INTRODUCTION

Public goods

Public goods

- It is not the ownership of the supplying organization that makes a public good public
- Public good is a commodity that is:

NON-RIVAL IN CONSUMPTION

and

NON-EXCLUDABLE

- **NON-RIVAL** means that when one household partakes of the commodity's benefits, it does not diminish the benefits received by all other consumers of the commodity
- In more technical terms, once a public good is provided, the marginal cost of another person's consuming it is zero
- In contrast, consumption of a private good is rival

Public goods

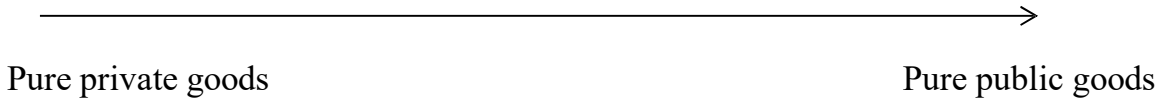
- **NON-EXCLUDABLE** means that once the good or service are made available to one person, *others cannot be excluded* from making use of the same good or service

- The consumption of a good is non-excludable when it is either very expensive or impossible to prevent anyone from consuming the good even when he/she refuses to pay for it

- A public good is a good that, if made available to one person, automatically becomes available to others

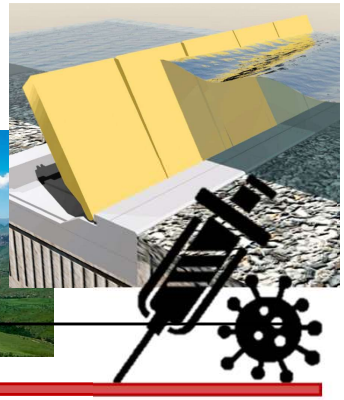
Public goods

- Private goods are rival in consumption and excludable (at zero costs)
- Public goods and private goods are two polar cases

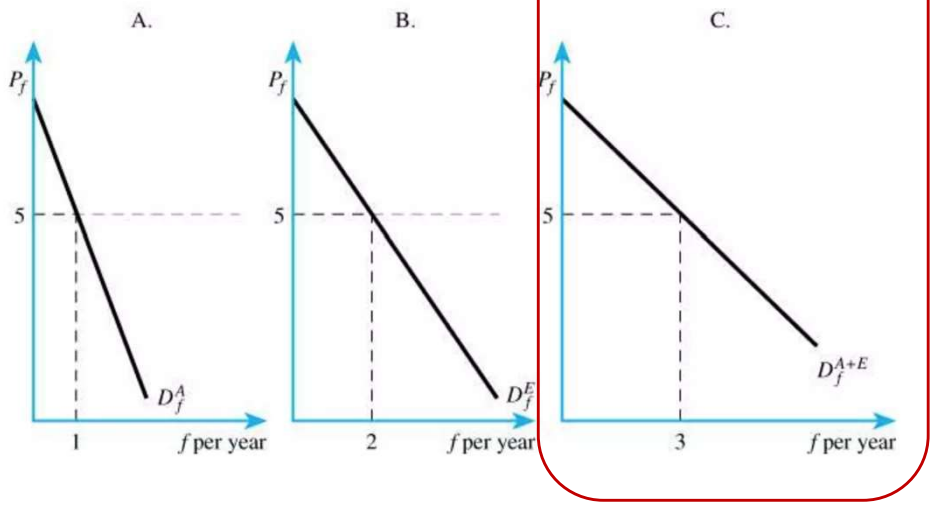


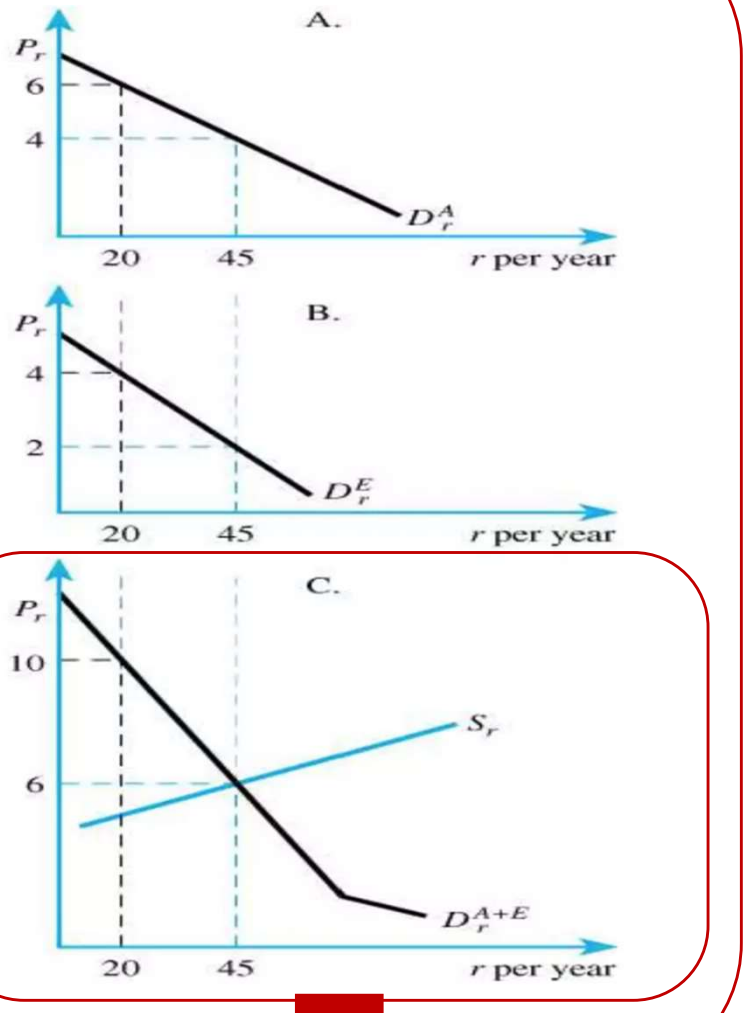
- In many cases, it is useful to think of 'publicness' as a matter of degree
- A pure public good satisfies the definition exactly
- Consumption of an impure public good is to some extent rival
- Impure public good – a commodity that is somewhat non-rival in consumption

Public goods

	Excludable	Non-Excludable
Rival	 PRIVATE GOODS  	  COMMON RESOURCES 
Non-Rival	  CLUB GOODS    	   PUBLIC GOODS   Ministero della Difesa  

Private Goods vs Public goods

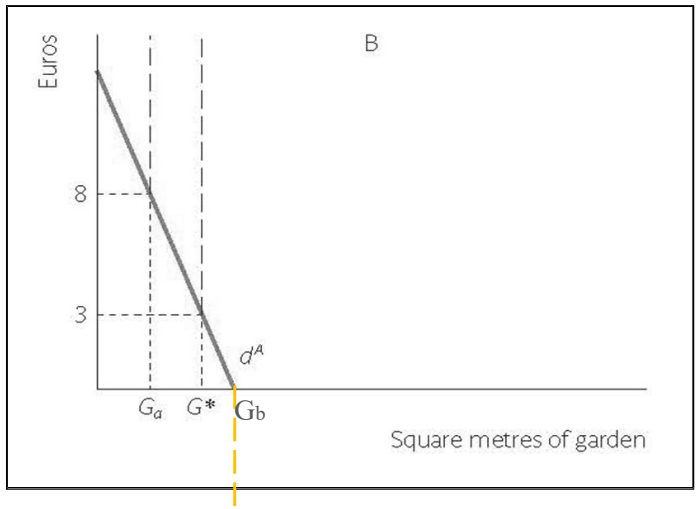


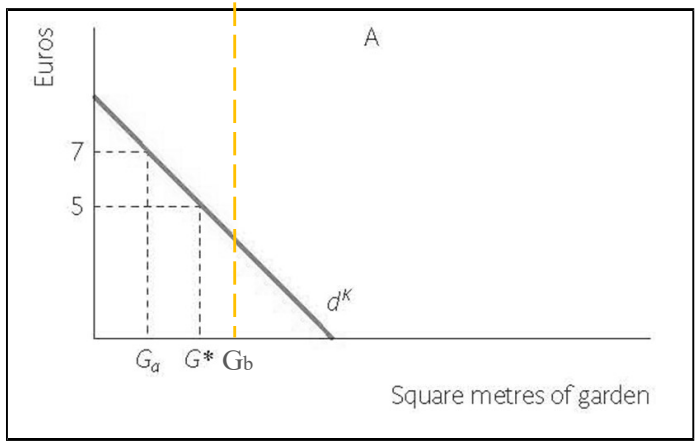


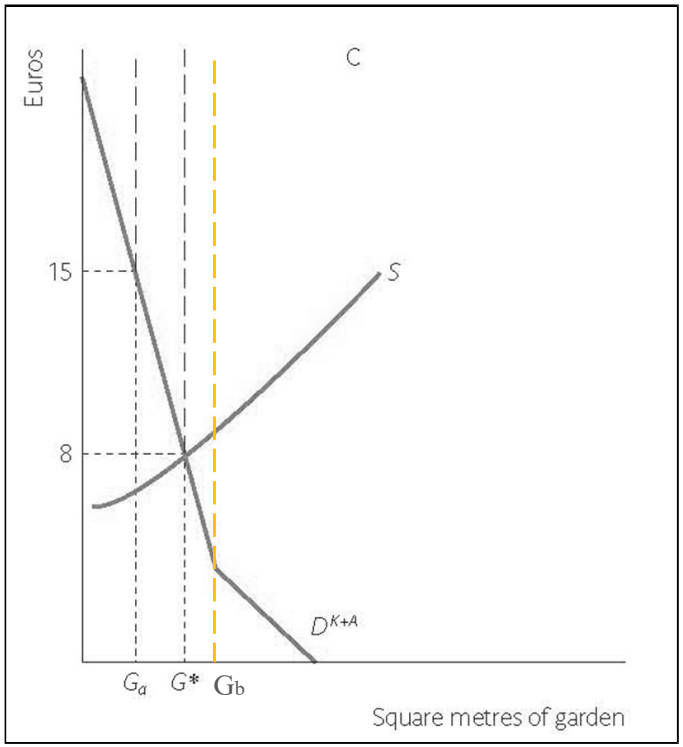
Efficient provision of public goods

- It is important to note that even though **everyone can consume the same quantity of a public good**, there is no requirement that this consumption be valued equally by all
- For a private good everyone will consume the same amount but the marginal valuation on the last item consumed may be different for different individuals (at the margin)
- The efficient production level is found at the point where group willingness to pay for an additional unit just equals the marginal cost of producing a unit

Efficient provision of public goods







Group willingness to pay for a public good is found by vertical summation of demand curves. At the efficient level of the public good, *G**, the sum of the marginal rates of substitution (MRS) equals the marginal rate of transformation (MRT).

Public goods

In the presence of public goods, a "**MARKET FAILURE**" (typically) occurs:

1. The market fails when for some reason it proves incapable of autonomously arriving at **(PARETO) EFFICIENT ALLOCATIONS** of resources

2. Failures must be traced back to the existence of **EXTERNALITIES**

Efficient provision of public goods

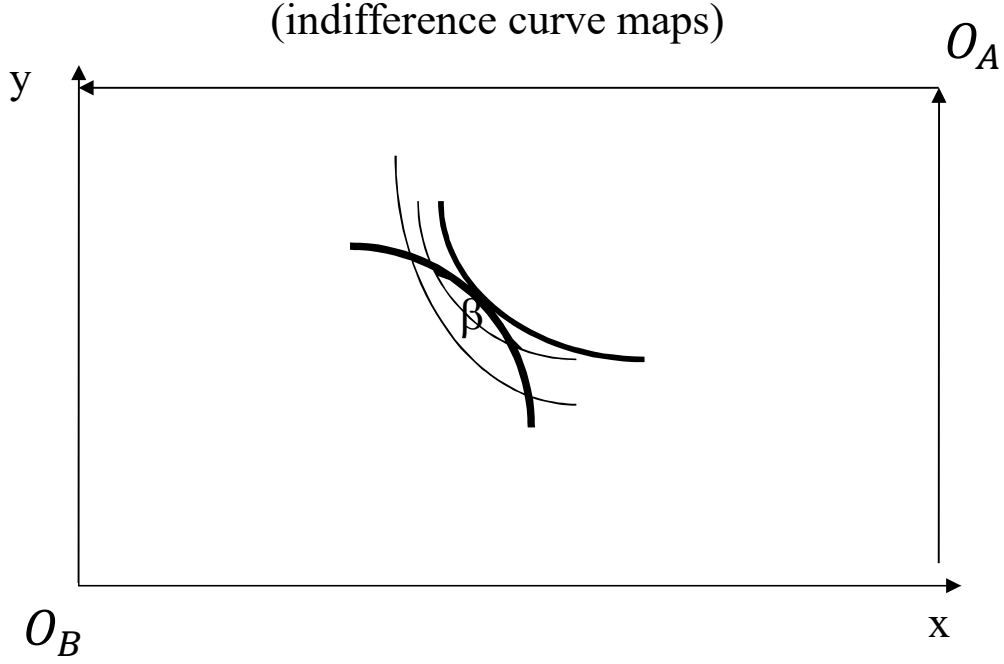
The key question now: is whether the **Pareto-efficient production** of a public good will be met by private markets?

- If individual's demand curve were known, there would be no problem in determining efficient allocation (i.e. optimal provision) in the first place
- If a public good is excludable to some extent, private provision is likely to lead efficiency problems
- When the good is non-excludable, things become even more problematical
- Note that when a private good is exchanged in a competitive market, an individual has no incentive to lie about how much he or she values it
- In the case of non-excludable public good, people may have incentives to hide their true preferences

Pareto-Efficiency allocation of Public goods

- Pareto improvement- a reallocation of resources that makes at least one person better off without making anyone else worse off
- **Pareto efficient allocations :** allocations of commodities and inputs such that the only way to make one individual better off is to make another worse off
- When economists use the word efficient, they generally have Pareto efficiency in mind
- Clearly, a Pareto efficient allocation must be consumption efficient (on the contract curve) and production efficient (on the production possibilities curve)

To obtain the solution to the consumption-efficiency problem, we can construct the Edgeworth box (indifference curve maps)



β is (Pareto) consumption efficient
In β indifference curves by A and B are tangent

Our goal is to find condition for Pareto efficient allocations of commodities and inputs

Pareto-Efficiency allocation of Public goods

- In real world situations, it is **not likely** that consequently to a reallocation of resources at least one individual is better off, and no one is worse off
- Therefore, the Pareto-efficiency criterion can be relaxed into the ***Kaldor-Hicks criterion***
- The Kaldor-Hicks '**compensation principle**' established the idea of hypothetical compensation as a practical rule for deciding on policies and projects in these real-life contexts
- It relies on the concept of a potential Pareto improvement
- All that is required is that gainers can compensate losers to achieve a 'potential' Pareto improvement, though the compensation have not actually to be carried out

Pareto-Efficiency allocation of Public goods

- Although a competitive market will provide private goods efficiency, will the same be true for public goods?
- People may have incentives to hide their true preference for public goods
- If Mark can get Tom to pay for the public good, he can use his income for other purposes and still enjoy the public good.

This incentive to let others pay for the public goods while still enjoying the benefits is known as the ***"free rider problem"***

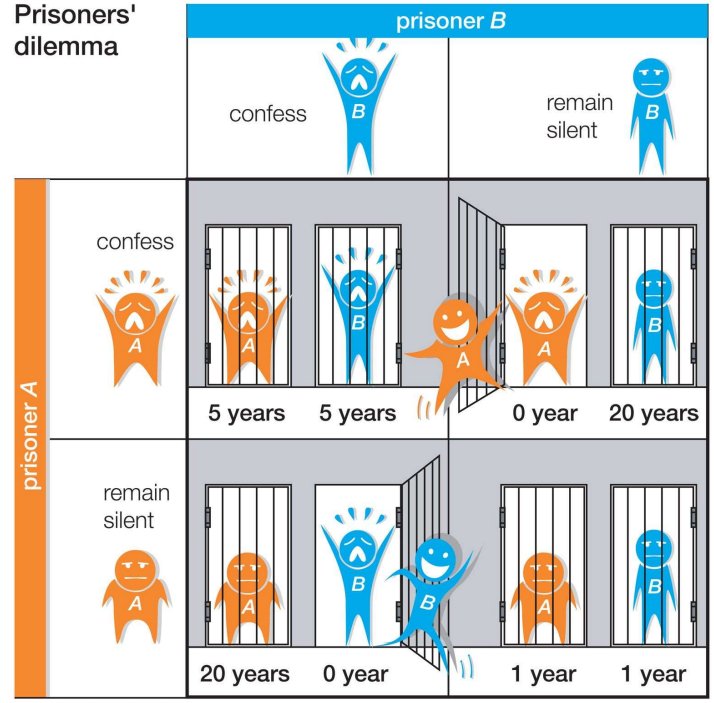
Pareto efficiency

- Each individual is willing to achieve his/her optimal consumption level regardless or not they contributed to the good.

- The free-riding issue is one of the key factors in the under-production of public goods (or services).

- The provision of public goods is an important problem in economics and the social sciences. It is often claimed that this problem has the structure of the well-known **PRISONER'S DILEMMA** so that rational and self-interested individuals would not be able to provide any public good by spontaneous cooperation.

- If all can have it without contributing to its cost, nobody will contribute and the good will not be produced. This is the public goods dilemma, a form of market failure that requires taxation to overcome it. Its solution lies outside the economic calculus; it belongs to politics.



Prisoner's Dilemma

- A dominant strategy - a strategy that works at least as well off as any other one, no matter what any other player does

- A dominant strategy equilibrium is 'an outcome in a game in which each player follows dominant strategy'

- The prisoners' dilemma is a situation in which each player has a dominant strategy, but playing these strategies leads to an outcome in which both players are worse off than if they collectively chose alternative strategies

Prisoner's Dilemma

A prisoner's dilemma for water purification plant

- Two players : A, B
- Possible actions: "Pay", "Do not pay"
- ***Pay-offs:***
- Initial Utility level = 0 €
- Cost of remediation = -150€
- After remediation Utility = +100 €
- If paid jointly =€150/2 =€75

The dominant strategy for both players is to free ride ("*to not pay*")

		B	
		Not pay	Pay
A	**Not Pay**	**(0, 0)**	**(100,-50)**
	Pay	**(-50,100)**	**(25,25)**

Utility Levels

Public goods, Environmental goods

- **ENVIRONMENTAL GOODS** are public goods (non-rival and non-excludable)
- Environmental goods have no market. They do not have a price but still have a value, i.e. total economic value
- **Total economic value (TEV)** provides an all-encompassing measure of the economic value of any environmental asset

Public goods

- **The TOTAL ECONOMIC VALUE (TEV) is** the net sum of all relevant **WTPs** and **WTAs** for a project outcome or policy change define the total economic cost of any change in well-being due to a project or policy
- TEV can be characterized differently according to the type of economic value arising
- It is usual to divide TEV into **use** and **non-use values:**

USE VALUES

  - **Use values** relate to actual use of the good in question (e.g. a visit to a national park), planned use (e.g. a visit planned in the future) or possible use
  - **Actual and planned uses** are fairly obvious concepts, but possible use could also be important since people may be willing to pay to maintain a goods in existence in order to preserve the option of using it in the future
  - **<u>Option value thus becomes a form of use values</u>**

Public goods

NON- USE VALUES

- **Non-use value** refers to the willingness to pay to maintain some good in existence even if though there is no actual, planned or possible use

- The types of non-use values could be various, but a convenient classification is in terms of:

  - ✓ ***Existence value:*** refers to the WTP to keep a good in existence in a context where the individual expressing the value has no actual or planned use for his/herself or for anyone else

  - ✓ ***Altruistic value:*** might arise when the individual is concerned that the good in question should be available to others in the current generation

  - ✓ ***Bequest value:*** similar to AV, but the concern is that the next and future generations should have the option to make use of the good

Public goods

Why Study Public Goods in Vulnerability and Risk Management?

- Public goods to mitigate risk
- Efficient Allocation of Resources
- Long-Term Planning

Case Study Example: *Flood Defenses in Coastal Cities*.
Consider a coastal city at risk of flooding due to rising sea levels and storm surges. The construction of a sea wall to protect the city is a public good. Once built, it provides protection to all residents, businesses, and infrastructure in the area. However, individual citizens may not have the incentive to pay for the sea wall, because they know they will benefit from it whether they contribute or not (the free-rider problem). Without government intervention, the sea wall may not be built, leaving the city vulerabe to flood risk.

REFERENCES

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- Katz M.L. , Rosen H.S., Bollino C.A. (2007) “Microeconomia”, McGraw Hill, Milano.