**Solution (Assignment 1)**

**Problem 1:**

Utopia and Walhalla are two imaginary countries. Both produce fruits and wood. Each country has a labor force of 1500 workers. The following table gives the monthly production of each worker in each country.

***Monthly productivity per worker in each country***

|  |  |  |
| --- | --- | --- |
|  | Baskets of fruit | Logs of wood |
| Utopia workers | 18 | 6 |
| Walhalla workers | 48 | 12 |

a/ Which country has an absolute advantage in the production of fruit? Which country has an absolute advantage in the production of wood?

Walhalla has an absolute advantage in both fruits and wood: it produces them with fewer resources.

b/ Which country has a relative advantage in the production of fruit? Of wood?

***Computing the opportunity cost of producing a basket of fruit***:

In Utopia: to obtain 18 baskets of fruit, it gives up 6 logs of wood 🡺 the opportunity cost of a basket of fruit is 0.33 logs of wood (1/3 logs of wood)

In Walhalla: to obtain 1 basket of fruit, it gives up 0.25 logs of wood (1/4 logs of wood) 🡺 the opportunity cost of a basket of fruit is 0.25 logs of wood.

Thus, Walhalla has a CA in producing fruits.

***Computing the opportunity cost of producing a log of wood***:

In Utopia: the opportunity cost of a log of wood is 3 baskets of fruit.

In Walhalla: the opportunity cost of a log of wood is 4 baskets of fruit.

Thus, Utopia has a CA in producing wood.

c/ Sketch the production possibility frontier (PPF) for both countries.

Let us first compute the monthly output in both countries:

In Utopia: i) fruits production = 1500 × 18 = 27000; ii) wood production = 1500 × 6 = 9000

In Walhalla: i) fruits production = 1500 × 48 = 72000; ii) wood production = 1500 × 12 = 18000

***Monthly output***

|  |  |  |
| --- | --- | --- |
|  | Basket of fruits | Logs of wood |
| Utopia | 27 000 | 9 000 |
| Walhalla | 72 000 | 18 000 |

d/ Assume that there is no trade between both countries. If, within each country, authorities wanted to have equal numbers of logs and baskets of fruit, how would they allocate their workers to the two sectors?

***The allocation of workers in Utopia***: in Utopia, the worker’s productivity in terms of fruit is 3 times higher than its productivity in wood. Therefore, if Utopian authorities want to have an equal number of baskets of fruits and logs of wood, they should allocate ¼ (0.25) of the labor force to the fruits sector and ¾ (0.75) of the labor force to the wood sector. Thus, 375 workers will produce fruits (1500/4), and 1125 workers will produce wood (1500 × 0.75).

The fruit production will be equal to 375 × 18 = 6750; and the wood production will be equal to 1125 × 6 = 6750

We can also answer this question by using some algebra: let x be the numbers of workers to be allotted to the fruits sector and y the number of workers to be allotted to the wood sector. We know that the total workforce is 1500 (🡸🡺 x + y = 1500); we also know that the Utopian authorities want to have an equal monthly output in terms of fruits and wood

(🡸🡺 18x = 6y): all in all we have the following system of two equations with two unknowns:

1. x + y = 1500
2. 18x = 6y

From (2): y = (18/6) × x 🡺 y = 3x

Substituting 3x for y in (1): x + 3x = 1500 🡺 4x = 1500 🡺 x = 1500/4 = 375

Y = 3(375) = 1125

***The allocation of workers in Walhalla***: in Walhalla, the worker’s productivity in terms of fruit is 4 times higher than its productivity in wood. Therefore, Walhalla should allocate 1/5 (0.2) of its labor force to the fruit sector and 4/5 (0.8) of the labor force to the wood sector. Thus, 300 workers will produce fruits (1500/5), and 1200 workers (1500 × 0.8) will produce wood.

The fruit production will be equal to 300\*48 = 14400, and the wood production will be equal to 1200\*12 = 14400

Again, we can use some algebra:

1. x + y = 1500
2. 48x = 12 y

From (2): y = (48/12) × x 🡺 y = 4x

Substituting 4x for y in (1): x + 4x = 1500 🡺 5x = 1500 🡺 x = 1500/5 = 300

Y = 4(300) = 1200

In Utopia, If 375 workers are allocated to the fruits sector 🡺 the production would be 6750 baskets of fruits (375 × 18); if the remaining workforce is allocated to the wood sector 🡺 the production would be 6750 logs of wood (1125 × 6)

In Walhalla, if 300 workers are allotted to the fruits sector 🡺 the monthly production would be 14400 (300 × 48); if the remaining workforce is allotted to the wood sector 🡺 the monthly production would be 14400 (1200 × 12)

|  |  |  |
| --- | --- | --- |
|  | Basket of fruits | Logs of wood |
| Utopia | 6 750 | 6 750 |
| Walhalla | 14 400 | 14 400 |

**Problem 2:**

Suppose that journalism students at LAU want to write an article in the “Daily Tribune” (LAU students’ newspaper) about the costs and benefits of a projected railway line between Tripoli and Saida. Currently, a large proportion of the workers whose jobs are located in Beirut live outside the capital. They must drive several kilometers through congested traffic on a daily basis. The railway will cost around $ 9 billion, which will be paid for with a tax on income over the next 15 years.

Naturally, journalism students look for business and economics students to get a well-advised opinion.

What are the opportunity costs of building this railway? What are the likely benefits that will be bestowed on citizens if the railway is built? What other factors might you consider when giving your opinion?

Opportunity costs of building the railway line include the value of other goods and services that the Lebanese government could have purchased with $9 billion or the value of the goods and services that taxpayers could have purchased with the tax revenue used to finance the project. In addition, the construction itself may impose costs – delays, noise, and so on – and presumably shopkeepers located near the projected line will lose, at least temporarily, as consumers shift their business toward shopkeepers located elsewhere.

The benefits of the new line include reduced commuting time and cost for workers, increased sales tax revenues for the Lebanese government, and gains for shopkeepers located near the stations.

The line may have environmental effects that could be positive (less pollution from traffic).

**Problem 3:**

A large scale survey of consumer food purchases revealed that, on average, retired people spend less money for the same basket of food than working people do. Can you explain this fact?

Purchasing a basket of food takes two basic ingredients: money and time. For individuals who work, the opportunity cost of shopping in terms of time is high. For retired individuals, the opportunity cost of time shopping is lower. A lower opportunity cost of time spent on shopping means that retired people will spend more time for shopping **and bargaining/searching for the least costly items** 🡺 retired individuals are likely to pay less for the same bundle of goods as individuals who work.

**Problem 4:**

Match each of the following diagrams with a description (base your analysis on the location of point A). Some descriptions might apply to more than one diagram, and some diagrams might have more than one description.

a/ Inefficient production of meat and fish

b/ Productive efficiency

c/ Technological progress affecting the production of meat and fish

d/ The law of increasing opportunity cost

e/ An impossible combination of meat and fish

f/ A perfect substitution between factors of production in the two sectors

***Diagram a***: b) (A is on the PPF); f) when there is a perfect substitution between factors of production used in the two sectors of an economy 🡸🡺 the factors are not very specialized in one particular good/sector (they practically have the same expertise and knowledge in the production of both goods) and can be substituted for each other without additional costs 🡺 a continuous movement from one sector to another will not induce higher opportunity cost (there will be a constant opportunity cost) 🡸🡺 the PPF is linear (example, bread and pastry)

***Diagram b***: e) (A is outside the PPF)

***Diagram c***: a) (A is inside the PPF)

***Diagram d***: b) (A is on the PPF); d) (the PPF is concave);

***Diagram e***: b) (A is on the PPF); c) (new PPF); d) (the PPF is concave)

***Diagram f***: b) (A is on the PPF); d) (the PPF is concave).

Fish

b)

A

a)

A

Fish

Meat

Meat

d)

Fish

c)

A

Fish

A

Meat

Meat

f)

A

Meat

Fish

e)

A

A

Meat

Fish