

Why do Environment Problems Occur?

- Market Failure
- Market – An Exchange institution that can organise economic activity
- Prices as a means of Communication
- Perfectly functioning markets bring co-ordinated economic decisions in the most efficient manner
- Optimal private decisions will lead to optimal social outcomes.

Market Failure

| Market Success (violations lead to Market failures) | Avoiding Market failure |
|---|--|
| <ul style="list-style-type: none">• Complete set of markets with well-defined property rights exist so that assets can be freely traded | <ul style="list-style-type: none">• Complete markets –• Enough markets exist to cover every possible transaction |
| <ul style="list-style-type: none">• Consumers and producers behave competitively by maximizing benefits and minimizing costs | Traders can costlessly create a well-defined property rights system |
| <ul style="list-style-type: none">• Market Prices are known to all consumers and firms | Well-assigned property rights <ul style="list-style-type: none">- Comprehensively assigned (either privately or collectively owned and all entitlements enforced effectively)- Exclusive (benefits accrue to the owner)- Transferable- Secure |
| <ul style="list-style-type: none">• Transaction costs are zero i.e. charging prices does not consume resources | |

Environment being a Public good

- Pure public good (consumption is non-rival and non-excludable)
- Non- Exclusion
- Non-rival goods (marginal social cost of supply to an additional individual is zero, Markets fail because firms cannot profit, the incentive to free-ride, prisoner's dilemma)
- Rival Goods (overexploitation, Tragedy of Commons e.g. fishing grounds)

Prisoner's dilemma (Individual rationality diverges from group rationality)

- Two suspects, who are guilty of a specific crime are taken into custody and placed in different cells).
- However, there is no adequate evidence to convict them at a trial.
- The district attorney points out to each prisoner that each has two alternatives:
- to confess to the crime the police are sure they have done, or not to confess.
- If they both do not confess – they will get minor punishment;
- if they both confess they will be prosecuted but will be given less than severe sentence
- but if one confesses and the other does not, then the confessor will receive lenient treatment for turning state's evidence whereas the latter will get severe punishment



Prisoner's dilemma (example)

| | | |
|---------------|---------|---------------|
| | B | |
| | Confess | Don't confess |
| Confess | (8, 8) | (1, 10) |
| A | (10, 1) | (1, 1) |
| Don't Confess | | |

Both players would be better off if none confesses
However, confessing comes out as dominant strategy and they end up spending more time in Prison

Other reasons why Markets Fail

- Non-Convexities
- Asymmetric Information
- Moral Hazard (Incentive Problem)
- Adverse Selection) (cannot identify the type or character)
- Externalities

WHY THESE SIDE EFFECTS?

- Interdependence in production or consumption.
- The utility of individual i depends not only on his consumption but also on the consumption of another individual:
- $U_i = U_i(X_i, X_j)$ & $P_i = P_i(X_i, X_j)$
- NOTE
- These damages are unintentional *per se*, as they are typically challenging to avoid.
- This interdependence must also be a non-market dependence to qualify as an externality.

EXAMPLES

- 1) Congestion caused by a vehicle on other drivers - - unintentional and difficult to avoid.
- 2) Air Pollution caused by power plants - unintentional and difficult to avoid
- 3) If many people are in queue to buy water or medicine,
→ this may lead to ↑ in price.
Can this be Called as EXTERNALITY? – No

Why Because it is perpetuated through market mechanisms. Hence not an external effect.

WHEN EXTERNALITY ARISES?

Two Types of COSTS:

- 1) Private Costs
- 2) Social Costs

Ex. - w.r.t. Vehicular Air pollution in Delhi/Chennai

Private Costs - Cost of Owning a vehicle, Fuel (petrol/diesel/LPG), maintenance cost etc.

Social Costs - Effect of pollutant on other people, my vehicle causing congestion for others + Private costs.

When SOCIAL COSTS > Private Costs

⇒ Negative Externality

OTHER EXAMPLES OF EXTERNALITY?

Examples of Negative Externality

- Pollution of Ganges or Yamuna by upstream activities
- Transboundary Pollution
- Soil Erosion caused by excessive and type of agriculture
- Floods caused by Deforestation
- Garbage (NIMBY)
- Use of pesticides in agriculture – affecting downstream water bodies

POSITIVE EXTERNALITY

Positive Externalities:

When Social Benefit > Private Benefit

Examples of Positive Externality

- 1) R&D by a firm for Cancer / COVID vaccine]
- 2) New filters for cars to reduce emissions
- 3) Forestation in hilly regions affecting water supply in the plains.

TYPES OF EXTERNALITY

Two Types:

- 1) Positive and Negative
- 2) Depletable and Non-depletable
 - Manure from a cow is depletable.
 - Because if one person takes it, the other cannot.
 - Vehicular air pollution or Odour from Solid waste are non-depletable