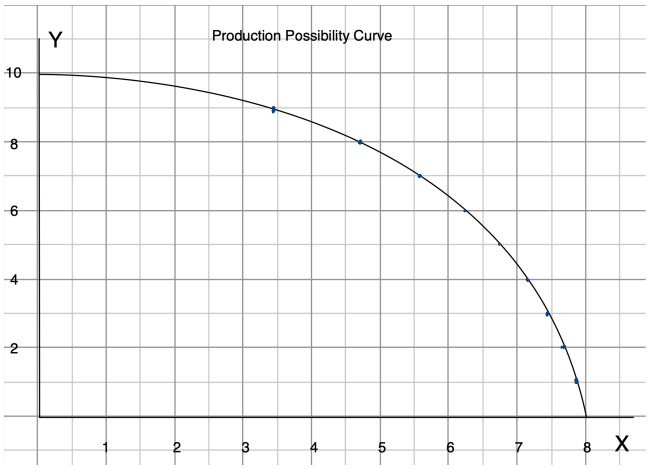
- Knowing the slope, we can approximate if we have 0.1 unit more of $x, i.e., \Delta x = 0.1$, the amount of $y$ we have to sacrifice =

## HW Nonlinear PPC



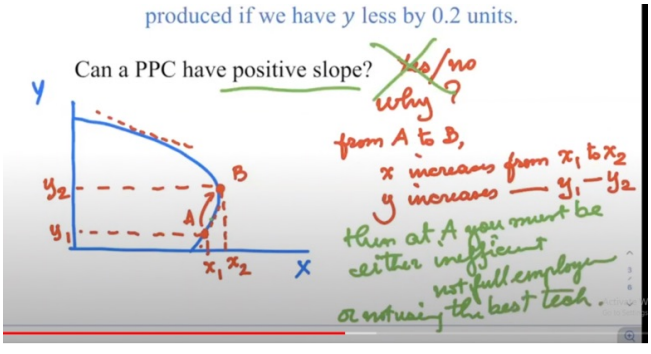

a) Find the opportunity cost of each additional unit of $y$ in terms of units of $x$

| $y$ | $x$ | Opp. Cost of $y$ |
|---|---|---|
| 0 | 8 | 0 |
| 1 | 7.8 | 0.2 |
| 2 | 7.7 | 0.1 |
| 3 | 7.4 | 0.3 |
| 4 | 7.1 | 0.3 |
| 5 | 6.75 | 0.35 |
| 6 | 6.25 | 0.5 |
| 7 | 5.6 | 0.65 |
| 8 | 4.7 | 0.9 |
| 9 | 3.45 | 1.25 |
| 10 | 0 | 3.45 |

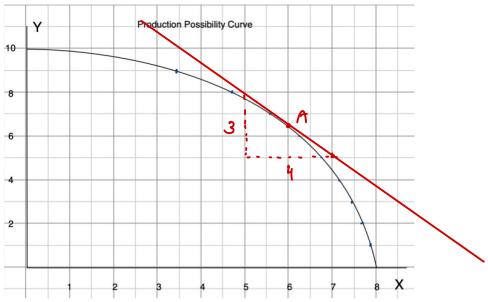
b) Is the opportunity cost of $y$ increasing?
c) Compute the opportunity cost per unit of $y$ when $x = 6$.
d) At $x = 6$, approximate how much more $x$ can be produced if we have $y$ less by 0.2 units.

Can a PPC have positive slope?

Cannot have



**HW Nonlinear PPC**

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b) Is the opportunity cost of $y$ increasing?

b) Yes, as y increasing the opp. cost of y in term of x increase too.

c) Compute the opportunity cost per unit of $y$ when $x = 6$.

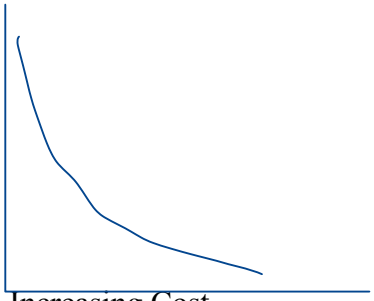
d) At $x = 6$, approximate how much more $x$ can be produced if we have $y$ less by 0.2 units.

c) At A slope $= -\frac{3}{4}$ that means if we have 1 unit more of y, we will have $\approx -0.75$ less of x

d) $x = -0.2 \times (-0.75)$

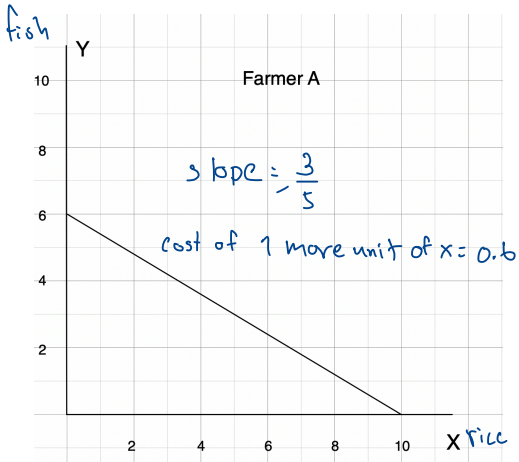
$= 0.15$

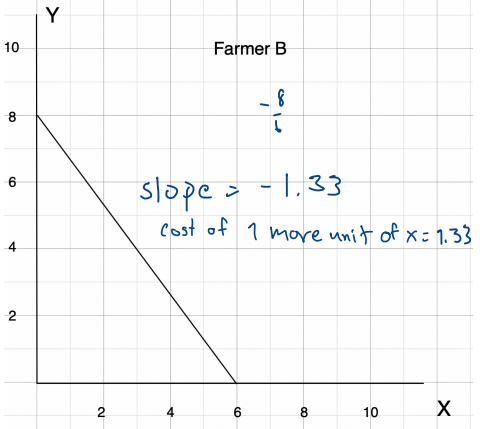
**Nonlinear PPC:** ***Decreasing Cost PPC***

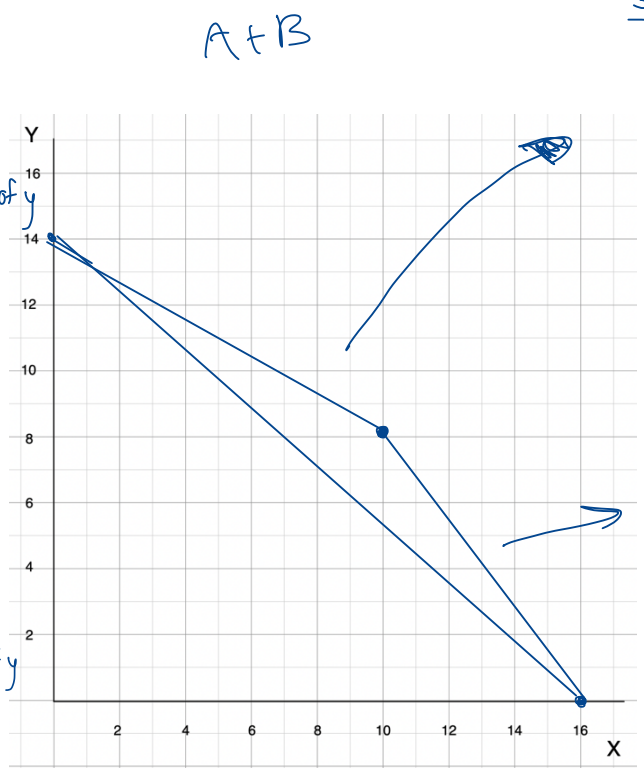


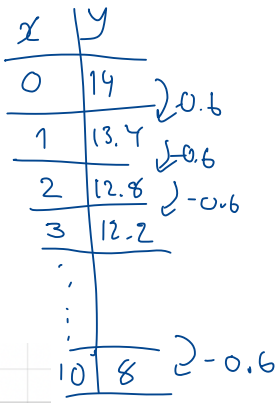
- Most PPC are Increasing Cost

**Example** There are two farmers A and B who produce X = rice and Y= fish, each having a constant PPC as given.



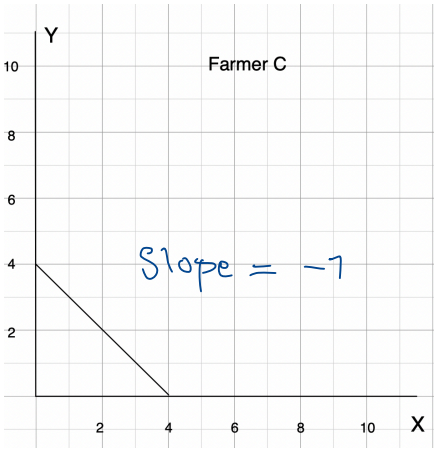



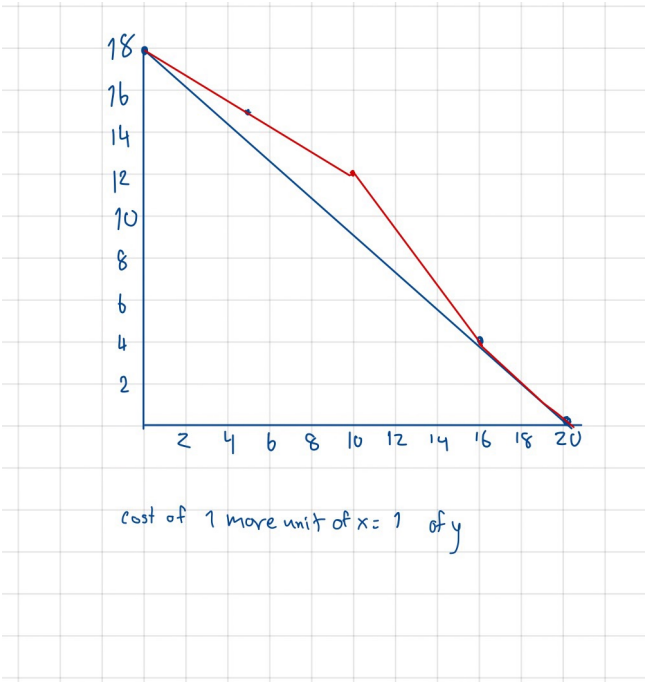





We can find the PPC of the combined resources of both farms.

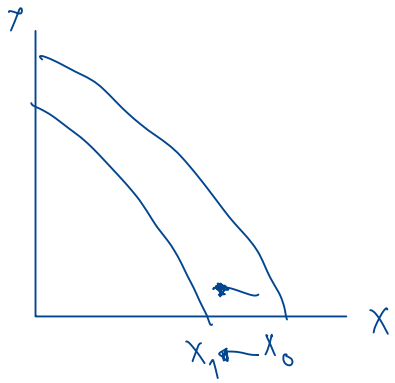
HW Farmer C has the PPC given below. Find the PPC of all three farmers A, B and C combined.



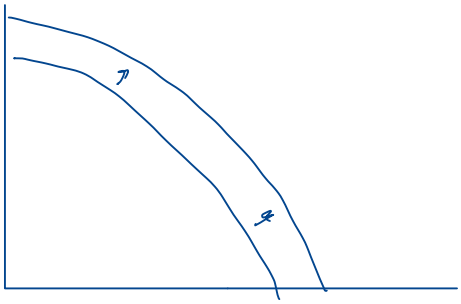




Change in PPC

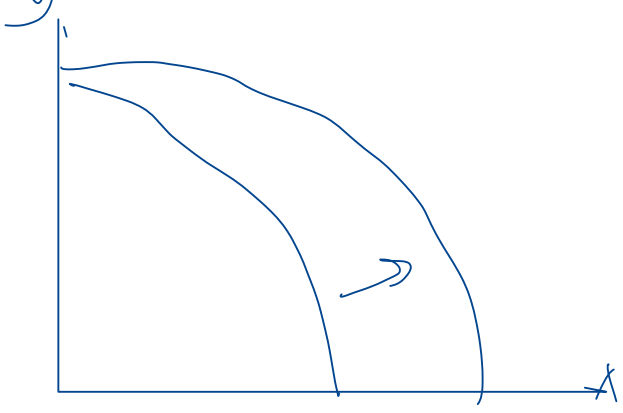
1. COVID-19




2. Improvement of Technology of producing both $x$ and $y$.



If only the tech of producing x improves



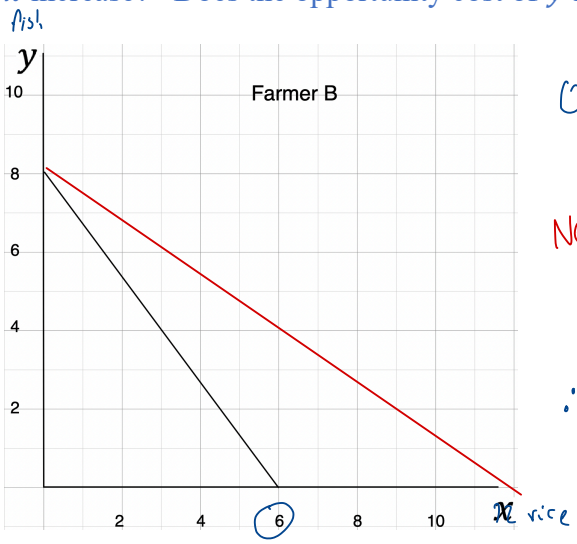
8 0

$y = -\frac{4}{3}x + 8 \rightarrow -\frac{3}{4}y = x + \frac{8}{12}x \quad \frac{12}{8}y$

HW. If a new fertilizer is found to double the output of rice ($x$) for any level of production of fish ($y$), how will PPC of farmer B change? Does the opportunity cost of $x$ increase? Does the opportunity cost of $y$ increase?

$-1.33$

$-\frac{8}{6} \quad -\frac{4}{3}$



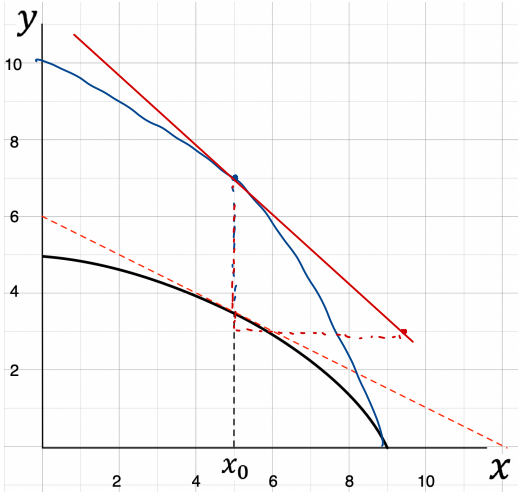

Old = Opp. Cost 1.33 units of fish for 1 rice cost
0.75 units of rice for 1 fish

New = Opp. Cost 0.67 units of fish for 1 fish
Opp. Cost 1.5 units of rice for 1 fish

∴ The opp. cost that increases is the opp. of fish

HW. Given the PPC below,
a) What is the opportunity cost of $x$ at $x_0 = 5$?
b) Suppose the technology of producing $y$ improves so that the economy can double the output of $y$ for any output level of $x$. Draw the new PPC.
c) What is the opportunity cost of $x$ at $x_0 = 5$ for the new PPC?

(5, 7)




a) $\frac{3.5}{5} = 0.7$ opportunity cost of $x = 0.7$ in term of $y$

c) $-\frac{7}{9.5} = -0.73$ opportunity cost of $x = 0.73$ in term of $y$