigation project:

1. Identification of Potential Environmental Impacts:
2. Assessment and Evaluation of Impacts:
3. Public Participation and Stakeholder Engagement
4. Decision-making and Permitting

By following these steps, the EIA process helps to proactively identify potential negative environmental impacts of the dam lift irrigation project and develop effective mitigation strategies. This ensures that the project is carried out in an environmentally responsible and sustainable manner, minimizing harm to the environment and promoting long-term environment.

- **Alternative Water Sources :**

Utilizing alternative water sources and implementing rainwater harvesting systems involve tapping into non-conventional sources of water to reduce strain on dams and minimize environmental impact.

Harvest rainwater from rooftops and other surfaces, storing it in tanks or reservoirs for later use in irrigation and other purposes. This helps in reducing demand on dams and groundwater, while also preventing soil erosion and improving groundwater levels.

Reuse household greywater (non-toilet wastewater) for irrigation, flushing toilets, and other non-potable uses. Properly treated greywater can substitute for freshwater, reducing overall water consumption.

There are also different technique for alternative water sources like Stormwater Management, Treated Wastewater (Sewage Water)etc.

By integrating these alternative water sources into water management strategies, we can reduce pressure on dam-based irrigation systems and promote a more sustainable approach to water usage while mitigating the environmental impact on river ecosystems.

- **Plant More Trees:**

The negative effects of cutting down trees for dam and irrigation projects are indeed significant, as discussed earlier. To counteract these adverse impacts and promote a healthier environment, planting more trees is crucial. Here's how planting more trees can serve as a solution:

1. Restoring Biodiversity and Habitats
2. Soil Conservation and Erosion Prevention
3. Carbon Sequestration and Climate Regulation
4. Water Cycle and Hydrological Balance
5. Community Well-being and Economic Opportunities
6. Sustainable Development and Green Infrastructure.

In summary, planting more trees is a powerful solution to mitigate the negative environmental effects of cutting trees for dam and irrigation projects. It's an actionable step towards restoring ecological balance, promoting sustainable development, and fostering a greener, healthier future for all.

- **Improving Soil Health:**

Improving soil health and reducing soil erosion associated with increased agricultural activity due to a dam lift irrigation project is crucial for maintaining the long-term sustainability of the project. Here are specific actions to overcome these challenges:

1. Implement Sustainable Agricultural Practices
2. Promote Organic Farming and Composting
3. Soil Testing and Nutrient Management
4. Erosion Control Measures

By implementing these strategies, a dam lift irrigation project can help farmers adopt sustainable farming practices that improve soil health, reduce erosion, and contribute to the overall success and sustainability of the project.

- **Tembhu Dam Lift Irrigation Project Visit & Overall Conclusion:**

During our visit to the Thembhu Dam lift irrigation project, we closely examined the construction activities and operations involving the dam workers. Additionally, we conducted interviews with local villagers to gain insights into their perspectives on the environmental impacts of the project. Villagers expressed optimism about the positive effects, highlighting potential improvements in agricultural productivity and economic growth due to a more consistent water supply for their crops. However, they also voiced concerns regarding potential negative impacts on the environment, including disruptions to local ecosystems, alterations to natural water courses, and the potential loss of habitats for wildlife.

Fig. Visit With Dam Worker

To address these concerns, it is imperative to adopt strategies that mitigate the adverse effects on the environment. Implementing eco-friendly construction practices, conducting thorough environmental impact assessments, and adhering to strict regulatory guidelines can help minimize ecological disruption. Additionally, promoting community engagement and involving villagers in decision-making processes can ensure that their concerns are considered and

integrated into the project's development. Utilizing innovative technologies for efficient water management and incorporating sustainable measures such as afforestation and responsible waste management are crucial steps towards ensuring a harmonious balance between agricultural development and environmental preservation in the region.

Fig. Discussion With Villager

0.8 SKILL DEVELOPED: -

- Team members can communicate more effectively with their teams.
- We can assess the social implications of the project on local communities.
- Understanding the principles and methodologies of Environmental Impact Assessment to assess the project's potential environmental effects.

0.9 APPLICATIONS OF THIS MICRO-PROJECT: -

- Dam lift irrigation projects provide a reliable source of water for crop cultivation, enabling farmers to increase yields and diversify crops.
- Water availability from dam lift systems can support the growth of trees and woody plants in agroforestry systems.
- The water released from the dam can be used for floodplain agriculture, especially during the dry season.
- Dam construction often leads to the development of road networks, which can improve access to remote areas.
- These projects can serve as educational tools and research sites for studying water resource management, agriculture, and environmental science.