

Environmental Impact Assessment

- A country's progress generally depends on economic development through activities such as manufacturing, trading etc.
- Development projects in the past were undertaken without any consideration to their environmental consequences.
- EIA enables the decision makers to analyse the effect of developmental activities on the environment, if any, well before the developmental project is implemented.

Concept Of EIA

- EIA is a tool which helps to evaluate the environmental impacts of proposed developmental projects or programs.
- It ensures that the mitigation strategies are included in the plan and the project under construction is environmentally sound and within limits of the capacity of assimilation and regeneration capacities of the ecosystem.

Objectives of EIA

- To serve as a primary environmental clearance tool.
- To assess consistently all proposals for potential environmental impacts.
- To suggest the use of scientific practice and strategies for mitigation.
- To address all possible factors such as short term, long term, small scale and large scale impacts.
- To include mechanisms for monitoring, auditing and evaluation.

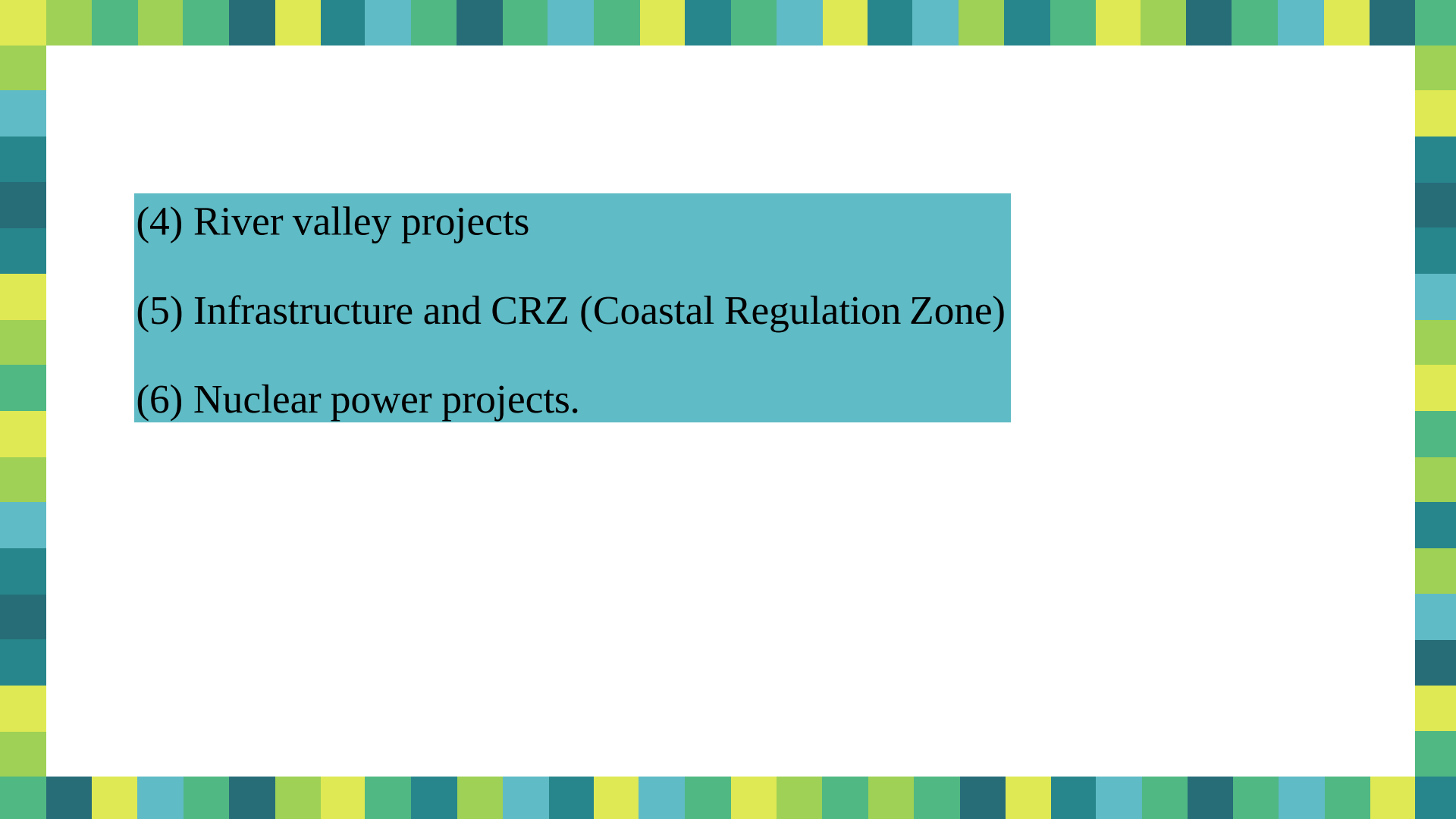
EIA In India

- EIA was introduced in India in 1978, with respect to river valley projects.
- EIA Notification comes under the provisions of Environment(Protection) Act, 1986.
- EIA is now mandatory for Red category projects, and other such categories as per notification of Ministry released in 2016 and these projects get Environmental Clearance (EC) only after the EIA requirements are fulfilled.

EIA comes under **Notification on Environmental Impact Assessment (EIA) of developmental projects 1994** under the provisions of **Environment (Protection) Act, 1986**

Environmental Clearance

- Environmental clearance or the ‘go ahead’ signal is granted by the Impact Assessment Agency in the MoEFCC.
- All projects that require clearance from central government can be broadly categorized into the following:-
 - (1) Industries
 - (2) Mining
 - (3) Thermal power plants

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(4) River valley projects

(5) Infrastructure and CRZ (Coastal Regulation Zone)

(6) Nuclear power projects.

Environmental Components of EIA

Air Environment

- Quality of ambient air.
- Wind speed, direction, humidity etc.
- Quantity of emission likely from project.
- Impact of the emission on the area.
- Pollution control desires/air quality standards.

Noise

- Levels of noise present and predicted.
- Strategies for reducing noise pollution.

Water Environment

- Existing ground and surface water resources, their quality and quantity within the zone.
- Impact of proposed project on water resources.

Biological Environment

- Flora and fauna in impact zone.
- Potential damage (likely) due to project, due to effluents, emissions and landscaping.
- Biological stress (prediction).

Land Environment

- Study of soil characteristics, land use, and drainage pattern, and the likely adverse impact of the project.
- Impact on historical monuments and heritage site.

Steps In EIA Process

1. Screening.
2. Scoping and consideration of alternatives.
3. Baseline data collection.
4. Impact prediction.
5. Assessment of alternatives, delineation of mitigation measures and environmental impact statement.
6. Public hearing.
7. Decision making.
8. Monitoring and implementation of environmental management plan.

Steps In EIA Process

- **Screening:** The project plan is screened for scale of investment, location and type of development and if the project needs statutory clearance.
- **Scoping:** The project's potential impacts, zone of impacts, mitigation possibilities and need for monitoring. The EIA agency has to follow the published guidelines by the Ministry of Environment and Forest (MoEF) of government of India.
- **Collection of baseline data:** Baseline data is the environmental status of study area.

- **Impact prediction:** Positive and negative, reversible and irreversible and temporary and permanent impacts need to be predicted which presupposes a good understanding of the project by the assessment agency.
- **Mitigation measures and EIA report:** The EIA report should include the actions and steps for preventing, minimizing or by passing the impacts or else the level of compensation for probable environmental damage or loss.
- **Public hearing:** On completion of the EIA report, public and environmental groups living close to project site may be informed and consulted.

- **Decision making:** Impact Assessment (IA) Authority along with the experts consult the project-in-charge along with consultant to take the final decision, keeping mind EIA and EMP (Environment Management Plan).
- **Monitoring and implementation of environmental management plan:**
The various phases of implementation of the project are monitored.
 - **Risk assessment:** Inventory analysis and hazard probability and index also form part of EIA procedures.

Environmental Appraisal Procedure In India

- Once an application has been submitted by a project authority along with all the requisite documents specified in the EIA Notification, it is scrutinised by the technical staff of the Ministry prior to placing it before the Environmental Appraisal Committees.
- The Appraisal Committees evaluate the impact of the project based on the data furnished by the project authorities.
- If necessary, site visits or on-the-spot assessment of various environmental aspects are also undertaken.

- Based on such examination, the Committees make recommendations for approval or rejection of the project, which are then processed in the Ministry for approval or rejection.
- In case of site specific projects such as Mining, River Valley, Ports and Harbours etc., a two stage clearance procedure has been adopted whereby the project authorities have to obtain site clearance before applying for environmental clearance of their projects.
- This is to ensure avoiding areas which are ecologically fragile and environmentally sensitive.
- In case of projects where **complete information has been submitted** by the project proponents, a decision is taken within **90 days**.

Monitoring

- After considering all the facets of a project, environmental clearance is accorded subject to implementation of the stipulated environmental safeguards.
- Monitoring of cleared projects is undertaken by the **six regional offices** of the Ministry functioning at Shillong, Bhubaneshwar, Chandigarh, Bangalore, Lucknow and Bhopal.
- The primary objective of such a procedure is to ensure adequacy of the suggested safeguards and also to undertake mid-course corrections required, if any.

Main Participants of EIA

EIA applies to public and private sections. The **six main players** are:

1. Those who propose the project.
2. The environmental consultant who prepare EIA on behalf of project proponent.
3. Pollution Control Board (State or National).
4. Public has the right to express their opinion.
5. The Impact Assessment Agency.
6. Regional centre of the MoEFCC.

EIA notification, 2006

The objective of EIA Notification 2006 is to address the limitations in the old EIA Notification (1994).

Salient features:

- **More number of projects** brought within the purview of the environmental clearance process.
- **A revised list of projects and activities** has been redrawn that requires prior environmental clearance.

- Doing away with the categorisation of projects requiring EIA based on investment.
- Now the **size or capacity of the project** determines whether it is cleared by the central or state government.
- The major difference in the New EIA Notification 2006 from the earlier one (1994) is its **attempt to decentralise power to the State Government.**
- Earlier all the projects under schedule 1 went to the Central Government for environmental clearance.
- However, as per the new notification, significant number of projects will go to the state for clearance depending on its size/capacity/area.

- The EIA Notification, 2006, broadly divides all projects into two categories— **Category A and Category B** —based on potential impacts over an area and on human health and natural and man-made resources.
- All Category A projects (with potentially significant impacts) are required to carry out an EIA and undertake a public hearing before an EC (Environmental clearance) may be granted by the Union environment ministry.

- Category A projects include all physical infrastructure whose size and cost is greater than certain minimum levels as defined in the Schedule.
- Environmental Clearances for these projects are granted at the Central level.
- Physical infrastructure includes projects in the ports, highways, water and sanitation, urban transport, and solid waste management sectors.
- All new National Highways are classified as Category A.
- In addition, expansion of National Highways greater than 30 KM involving land acquisition and passing through more than one State are categorized as Category A.

- Category B covers projects with lesser size or capacity, and smaller impacts than Category A.
- Category B projects (with potentially less significant impacts) are evaluated and given a clearance by state level authorities, the State Environment Impact Assessment Authority (SEIAA) and State Expert Appraisal Committee (SEAC).
 - Projects under Category B1 also require an EIA and public consultation, but those falling under B2 are exempted from requirements of both EIA and public consultation.
- The new notification also talks about ‘**Scoping**’, which was completely missing earlier.

Issues pertaining to draft EIA Notification 2020

Post-Facto Approval

- The new draft allows for post-facto approval for projects. It means that the clearances for projects can be awarded even if they have started construction or have been running phase without securing environmental clearances.
- Post facto approval is the derogation of the fundamental principles of environmental jurisprudence and violation of the “**precautionary principle**,” which is a principle of environmental sustainability.

Public Consultation Process

- The draft notification provides for a reduction of the time period from 30 days to 20 days for the public to submit their responses during a public hearing for any application seeking environmental clearance.
- The danger is that if adequate time is not given for the preparation of views, comments and suggestions to those who would be affected by the project, then such public hearings would not be meaningful.
- Unless a public hearing is meaningful, the whole EIA process would lack transparency and credibility.

Bypassing EIA Process

- Through** the draft notification, the central government gets the power to categorise projects as “strategic.”
- Once a project is considered as strategic, the draft notification states that no information related to such projects shall be placed in the public domain.

- Further, the draft notification states that the new construction projects up to 1,50,000 square metres (instead of the existing 20,000 square metres) do not need “detailed scrutiny” by the Expert Committee, nor do they need EIA studies and public consultation.

Compliance Report Issue

- The 2006 notification required that the project proponent submit a report every six months, showing that they are carrying out their activities as per the terms on which permission has been given.
- However, the new draft requires the promoter to submit a report only once every year.

New Categorisation Of Industries, 2016

- **Based on their pollution load.**
- MoEFCC has developed the criteria of categorization of industrial sectors based on the **Pollution Index** which is a function of the emissions (air pollutants), effluents (water pollutants), hazardous wastes generated and consumption of resources.
- The new category of **White industries** which is practically non-polluting will not require Environmental Clearance (EC) and Consent and will help in getting finance from lending institutions.

- The Pollution Index PI of any industrial sector is a number from 0 to 100 and the increasing value of PI denotes the increasing degree of pollution load from the industrial sector.

1. Industrial Sectors having Pollution Index score of 60 and above- **Red category**
2. Industrial Sectors having Pollution Index score of 41 to 59- **Orange category**
3. Industrial Sectors having Pollution Index score of 21 to 40- **Green category**
4. Industrial Sectors having Pollution Index score incl. & upto 20- **White category**

Issues With EIA

- **Screening:** In the EIA notification released by the govt. in 2006, there is a lack of clarity in overall conductance of the Screening process.
- Sometimes the EIA reports are too technical and often prepared lifting content and data from other sources, thus presenting contradictory, inconsistent and outdated information.
- Moreover, there is no process for punishing the agencies involved in plagiarism and preparing such dishonest EIA reports.

- Sometimes the agencies or project proponents include incomplete surveys, improperly demarcate EIA study area and publish unsubstantiated statements.
- Many agencies hire local and incompetent professionals at a cheaper cost which results into poor quality of EIA reports.
- Generally the local people are unaware of the process of EIA, its significance for them, role of various players and their own rights and responsibilities.
- They are also unable to comprehend the reports as the reports are seldom published in local languages. The technical language of the reports further makes understanding them difficult.
- Corruption and negligence of officials involved in public hearing committees.

- **Global Alliance for Climate-Smart Agriculture (GACSA)**

- GACSA is promoted by **FAO** along with various governments.
- Its vision is to improve food security, nutrition and resilience in the face of climate change.
- GACSA works towards three aspirational outcomes to:
 - 1. Improve farmers' agricultural productivity and incomes in a sustainable way;**
 - 2. Build farmers' resilience to extreme weather and changing climate;**
 - 3. Reduce greenhouse gas emissions associated with agriculture, when possible.**

- **Bio-Fertilizers and Their Use In Agriculture**

- For a sustainable agriculture system, it is essential to use renewable inputs (fertilizer, pesticides, water etc.) which can benefit the plant and cause no or minimal damage to the environment.
- One of the energy efficient and pollution free method is to exploit the ability of certain microorganisms like **bacteria, algae and fungi** to **fix atmospheric nitrogen, solubilize phosphorus, decompose organic material or oxidize sulphur** in the soil.

When they are applied in the soil, they enhance growth and yield of crops, improve soil fertility and reduce pollution. They are known as "**bio fertilizers**"

- **Rhizobium biofertilizer**

- Rhizobium is a **symbiotic bacterium forming root nodules in legume plants.**
- These nodules act as miniature nitrogen production factories in the fields.
- The nodule bacteria **fix more nitrogen (N₂)** than needed by legume plant and the bacteria.
- The surplus fixed nitrogen is then secreted and fertilizes the soil.

Rhizobium is **more efficient** than-free living nitrogen-fixing bacteria



- Azotobacter biofertilizer

- Azotobacter are aerobic free living nitrogen fixers.
- They grow in the rhizosphere (around the roots) and fix atmospheric nitrogen non-symbiotically and make it available to the particular cereals.

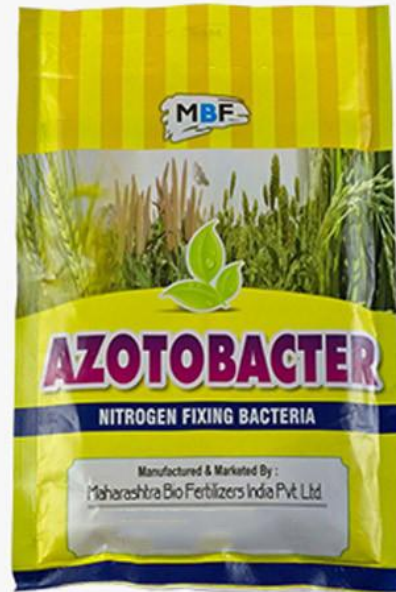
These bacteria produce growth promoting hormones which helps in enhancing growth and yield of the plant



- **Azospirillum biofertilizer**

- These are **aerobic free living nitrogen fixers** which live in associative symbiosis.
- In this type of association bacteria live on the root surface of the host plant and **do not form any nodule** with roots of grasses.
- It increases crop yield and its inoculation benefits crop.
- They also benefit the host plants by supplying growth hormones and vitamins.
- These bacteria are commonly used for the preparation of commercial inoculants (vaccines, culture medium).





- **Blue green algae**

- Blue green algae (BGA or cyanobacteria) like **Nostoc** and **Anabaena** are free living photosynthetic organisms also **capable of fixing atmospheric nitrogen**.

In the flooded rice fields blue green algae serves as a nitrogen biofertilizer



- **Azolla biofertilizers**

- Azolla is a water **fern** inside which grows the nitrogen fixing blue green algae **Anabaena**.
- It contains 2-3% nitrogen when wet and also produces organic matter in the soil.
- The Azolla-Anabaena combination type biofertilizer is used all over the world.
- The only constraint in Azolla is that it is an aquatic plant and **water becomes limiting factor** in growing it particularly in summer.

A fern is a member of a group plants that reproduce via spores and have neither seeds nor flowers.



- **Phosphorus solubilizing biofertilizer**

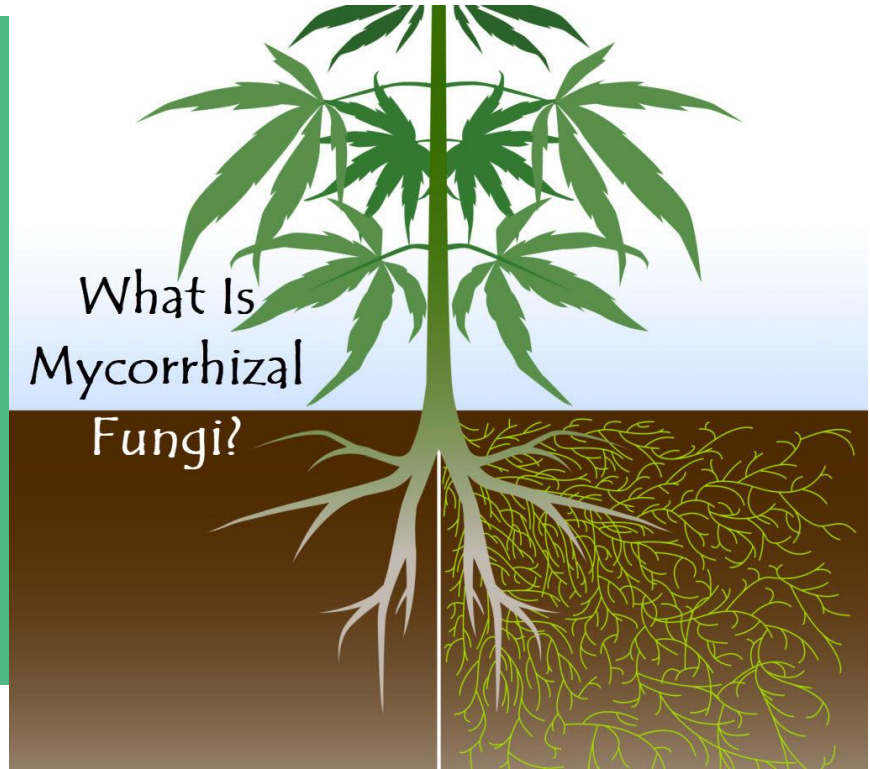
- Phosphorus is an important element required for plant growth.
- This element is also **needed for nodulation by rhizobium**.
- Some microorganisms are capable of solubilizing immobilized phosphorus making it available to plants for absorption.



- **Mycorrhizal fungi biofertilizer**

- **Mycorrhizal fungi** acts as biofertilizer and are known to occur naturally on roots of forest trees and crop plants.
- Mycorrhizal fungi **resist disease** in plants. The plants also show **drought and salinity resistance**. Plants can **tolerate** adverse soil, pH, high temperature and heavy metal toxicity.
- In soils low in available nutrients there is an increased absorption of nutrients by plants infected with Mycorrhiza.

The fungus has the ability to **dissolve and absorb phosphorus** that plant roots cannot readily absorb





- **Compost Tea**

- Compost Tea is a liquid fertilizer for flowers, vegetables and houseplants.
- Compost tea is an **aerobic** (in the presence of oxygen) water solution that has extracted the microbe population from compost (dead and decaying matter) along with the nutrients.
- In simple terms, it is a concentrated liquid created by a process to increase the numbers of beneficial organisms as an organic approach to plant/soil care.

- can be **sprayed directly** onto the leaf surface.



- **Bio char**

- Bio char is charcoal that is used as soil amendment (minor improvement).
 - It is created using a pyrolysis process (decomposition brought about by high temperatures), **heating biomass in a low oxygen environment.**
 - Once the pyrolysis reaction has begun, it is self-sustaining, requiring no outside energy input.
 - By-products of the process include **syngas ($H_2 + CO$)**, minor quantities of methane (CH_4), organic acids and excess heat.
 - Once it is produced, bio char is spread on agricultural fields and incorporated into the top layer of soil.
 - The syngas and excess heat can be used directly or employed to produce a variety of biofuels.
- It increases crop yields, sometimes substantially if the soil is in poor condition.
 - It helps to prevent fertilizer runoff and leeching, allowing the use of less fertilizers.
 - It retains moisture, helping plants through periods of drought more easily.
 - Most importantly, it replenishes exhausted or marginal soils with organic **carbon**
 - it promotes the growth of nitrogen-fixing microorganisms.
 - to retain water for a longer time.

Fertigation is the injection of fertilizers, used for soil amendments, water amendments and other water-soluble products into an irrigation system.

Fertigation is related to chemigation, the injection of chemicals into an irrigation system.

- Increased nutrient absorption by plants.
- Accurate placement of nutrient, where the water goes the nutrient goes as well.
- Ability to "micro dose", feeding the plants just enough so nutrients can be absorbed and are not left to be washed down to storm water next time it rains.
- Reduction of fertilizer, chemicals, and water needed.
- Reduced leaching of chemicals into the water supply.
- Reduced water consumption due to the plant's increased root mass's ability to trap and hold water.
- Application of nutrients can be controlled at the precise time and rate necessary.
- Minimized risk of the roots contracting soil borne diseases through the contaminated soil.
- Reduction of soil erosion issues as the nutrients are pumped through the water drip system. Leaching is decreased often through methods used to employ fertigation.



• **National Programme for Organic Production (NPOP)**

- **Ministry of Industries and Commerce** has implemented the NPOP since 2001.

- **What it does?**

- Certification programme for organic agriculture and products as per the approved criteria.
- Accredited certification programmes of Certification Bodies seeking accreditation.
- Facilitate certification of organic products in conformity with the prescribed standards.
- Facilitate certification of organic products in conformity with the importing countries organic standards.
- Encourage the development of organic farming and organic processing.

APEDA

- The Agricultural and Processed Food Products Export Development Authority (APEDA) was established by APEDA Act in 1985. It came into effect in 1986.
- APEDA functions under **Ministry of Industries and Commerce**.