2. PRODUCTION STRUCTURE IN PRIMARY PRODUCTION BUSINESS AGRIBUSINESSES

The objective of the exercise: The aim of the exercise is to familiarize students with basic concepts from the given issue and at the same time to practice an example from determining the scope of the crop industries.

Content of the exercise:
2.1 Characteristics of basic concepts
2.2 Determination of the scope (size) of the crop industry
2.3 Addressing the example of the restructuring of manufacturing sectors in the selected primary production agribusiness.

2.1 Characteristics of basic concepts

The production structure generally represents a system formed by a rational representation of the industries and their elements and activities to achieve the necessary profit from successful business activity. From the manufacturing aspect, the production structure represents a system of factually, temporary, and spatially arranged elements of production in industries, especially in terms of the optimal solution of material energy, value, and other bonds in order to create prerequisites for achieving profit.

The production structure is influenced by the following factors:

- the production and economic conditions of the agribusiness,
- the results of marketing analyses,
- the level of the capital endowment of the entity,
- efficiency in the use of labor resources,
- degree of concentration and specialization of production,
- the economic viability of sectors in relation to the rational system of land management.

An overview of the production structure is provided by Figure 1.

Figure 1: Production structure of primary production Agri-entities (self-processing)

The production structure is primordial, determinant and at the same time reflects the target management of the business Agri-entities. We evaluate it from a point of view.

- Subject
- Time
- Environment

The material structure divides production into smaller parts, defining and characterizing their relationships and elements. The main criteria of the material structure:

- production profile,
- production program,
- output elements (products),
- human participation in the production process,
- technological processes.

The time structure is formed by the general time distribution of the production of products in the production unit. Specifically, it consists of a continuous-time composition consisting of a summary of work, downtime, and technological process times. From a time, point of view, there is a dependence on:

- seasons
- meteorological conditions,
- crop requirements for inputs at different stages of the growing season.

The spatial structure includes the distribution and arrangement of industries on the territory of a certain production-organizational unit, as well as personal and material factors of production in a certain proposed space, depending on natural, economic, and other specific conditions. The aim is to carry out production with minimum requirements for individual elements of production. **Factors** affecting the spatial structure of production are:

- the size and shape of the production and organizational unit,
- complex situational distribution of land, production, storage, and other capacities,
- the production focus of the business unit and its internal units,
- communication network (main and secondary field roads),
- deployment of transport, energy, labor, and other resources.

The following methods may be used for the rational distribution of work or, where the appropriate, representation of material movements:

- checkerboard,
- triangular method, coordinate method,
- the method of the center of gravity,
- circular method and other methods of linear programming.

2.2 Determination of the scope (size) of the crop and livestock industry

Industry - is part of the production of a certain business unit that produces one or several related products originating from the same source, but which differ from others, the object and tool of work, technology, organization, and final product.

Figure 2: Division of production branches of an Agri-business entity (own processing)

<u>Methods for determining the scope of industries</u>

- **the balance sheet method**, the essence of which lies in balancing the needs and resources of the various agribusiness industries. It is a laborious but fairly accurate way of determining the scope.
  - **economic and mathematical methods** (linear programming methods). This is a way of processing data using modern computing. The Simplex method is used, but also other methods.

The determination of the scope of the crop industry is obtained by summarizing the requirements of:

∑ tones of the contractually concluded quantity from n-customers
∑ tones in exchange for seed
∑ tones for feed purposes
∑ tones in kind
∑ tones for loss, drying, and cleaning (5-10 %)

∑tones of customers' requirements (n=5)

$$\boldsymbol{the\ scope\ of\ crop\ production\ (\ ha)\ =\ \frac{\sum customers\ requirements\ (tones)}{5\ year\ average\ yeld\ (crop) production\ (t.ha^{-1})}}$$

Determination of the scope of the livestock industry (meat production):

$$\text{average nuber (pcs)} = \frac{\sum \text{contracted amound of livestock production (t)} + \sum \text{loss (t)}}{\text{average production (t.pcs}^{-1}\text{.year}^{-1})}$$

$$final\ status(pcs) = PS + P - U$$

PS - initial status,
P - increments in pcs,
U - decreases in pcs,
KS - the final state in pcs.

$$\text{average number (pcs)} = \frac{\text{initial status} + \text{final status}}{2}$$

$$\text{U} = \text{elimination (pcs)} + \text{sale (pcs)} + \text{transfer from higher categories (pcs)} + \text{death (pcs)}$$

The equation can also be used for weight balance in t, at which point we will use the position of the expression in t.

Example 1:

Determine the extent of cultivation of individual cereals (winter wheat, spring barley, maize for grain), a certain primary production Agri- entity of the corn production area of Slovakia, while meeting the following requirements.

Winter wheat: 1200 t - mill and bakery business entity, 300 t for feed purposes, 100 t free sale to employees, 80 t in exchange for seed, 60 t loss by drying and cleaning. The average ha sharpest in the last 5 years was 5.2 $t.ha^{-1}$.

Spring barley: 800t - brewing business entity, 200t for feed purposes, 50t for seed exchange, 40 t loss by drying and cleaning. The average ha sharpest for the last 5 years was 4.8 $t.ha^{-1}$.

Maize for grain: 500 t - entity for the production of compound feeding kinds of stuff, 100 t for feed purposes, 40 t free sale to employees and 25 t losses by cleaning and drying. The average ha sharpest in the last 5 years was 6.0 $t.ha^{-1}$.

Example 2:

According to the specified data in the Design of the Production Structure for a selected, primary production agribusiness entity for the next 6 years, evaluate the effectiveness of the restructuring of the CROP industries for the (1) proposed period, (2) the proposed period and (3) the target solution.

The cost part shall be based on the baseline level of the unit costs of CROP products, including taking into account possible inflationary price increases of inputs up to the target solution. The implementation part is based on the expected increase in the purchase prices of crop products, also up to the target solution. Using economic indicators and also the results of the livestock of the same entity, evaluate in which period the most economically favorable

results are achieved in the restructuring of the crop sectors in the agribusiness under examination.

Calculate and assess the variant without fodder on arable land, i.e. purely vegetable, without connection to the livestock sectors and another variant with a significant (up to double the spread of forage on arable land) at the expense of ordinary market sectors of crop. At the same time, sales from the livestock breeding sector are expected to increase by 33.3%.

Table 7: Projected cost developments in the R&D sectors

	OWL. SECTOR (CROP)	1. PROPOSED PERIOD		2. PROPOSED PERIOD		3. TARGET PERIOD	
		SUM t	COST €. t-1	SUM t	COST €. t^{-1}	SUM t	COSTS €. t^{-1}
1	winter wheat	2500	116,2	2750	140	5302	150
2	spring barley	730	115	1004	135	792	145
3	hip. on grain	350	120	385	137,5	420	147
4	peas	240	280,9	260	487,5	280	555,5
5	corn for silage	4880	21,1	4890	23	4880	25,9
6	fodder	1818	10,1	1938	11,5	1948	12,5
7	sugar beet	4000	25	4000	27,9	4000	30
8	sunflower	194	225,5	237	255,6	286	275,5
9	rapeseed	60	300	100	315	200	335
10	green peas	30	170,9	66	182,6	105	192
11	early potatoes	158	170	132	185	120	197,5
12	tobacco	38	1361,1	32	1493,7	30	1659,7
13	vegetable	300	100,1	200	110,5	240	115,1
14	delicate pupae.	13	117,8	45	126,2	105	139,4
15	grape	90	410,5	95	514,5	102	661,1
16	fruit	35	149,4	42	169,3	49	182,6
17	permanent meadows	11	10,5	12	12	13	14,5
18	permanent pasture	29	7,2	32	8,5	35	10,5
19	Winter blends	-	-	-	-	-	-
20	Spring blends	-	-	-	-	-	-

Table 8: Projected development of implementation prices and subsidies in €.t^{-1} (recalculation)

	OWL. SECTOR (CROP)	1. PROPOSED PERIOD		2. PROPOSED PERIOD		3. TARGET PERIOD	
		SUM t	YIELD - PROFIT €. t-1	SUM t	YIELD- PROFIT €. t-1	SUM t	YIELD- PROFIT €. t-1
1	winter wheat	2000	165,3	2250	180	4500	195,6
2	spring barley	500	180	600	245,5	750	198,5
3	hip. on grain	100	195,5	285	199,4	300	210
4	peas	200	308,9	220	536,3	250	611,1
5	corn for silage						
6	fodder						
7	sugar beet	4000	29,9	4000	31,5	4000	33,2

8	sunflower	194	258,1	237	281,2	286	303,1
9	rapeseed	60	335	100	350	200	360
10	green peas	30	249	66	265,6	105	301,1
11	early potatoes	158	260,5	132	282,1	120	300
12	tobacco	38	1429,2	32	1598,3	30	1709,5
13	vegetable	300	149,4	200	156	240	174,3
14	delicate pupae.	13	207,5	45	217,4	105	237,3
15	grape	90	410	95	505,1	102	611,2
16	fruit	35	182,6	42	215,8	49	249
17	permanent meadows	11	10,5	12	12	13	14,5
18	permanent pasture	29	7,2	32	8,5	35	10,5
19	Winter blends	-	-	-	-	-	-
20	Spring blends	-	-	-	-	-	-

Note: Yield – strike price of product and subsidies in €.$^{t-1}$

Table 9: Economic assessment of proposed solutions (variants)

		1ST PERIOD				2ND PERIOD				3. TARGET PERIOD			
		COSTS	REALIZATION PRICE	ECONOMIC RESULT	PROFITABILITY RATE	COSTS	REALIZATION PRICE	ECONOMIC RESULT	PROFITABILITY RATE	COSTS	REALIZATION PRICE	ECONOMIC RESULT	PROFITABILITY RATE
1	winter wheat												
2	spring barley												
3	hip. on grain												
4	peas												
5	corn. for silage												
6	fodder												
7	sugar beet												
8	sunflower												
9	rapeseed												
10	green peas												
11	early potatoes												
12	tobacco												
13	vegetable												
14	delicate pupae.												
15	grape												
16	fruit												
17	permanent meadows												
18	permanent pasture												
19	Winter blends												
20	Spring blends												

Table 10: Economic evaluation of proposed solutions (variants) completion

	1ST PERIOD				2ND PERIOD				3. TARGET PERIOD			
	COSTS	REVENUES	ECONOMIC RESULT	PROFITABILITY RATE	COSTS	REVENUES	ECONOMIC RESULT	PROFITABILITY RATE	COSTS	REVENUES	ECONOMIC RESULT	PROFITABILITY RATE
∑profit CROP (in thousand €)												
Economic result CROP (in thousand €)												
Profitability rate - CROP												
∑ profit LIVESTOCK (in thousand €)			-13,9				21,6				121,2	
Costs livestock (in thousands €)	516				572,6				662			
Profitability rate LIVESTOCK												
Acreage of field (ha)	1686				1659				1630			
Costs (in thousand €) field.												
Profit from the field. (in 1000 €.ha^{-1})												
Profitability rate												
Efficiency												

$$\text{Profitability rate} = \frac{\text{profit}}{\text{costs (expences)}} \text{ x } 100$$

$$\text{Efficiency} = \frac{\text{profit}}{\text{costs (expences)}}$$