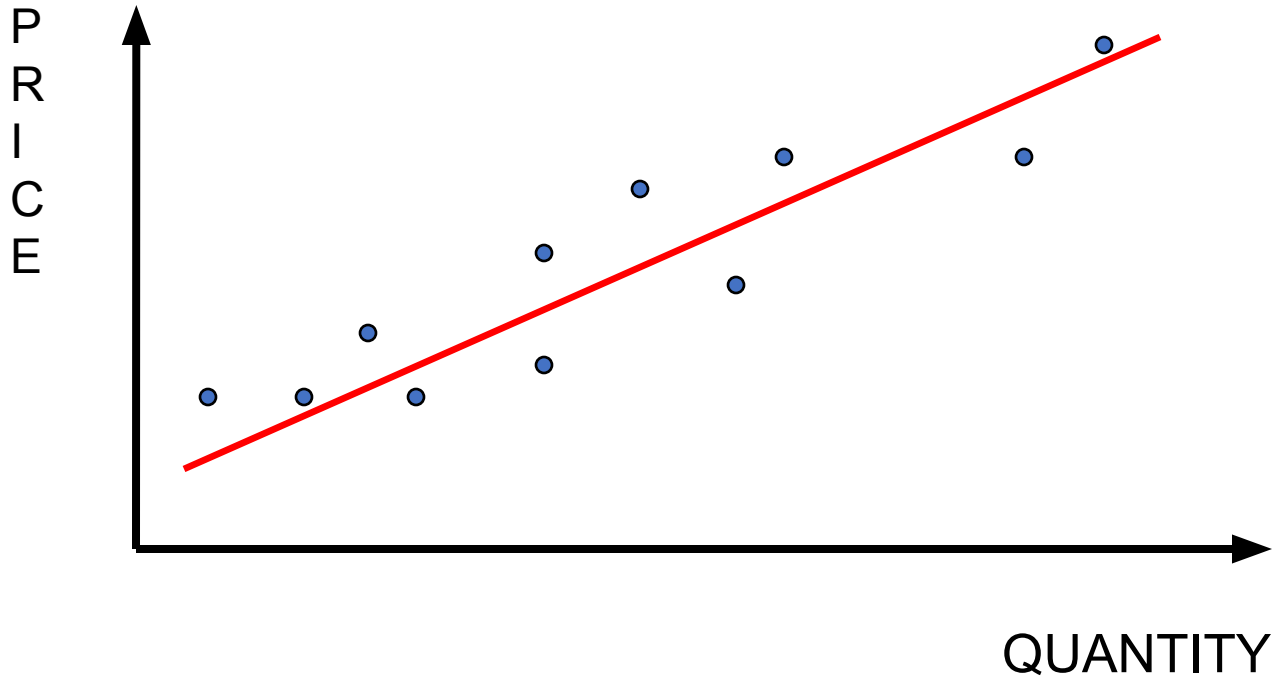
Part 2
Empirical Challenges to Measuring Value

The Supply Curve Slopes Up

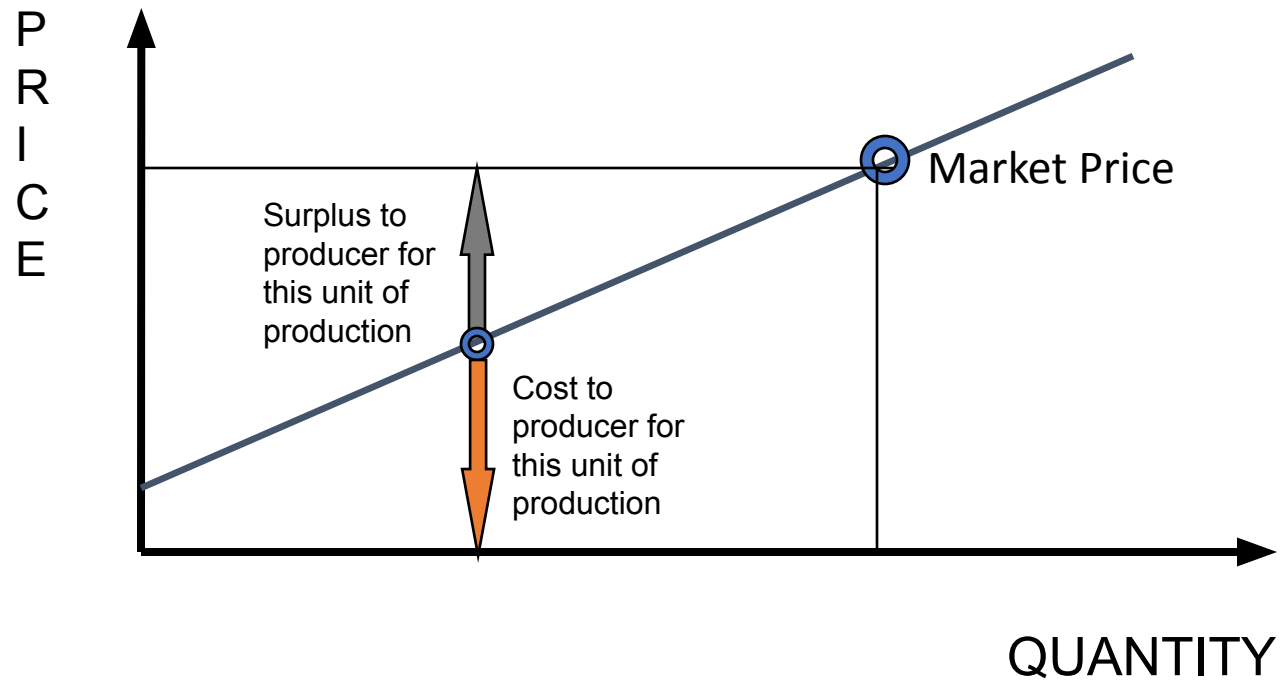
Start with some data from oyster growers:



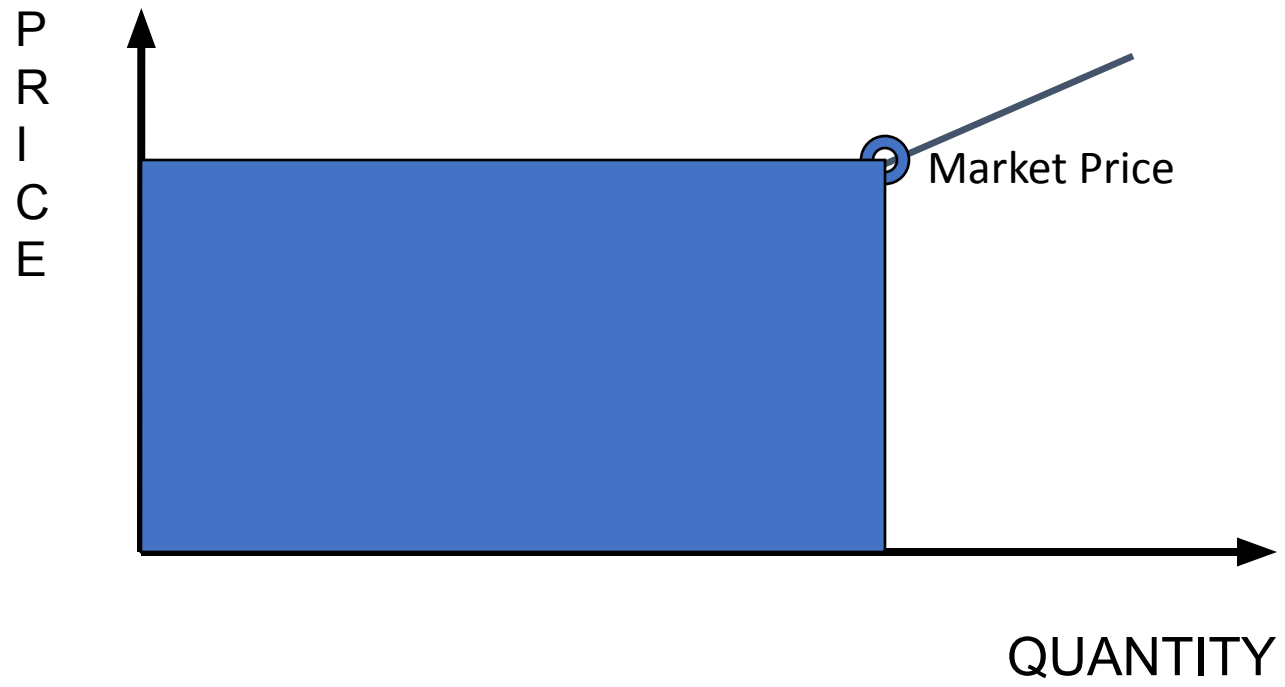
Why Is The Supply Curve Upward Sloping?

- On the margin (the next additional unit), it's more expensive to produce more
  - Everyone's already producing at their lowest cost (economies of scale have already been attained)
  - To produce more, need to bring more costly inputs into production (e.g., less productive growing areas)
  - This is true at the individual farm level as well as the industry as a whole

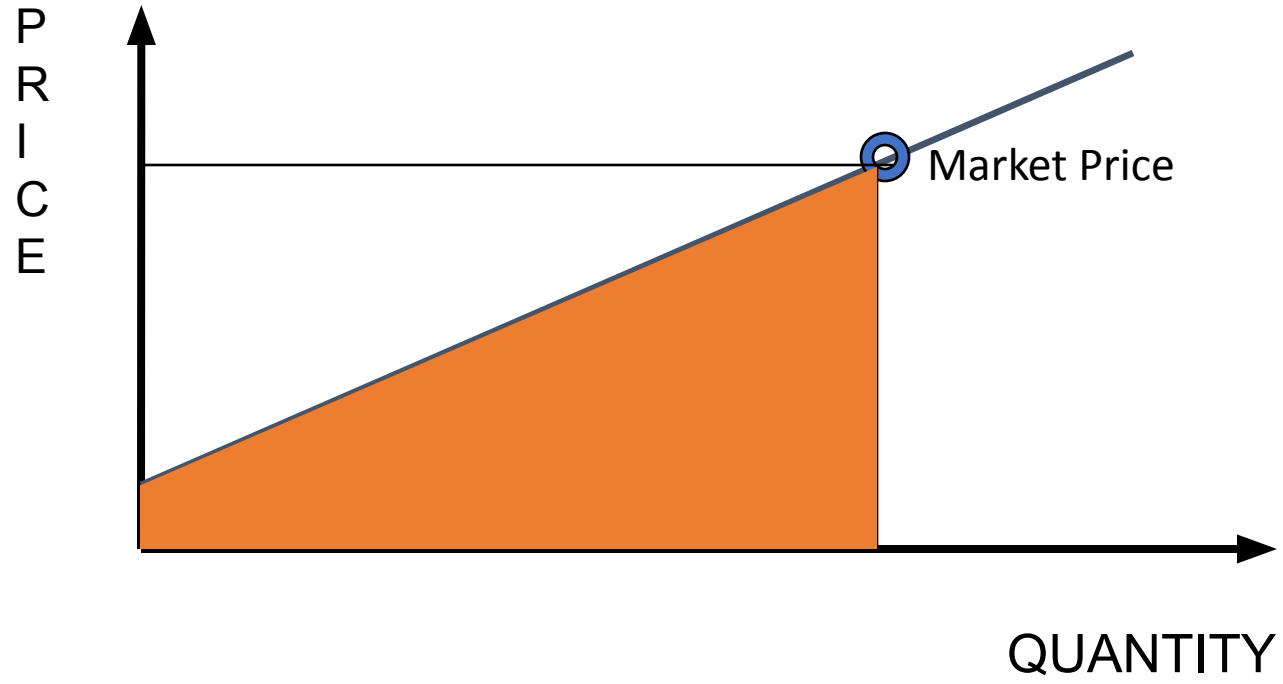
Under Competitive Market Conditions, The Producer Gets One Price For All Units of Production



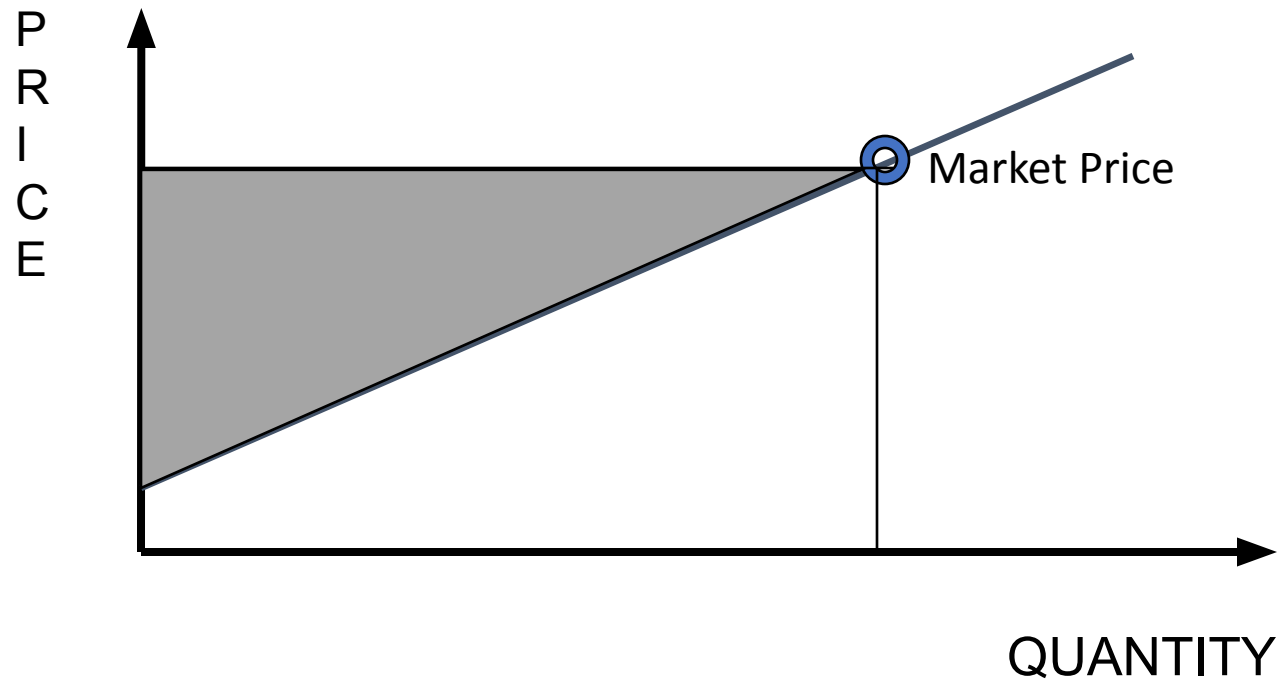
Add Up The Marginal Revenues:
TOTAL REVENUE = PRICE * QUANTITY



Add Up Marginal Costs:
The Total Cost of Production



What's Left?
The Producer Surplus

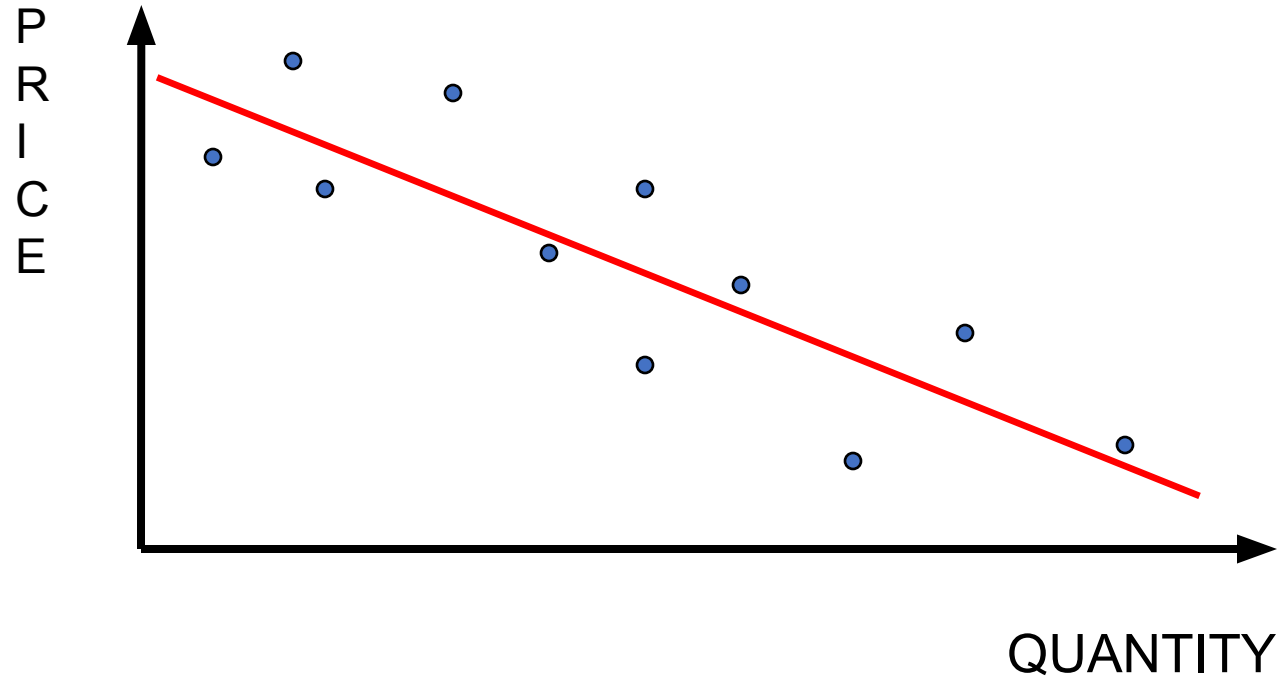


Producer Surplus

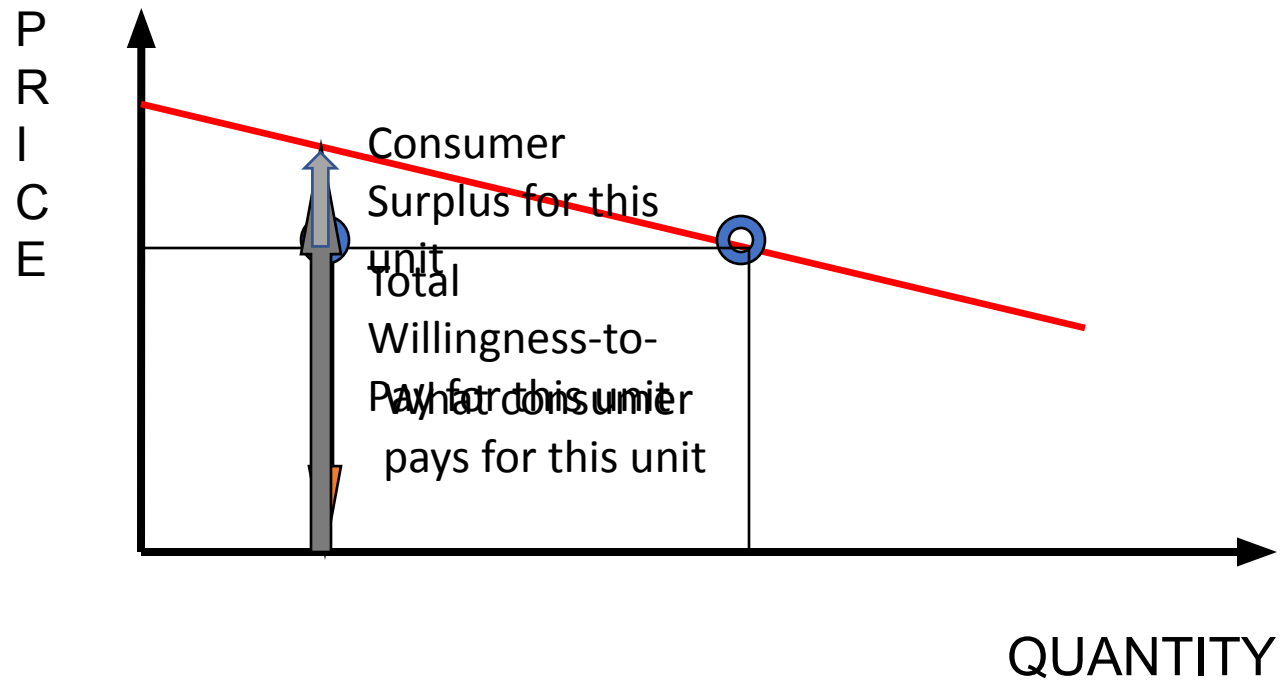
- Money Measure of the Net Economic Benefit to Producers From a Given Level of Production Taking All Costs Into Account
  - Private Costs (Does Not Include Externalities
  - Social Costs (Accounts for Externalities)

What About the Consumers?

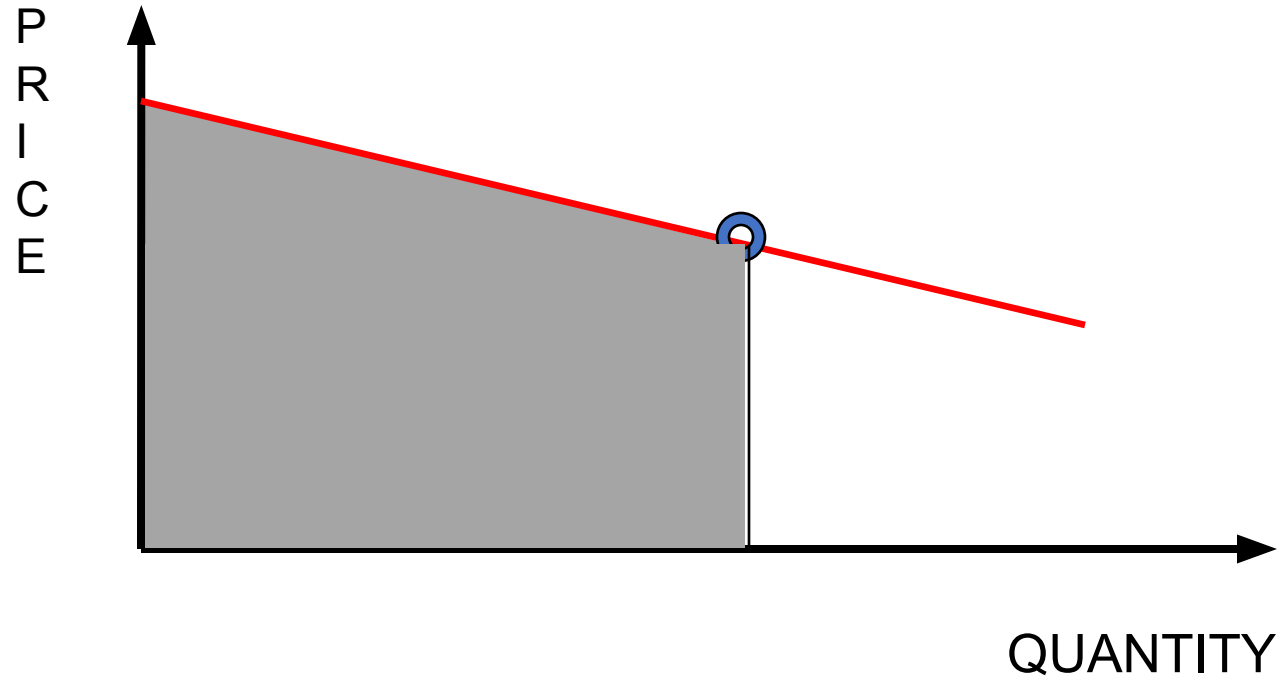
Demand Curve:



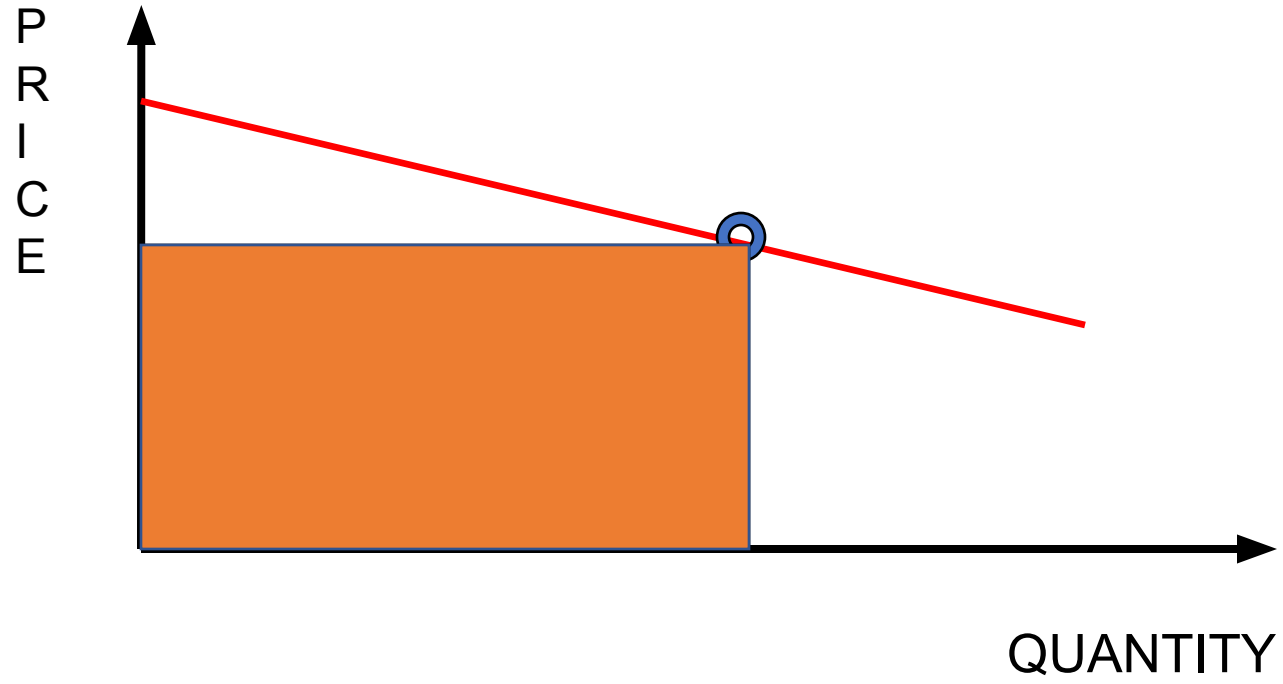
Consumer Surplus = Total WTP-Cost



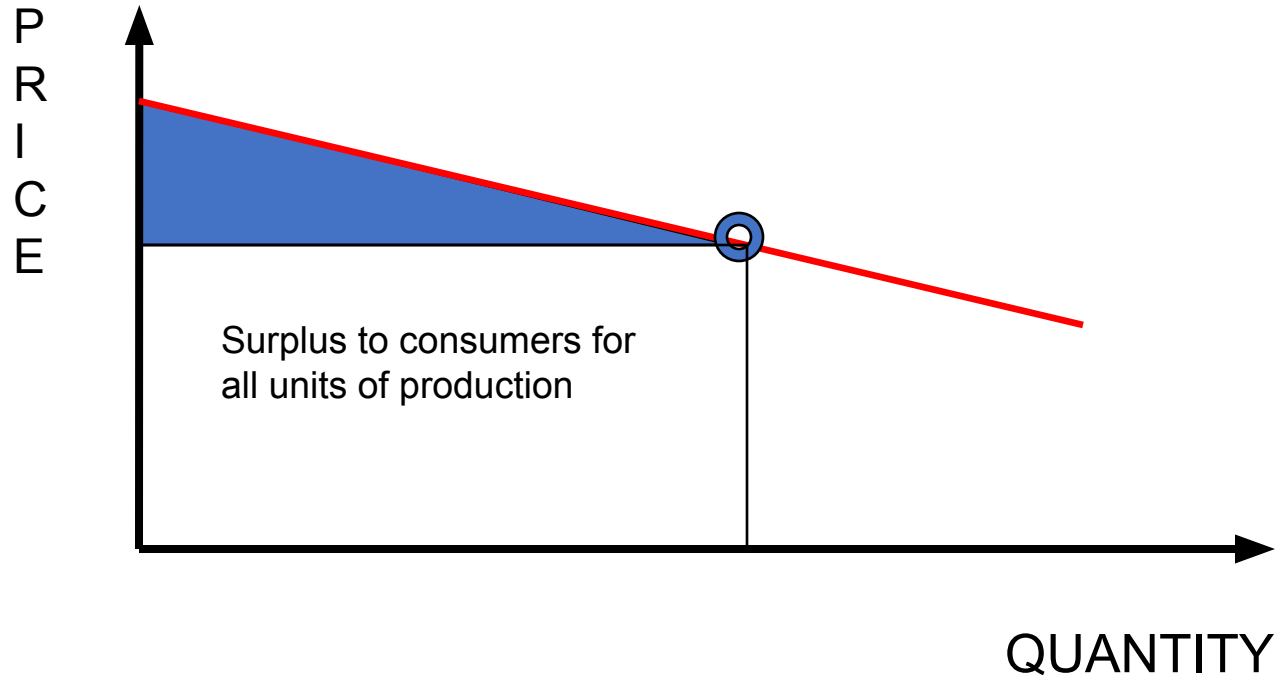
Add Up the Marginal Willingness-To-Pay = Total WTP



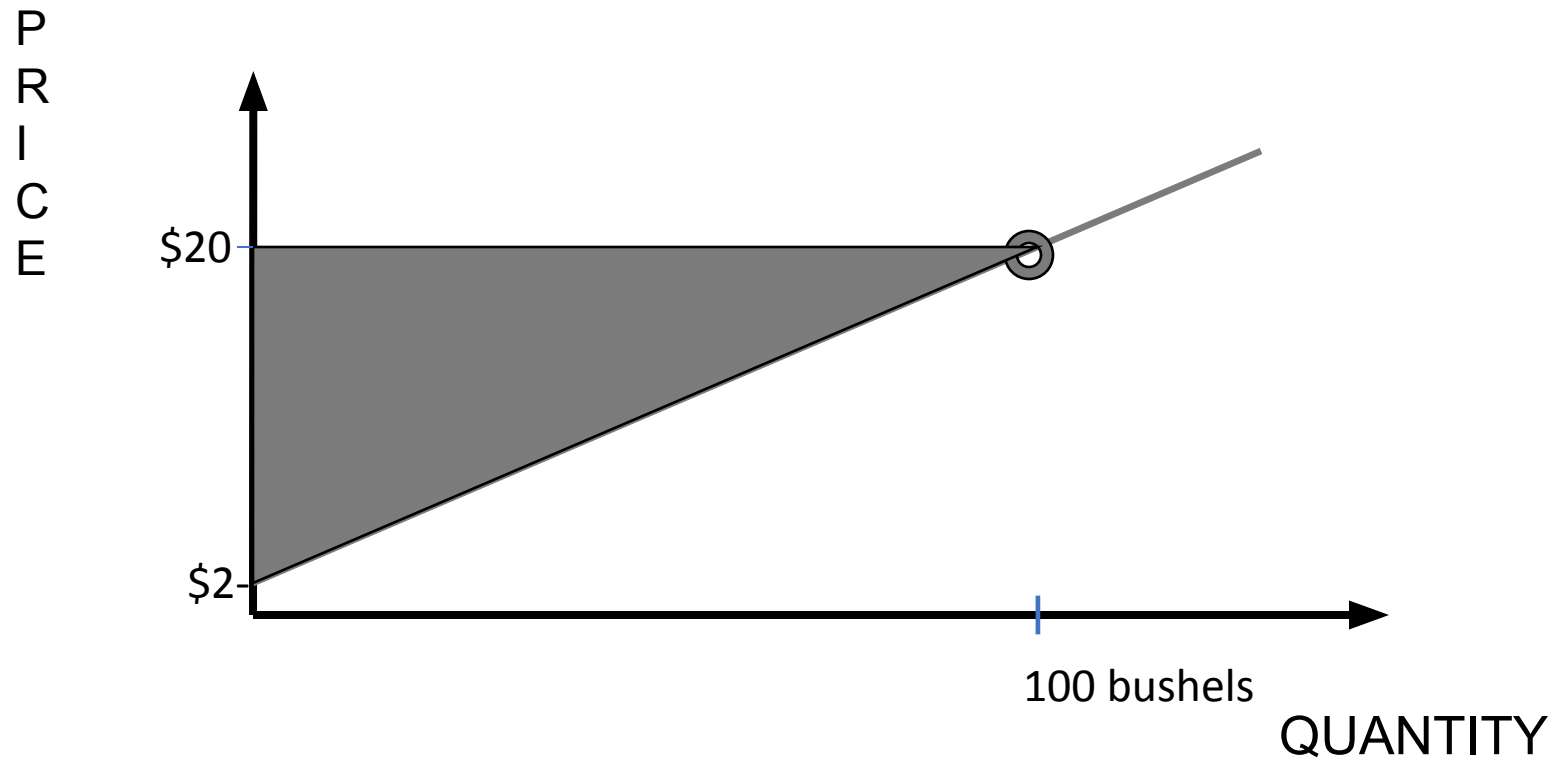
Add up the Marginal Costs to Consumers = Total Cost



Consumer Surplus



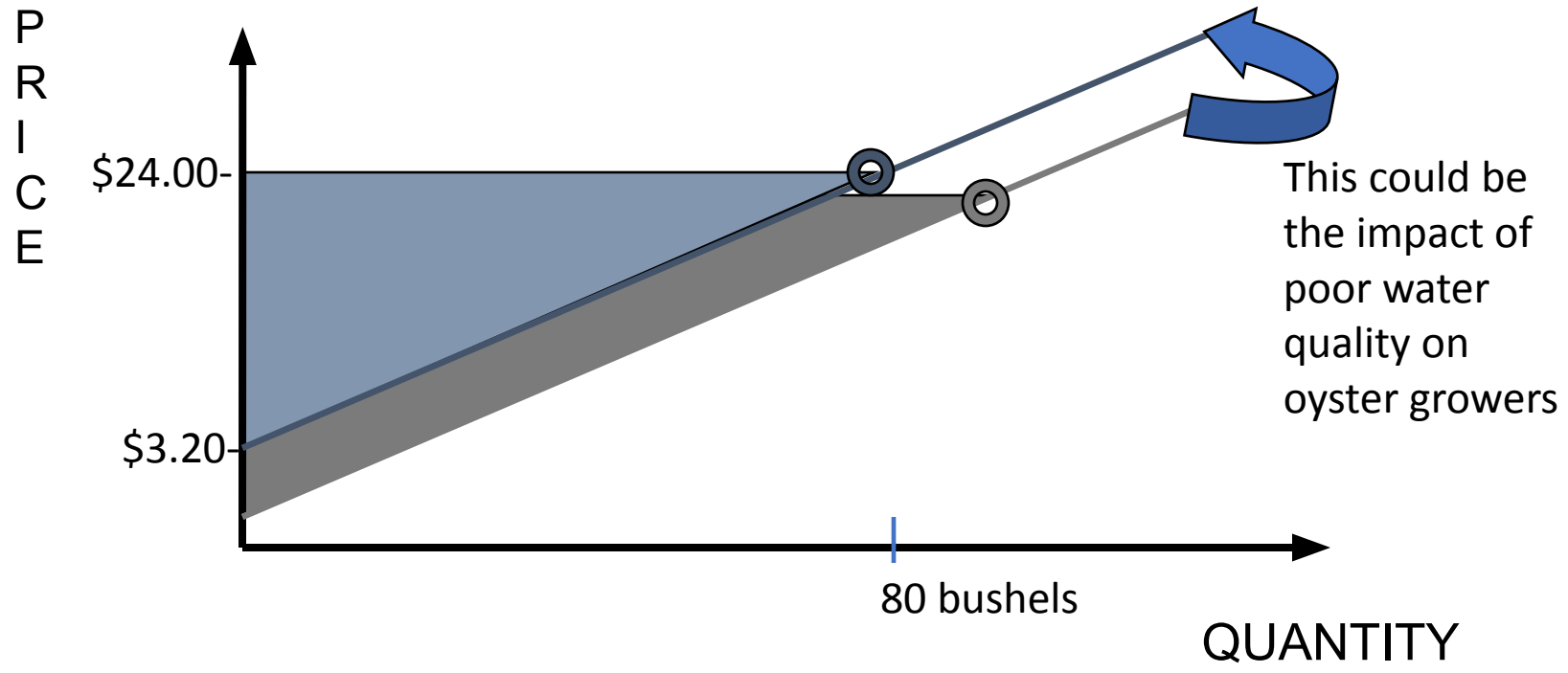
Calculating Producer Surplus



Calculating Producer Surplus

- Base of the triangle = $20-$2 = $18
- Height of the triangle = 100
- Area = ½ base X height
- Producer Surplus = $900

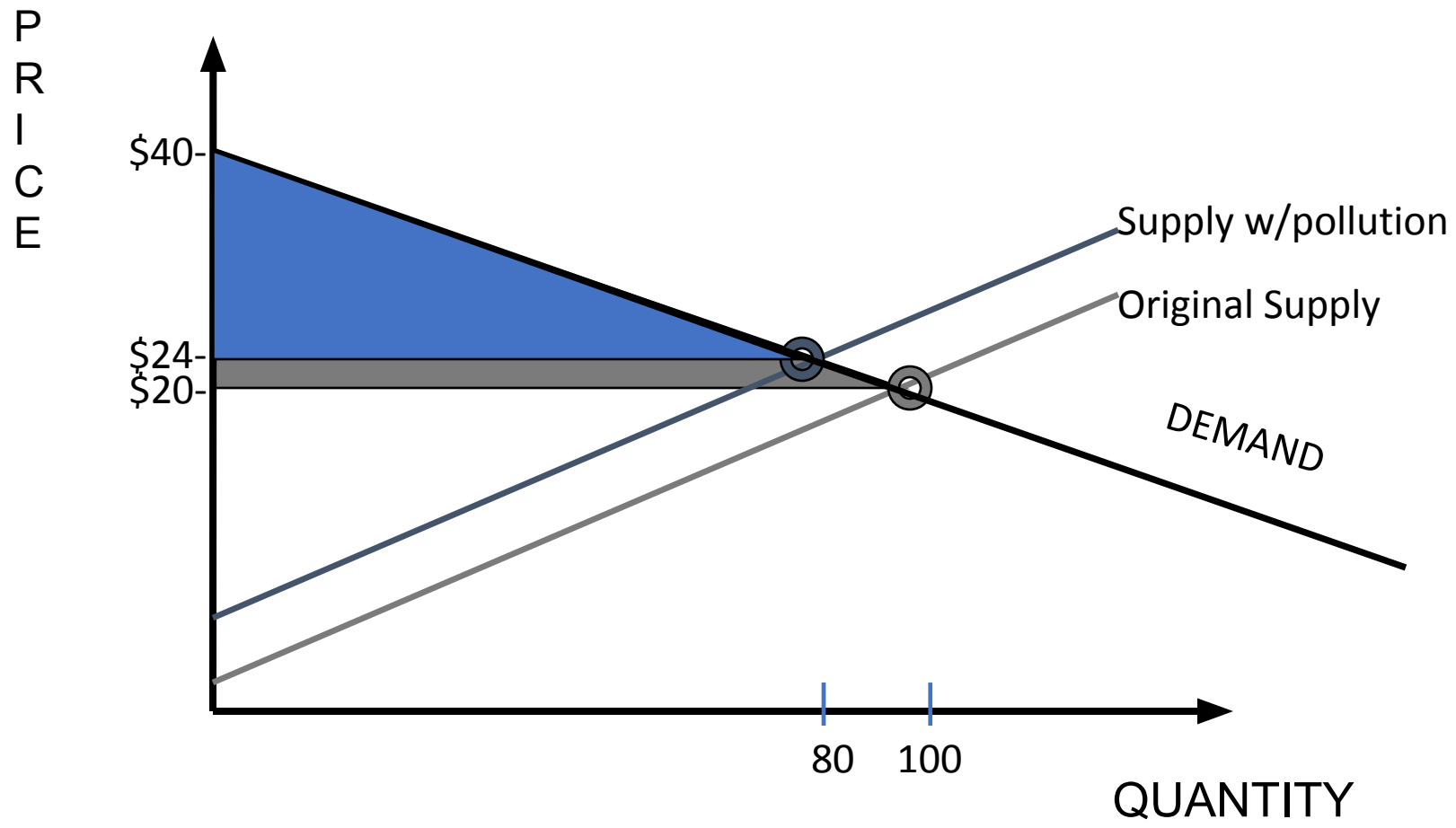
Taking Into Account the Cost of an Externality Shifts the Supply Curve Up



What's The Change in Producer Surplus?

- New Producer Surplus
  - New Base =$24-$3.20 = $20.80
  - New Height = 80 bushels
  - Note less produced at a higher cost
  - New PS = $832
- Change in PS = $832-$900 = -$68

What's the Change in Consumer Surplus?



Consumer Surplus & Total Calculations

- Without the pollution
  - ½ ($40-$20) X 100 = $1,000
- With the pollution
  - ½ ($40-$24) X 80 = $640
- Change in Consumer Surplus
  - $640 - $1000 = -$360

TOTAL SOCIETAL IMPACT = -$360-$68 = -$428

What Do We Value Related to the Environment and Natural Resources?

Ecosystem Services: Millennium Ecosystem Assessment

Provisioning	Regulating	Cultural
• Food • Freshwater • Fuelwood • Fiber • Biochemicals • Genetic Resources	• Climate regulation • Disease regulation • Water regulation • Water purification • Pollination	• Spiritual and religious • Recreation and ecotourism • Aesthetic • Inspirational • Educational • Sense of place • Cultural heritage

Supporting		
• Soil Formation	• Nutrient Cycling	• Primary Production

Types of Values Will Influence How We Measure Them

- Use Value – can observe behavior or choices made under different scenarios
  - Market value
    - Price and quantity data available to measure demand curve (e.g. commercial fishing)
  - Non-market value
    - Can observe choice behavior, but not prices (e.g., recreational fishing)
- Non-Use or Passive Use Value – by definition nothing to observe directly related to what is being valued

Passive Use Values

- Existence Value
  - Person's willingness to pay to preserve a resource for which he has no **current** or **future** plans for personal use
- Altruistic Value
  - Willingness-to-pay to preserve someone else's use value
- Bequest Value
  - Willingness-to-pay for use value for future generations
- Option Value
  - Willingness-to-pay for **opportunity** to use resource in the future.