

**Vilesa:** Development of a virtual learning learnin space as a tool for developing student’s critical thinking, communication, collaboration and creativity skills in the context of COVID 19. No. 2021-1-LT01-KA220-HED-000023551.

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## The case ‘ Economics’

The case study "Forest" gives you the opportunity to acquire practical skills in forest management, to plan your activities over a longer period of time, to get an idea of the rational use of natural resources.









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| Years | Area   |        |             |              | Area of the cut |        |     | Capacity of forest equipment | Quantity of timber | Timber price | Income from agricultural production |
|-------|--------|--------|-------------|--------------|-----------------|--------|-----|------------------------------|--------------------|--------------|-------------------------------------|
|       | Forest | Shrubs | Arable land | Young growth | Forest          | Shrubs |     |                              |                    |              |                                     |
| 1     | ...    | ...    | ...         | ...          | ...             | ...    | ... | ...                          | ...                | ...          | ...                                 |
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Economics ● Mirrored Panel ● Explanation ●



## Post-match analysis

Let's look at the basic strategies mentioned in the rules of the game.

1. Agricultural strategy, that is, the participant in the game does not cut down existing forests and shrubs and is engaged only in agricultural production. One of the variants of the mock trial is shown in the tables, provided that the other participants in the game gradually abandon agricultural production and switch to forest management. And so by choosing this strategy, it is possible to get about 34,000 monetary units in 6 years. The value of the forest in these years has reached 36,000 per 1 ha and totals 720,000 monetary units.
2. Agricultural strategy by increasing the area of arable land. The participant of the game preserves 20 ha of forest, cuts down 10 ha of scrubland and turns this area into arable land. Accounting for economic and financial activities is shown in the tables. In 6 years, under favorable conditions, the bank's bill reaches about 235,000 monetary units (that's 6.5 times more than in strategy 1) and the forest's value has reached 720,000 monetary units.



3. The mixed strategy, which differs from the previous one in that the bushes are cut down in the first year and a new forest is planted in these 10 ha, in the fourth year arable land is also forested. Thus, at the end of the game, the bill in the bank is about 200,000 monetary units, while the total value of the forest is 761,000, consisting of 720,000 (the old forest) plus 16,000 (10 ha of a 5-year-old young plant) and 25,000 (20 ha of a 3-year-old).

4. Forest development strategy. It provides for the immediate or gradual felling of 20 ha of old forests and shrubs and the replanting of free-range areas with a new forest. One of the variants of such housekeeping is presented in the tables. As can be seen, the bill in the bank in six years reaches almost 670, 000 monetary units, while the total value of the young stock is 82, 250.

#### Accounting for economic activity (Strategy 1)

| Years | Area   |        |             |              | Area of the cut |        | Capacity of forest equipment | Quantity of timber | Timber price | Income from agricultural production |
|-------|--------|--------|-------------|--------------|-----------------|--------|------------------------------|--------------------|--------------|-------------------------------------|
|       | Forest | Shrubs | Arable land | Young growth | Forest          | Shrubs |                              |                    |              |                                     |
| 1     | 20     | 10     | 20          | -            | -               | -      | -                            | -                  | -            | 200                                 |
| 2     | 20     | 10     | 20          | -            | -               | -      | -                            | -                  | -            | 200                                 |
| 3     | 20     | 10     | 20          | -            | -               | -      | -                            | -                  | -            | 200                                 |
| 4     | 20     | 10     | 20          | -            | -               | -      | -                            | -                  | -            | 200                                 |
| 5     | 20     | 10     | 20          | -            | -               | -      | -                            | -                  | -            | 200                                 |
| 6     | 20     | 10     | 20          | -            | -               | -      | -                            | -                  | -            | 200                                 |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
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| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |

1. Agricultural strategy, that is, the participant in the game does not cut down existing forests and shrubs and is engaged only in agricultural production. One of the variants of the mock trial is shown in the tables, provided that the other participants in the game gradually abandon agricultural production and switch to forest management. And so by choosing this strategy, it is possible to get about 34,000 monetary units in 6 years. The value of the forest in these years has reached 36,000 per 1 ha and totals 720,000 monetary units.



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Voice chat  
room 1

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Economics  
Mirrored Panel  
Explanation

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Table 1  
Table 2  
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Accounting for financial activities (Strategy 1)

| Years | Invoice in the bank at the beginning of the year | Expenditure                   |   |                      |                           |  | Invoice in the bank at the beginning of the year | Bank %quot %-"20%"+" 10% | Income      |                         | Compensation | Invoice in the bank at the end of the year |
|-------|--|-------------------------------|---|----------------------|---------------------------|--|--|--------------------------|-------------|-------------------------|--------------|--|
|       |  | For the purchase of equipment | For the maintenance of equipment in working order | For labor force m3-1 | For afforestation 1ha-100 | For the conversion of a cut to arable land 1 ha - 1000 |  |                          | Timber sold | Agricultural production |              |  |
| 1     | 0  |                               |   |                      |                           |  | 0  | 0                        |             | 4000                    |              | 4000                                       |
| 2     | 4000   |                               |   |                      |                           |  | 4000   | 4400                     |             | 4000                    |              | 8400                                       |
| 3     | 8400   |                               |   |                      |                           |  | 8400   | 9240                     |             | 4000                    |              | 13240                                      |
| 4     | 13240  |                               |   |                      |                           |  | 13240  | 14564                    |             | 4000                    |              | 19564                                      |
| 5     | 19564  |                               |   |                      |                           |  | 19564  | 21520                    |             | 4000                    |              | 26520                                      |
| 6     | 26520  |                               |   |                      |                           |  | 26520  | 29172                    |             | 4000                    |              | 34172                                      |
|       |  |                               |   |                      |                           |  |  |                          |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                          |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                          |             |                         |              |  |
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1. Agricultural strategy, that is, the participant in the game does not cut down existing forests and shrubs and is engaged only in agricultural production. One of the variants of the mock trial is shown in the tables, provided that the other participants in the game gradually abandon agricultural production and switch to forest management. And so by choosing this strategy, it is possible to get about 34,000 monetary units in 6 years. The value of the forest in these years has reached 36,000 per 1 ha and totals 720,000 monetary units.

Accounting for economic activity (Strategy 2)

| Years | Area   |        |             |              | Area of the cut |        | Capacity of forest equipment | Quantity of timber | Timber price | Income from agricultural production |
|-------|--------|--------|-------------|--------------|-----------------|--------|------------------------------|--------------------|--------------|-------------------------------------|
|       | Forest | Shrubs | Arable land | Young growth | Forest          | Shrubs |                              |                    |              |                                     |
| 1     | 20     | 10     | 20          |              |                 | 2      | 1000                         | i-1000             | 20           | 200                                 |
| 2     | 20     | 8      | 22          |              |                 | 2      | 1000                         | i-1000             | 30           | 200                                 |
| 3     | 20     | 6      | 24          |              |                 | 2      | 1000                         | $\bar{a}$ -1000    | 35           | 200                                 |
| 4     | 20     | 0      | 30          |              |                 | 4      | 2000                         | $\bar{A}$ -2000    | 35           | 250                                 |
| 5     | 20     | 0      | 30          |              |                 |        |                              |                    |              | 250                                 |
| 6     | 20     | 0      | 30          |              |                 |        |                              |                    |              | 250                                 |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
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2. Agricultural strategy by increasing the area of arable land. The participant of the game preserves 20 ha of forest, cuts down 10 ha of scrubland and turns this area into arable land. Accounting for economic and financial activities is shown in the tables. In 6 years, under favorable conditions, the bank's bill reaches about 235,000 monetary units (that's 6.5 times more than in strategy 1) and the forest's value has reached 720,000 monetary units.

## Accounting for financial activities (Strategy 2)

| Years | Invoice in the bank at the beginning of the year | Expenditure                   |   |                      |                           |  | Invoice in the bank at the beginning of the year | Bank %quot %- "20%"+" 10% | Income      |                         | Compensation | Invoice in the bank at the end of the year |
|-------|--|-------------------------------|---|----------------------|---------------------------|--|--|---------------------------|-------------|-------------------------|--------------|--|
|       |  | For the purchase of equipment | For the maintenance of equipment in working order | For labor force m3-1 | For afforestation 1ha-100 | For the conversion of a cut to arable land 1 ha - 1000 |  |                           | Timber sold | Agricultural production |              |  |
| 1     | 0  | 1200                          | 250   | 1000                 |                           | 200  | -2650  | -3180                     | 20000       | 4000                    |              | 28820                                      |
| 2     | 28820  |                               | 250   | 1000                 |                           | 200  | 19370  | 21307                     | 30000       | 4400                    |              | 55707                                      |
| 3     | 55707  |                               | 250   | 1000                 |                           | 200  | 54257  | 59683                     | 35000       | 4800                    |              | 99483                                      |
| 4     | 99483  | 2400                          | 500   | 2000                 |                           | 400  | 94183  | 103604                    | 70000       | 7500                    |              | 181101                                     |
| 5     | 181101   |                               |   |                      |                           |  | 181101   | 199211                    |             | 7500                    |              | 206711                                     |
| 6     | 206711   |                               |   |                      |                           |  | 206711   | 227382                    |             | 7500                    |              | 234882                                     |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |
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2. Agricultural strategy by increasing the area of arable land. The participant of the game preserves 20 ha of forest, cuts down 10 ha of scrubland and turns this area into arable land. Accounting for economic and financial activities is shown in the tables. In 6 years, under favorable conditions, the bank's bill reaches about 235,000 monetary units (that's 6.5 times more than in strategy 1) and the forest's value has reached 720,000 monetary units.

### Accounting for economic activity (Strategy 3)

| Years | Area   |        |             |              | Area of the cut |        | Capacity of forest equipment | Quantity of timber | Timber price | Income from agricultural production |
|-------|--------|--------|-------------|--------------|-----------------|--------|------------------------------|--------------------|--------------|-------------------------------------|
|       | Forest | Shrubs | Arable land | Young growth | Forest          | Shrubs |                              |                    |              |                                     |
| 1     | 20     | 10     | 20          |              |                 | 10     | 5000                         | i-5000             | 30           | 200                                 |
| 2     | 20     |        | 20          | 10           |                 |        |                              |                    |              | 200                                 |
| 3     | 20     |        | 20          | 10           |                 |        |                              |                    |              | 200                                 |
| 4     | 20     |        |             | 30           |                 |        |                              |                    |              |                                     |
| 5     | 20     |        |             | 30           |                 |        |                              |                    |              |                                     |
| 6     | 20     |        |             | 30           |                 |        |                              |                    |              |                                     |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
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| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |

3. The mixed strategy, which differs from the previous one in that the bushes are cut down in the first year and a new forest is planted in these 10 ha, in the fourth year arable land is also forested. Thus, at the end of the game, the bill in the bank is about 200,000 monetary units, while the total value of the forest is 761,000, consisting of 720,000 (the old forest) plus 16,000 (10 ha of a 5-year-old young plant) and 25,000 (20 ha of a 3-year-old).

Accounting for financial activities (Strategy 3)

| Years | Invoice in the bank at the beginning of the year | Expenditure                   |   |                      |                           |  | Invoice in the bank at the beginning of the year | Bank %quot %- "20%"+" 10% | Income      |                         | Compensation | Invoice in the bank at the end of the year |
|-------|--|-------------------------------|---|----------------------|---------------------------|--|--|---------------------------|-------------|-------------------------|--------------|--|
|       |  | For the purchase of equipment | For the maintenance of equipment in working order | For labor force m3-1 | For afforestation 1ha-100 | For the conversion of a cut to arable land 1 ha - 1000 |  |                           | Timber sold | Agricultural production |              |  |
| 1     | 0  | 6000                          | 1250  | 5000                 |                           |  | -12250   | -14700                    | 20000       | 4000                    |              | 139300                                     |
| 2     | 139300   |                               |   |                      | 10000                     |  | 129300   | 142230                    |             | 4000                    | 2000         | 148230                                     |
| 3     | 148230   |                               |   |                      |                           |  | 148230   | 163053                    |             | 4000                    |              | 167053                                     |
| 4     | 167053   |                               |   |                      | 20000                     |  | 147053   | 161758                    |             |                         | 8000         | 169758                                     |
| 5     | 169758   |                               |   |                      |                           |  | 169758   | 186734                    |             |                         |              | 186734                                     |
| 6     | 186734   |                               |   |                      |                           |  | 186734   | 205407                    |             |                         |              | 205407                                     |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |
|       |  |                               |   |                      |                           |  |  |                           |             |                         |              |  |

3. The mixed strategy, which differs from the previous one in that the bushes are cut down in the first year and a new forest is planted in these 10 ha, in the fourth year arable land is also forested. Thus, at the end of the game, the bill in the bank is about 200,000 monetary units, while the total value of the forest is 761,000, consisting of 720,000 (the old forest) plus 16,000 (10 ha of a 5-year-old young plant) and 25,000 (20 ha of a 3-year-old).

Accounting for economic activity (Strategy 4)

| Years | Area   |        |             |              | Area of the cut |        | Capacity of forest equipment | Quantity of timber | Timber price | Income from agricultural production |
|-------|--------|--------|-------------|--------------|-----------------|--------|------------------------------|--------------------|--------------|-------------------------------------|
|       | Forest | Shrubs | Arable land | Young growth | Forest          | Shrubs |                              |                    |              |                                     |
| 1     | 20     | 10     | 20          | 30           |                 | 10     | 5000                         | i-5000             | 20           |                                     |
| 2     | 20     |        |             | 35           | 5               |        | 5000                         | Ä-5000             | 20           |                                     |
| 3     | 15     |        |             | 40           | 5               |        | 5000                         | Ä-5000             | 20           |                                     |
| 4     | 10     |        |             | 45           | 5               |        | 5000                         | Ä-5000             | 30           |                                     |
| 5     | 5      |        |             | 50           | 5               |        | 5000                         | Ä-5000             | 35           |                                     |
| 6     |        |        |             | 50           |                 |        |                              |                    |              |                                     |
| ...   |        |        |             |              |                 |        |                              |                    |              |                                     |
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4. Forest development strategy. It provides for the immediate or gradual felling of 20 ha of old forests and shrubs and the replanting of free-range areas with a new forest. One of the variants of such housekeeping is presented in the tables. As can be seen, the bill in the bank in six years reaches almost 670, 000 monetary units, while the total value of the young stock is 82, 250.

## Accounting for financial activities (Strategy 4)

| Years | Invoice in the bank at the beginning of the year | Expenditure                   |   |                                   |                           |  | Invoice in the bank at the beginning of the year | Bank % "20%" + "10%" | Income      |                         | Compensation | Invoice in the bank at the end of the year |
|-------|--|-------------------------------|---|-----------------------------------|---------------------------|--|--|----------------------|-------------|-------------------------|--------------|--|
|       |  | For the purchase of equipment | For the maintenance of equipment in working order | For labor force m <sup>3</sup> -1 | For afforestation 1ha-100 | For the conversion of a cut to arable land 1 ha - 1000 |  |                      | Timber sold | Agricultural production |              |  |
| 1     | 0  | 6000                          | 1250  | 5000                              | 30000                     |  | -42250   | -50700               | 100000      |                         | 6000         | 55300                                      |
| 2     | 55300  |                               | 1250  | 5000                              | 5000                      |  | 44050  | 48455                | 100000      |                         | 1000         | 149455                                     |
| 3     | 149455   | 6000                          | 1250  | 5000                              | 5000                      |  | 132205   | 145426               | 100000      |                         | 1000         | 246426                                     |
| 4     | 246426   |                               | 1250  | 5000                              | 5000                      |  | 235176   | 258694               | 150000      |                         | 1000         | 409694                                     |
| 5     | 409694   | 6000                          | 1250  | 5000                              | 5000                      |  | 392444   | 431688               | 175000      |                         | 1000         | 607688                                     |
| 6     | 607688   |                               | 1250  |                                   |                           |  | 607688   | 688457               |             |                         |              | 668457                                     |
|       |  |                               |   |                                   |                           |  |  |                      |             |                         |              |  |
|       |  |                               |   |                                   |                           |  |  |                      |             |                         |              |  |
|       |  |                               |   |                                   |                           |  |  |                      |             |                         |              |  |
|       |  |                               |   |                                   |                           |  |  |                      |             |                         |              |  |
|       |  |                               |   |                                   |                           |  |  |                      |             |                         |              |  |

4. Forest development strategy. It provides for the immediate or gradual felling of 20 ha of old forests and shrubs and the replanting of free-range areas with a new forest. One of the variants of such housekeeping is presented in the tables. As can be seen, the bill in the bank in six years reaches almost 670, 000 monetary units, while the total value of the young stock is 82, 250.





Analysis of the task:

Compare the strategy you develop with all the strategies offered by the post-match and analyze its pros and cons. Determine which strategy is the best!

You have 50 ha of land at your disposal, of which 20 ha is occupied by forest, 10 ha by bushes and 20 ha by arable land. The forest is about 60 years old and is worth 600,000 monetary units (1 ha - 30,000).

Possible basic strategies for your operation:

- 1) do not cut down existing forests and bushes and engage in agricultural production;
- 2) preserve 20 ha of forest, cut down 10 ha of bushes, add this area to arable land or plant it with forest;
- 3) cut down (immediately or gradually) the existing 20 ha of forest and 10 ha of bushes and plant this area with forest or add it to arable land.

Deforestation requires the purchase of machinery.

Types of technology, capacity, price and service life:

(I) Moritz Fr70/75

Under the motto The concept remains, but everything is new, Pfanzelt presented the two new Moritz models in spring 2020.

- 50 or 75HP engine
- Separate traction, on-board and power hydraulics (96l and 300 bar)
- Mechanical PTO
- Two three-point category 1 attachment mounts
- Full operation of vehicle and attachments by professional remote control
- Forestry cable winches with up to 7.2 metric tonnes tractive force

| Power | Area of deforestation | Price | Warranty (years) | Maintenance costs (per year) |
|-------|-----------------------|-------|------------------|------------------------------|
| 500   | 0,5                   | 500   | 3                | 150                          |

(II) Hydraulic rotating tree saw LT3200

The TR Series Models are ideal maintenance tool for land owners to remove invasive trees. This high-speed saw cuts 11" in a single pass, up to a 22" tree with repositioning. The PTO powered cutting disc will cut as fast as an operator can back up. The LT3200 is equipped with a pushing bar



to direct the fall of trees away from the operator, while the TR3200 has a hydraulic grapples that can carry and stack trees.

| Power | Area of deforestation | Price | Warranty (years) | Maintenance costs (per year) |
|-------|-----------------------|-------|------------------|------------------------------|
| 1000  | 1                     | 1200  | 2                | 250                          |

### Info

So, 1000 cubic meters can be obtained from 1 ha of forest, and 500 cubic meters of timber from 1 ha of scrubland. With this technique and for the same cost, you can clear twice the area with brushwood.

Can cut 1, 2, 3, etc. ha of forest or bush. If you want to cut down more than 1 ha per year, you need to hire labor, who must pay 1 unit of money for 1 cubic meter of timber.

You can plant the cleared area of forest, scrub land, as well as arable land with forest, the value of which will increase during the game. Planting costs: 1 ha - 1000. This measure is stimulated by the state by paying compensation: 1 ha - 200. The increase in the value of the forest is given in the table.

If you want to turn the clearing into arable land and produce agricultural products, then 1 ha costs 100.

Timber prices and income from the sale of agricultural products depend on supply.

### Timber price

| Age of the forest from the moment of planting (in years) | The value of 1 ha of forest |
|--|-----------------------------|
| 1  | 1 000                       |
| 2  | 1 100                       |
| 3  | 1 250                       |
| 4  | 1 400                       |
| 5  | 1 600                       |
| 6  | 1 850                       |
| 7  | 2 100                       |
| 8  | 2 400                       |
| 9  | 2 700                       |
| 10   | 3 000                       |
| 60-64  | 30 000                      |
| 65-70  | 36 000                      |

### The price of common materials

| Average amount of aggregates per holding (1000 m <sup>3</sup> ) | 1 M <sup>3</sup> timber price |                        |
|---|-------------------------------|------------------------|
|   | In the internal market        | In the external market |
|   |                               |                        |

|       |    |    |
|-------|----|----|
| 0-2   | 35 | 40 |
| 2-5   | 30 | 35 |
| 5-10  | 30 | 30 |
| 10-20 | 25 | 25 |
| 20-30 | 20 | 20 |

Income from agricultural production

| Average area of arable land (ha) per holding | Annual income from 1 ha of arable land |
|--|--|
| 0-10   | 250                                    |
| 10-20  | 200                                    |
| 20-50  | 100                                    |

Annual economic and financial activity must be shown in tables.

When starting, there is no bank account. This means that you need to take out a loan to purchase the necessary equipment and pay for labor. This credit consists of the following expenses:

- for the purchase of equipment,
- for maintaining equipment in working order,
- for labor payment,
- for planting a forest,
- for turning a clearing into arable land.

20% of the loan amount must be paid annually for the loan. Only then should the annual income be added:

- for the sold timber,
- from agricultural production,
- compensation for planting the new forest.

As a result, a bank invoice for the end of the year is obtained.