

## The methodical basis of estimation of flax cluster elements' competitiveness

*The article examines the problems of formation and development of flax cluster in Vologda region by inter-branch and inter-territorial cooperating. The effectiveness of this cluster is primarily determined by the level of competitiveness of its products, it depends on the rate of development of advanced technologies of agricultural production, industrial primary processing of raw flax and textile industry. Basing on the data available in the system of state statistics and manufacturing accounting, the author suggests the technique to reveal the competitiveness of major products made of flax and the competitiveness of flax cluster as a whole. The algorithm of this technique for vertically-oriented formations in regional flax complex has been worked out.*

*Vologda region, cluster, flax complex, competitiveness, flax fiber, linen fabrics.*



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As is known, competitiveness is defined in a broad sense as an object property to meet in a certain extent the specific needs of different subjects, compared with other similar objects. All variety of competitive relations arising in the economic sphere by the degree of concentration of various subjects can be roughly divided into three levels:

macro-level (economic complex of the region, country, union of countries);

meso-level (industries, associations of enterprises, organizations or firms);

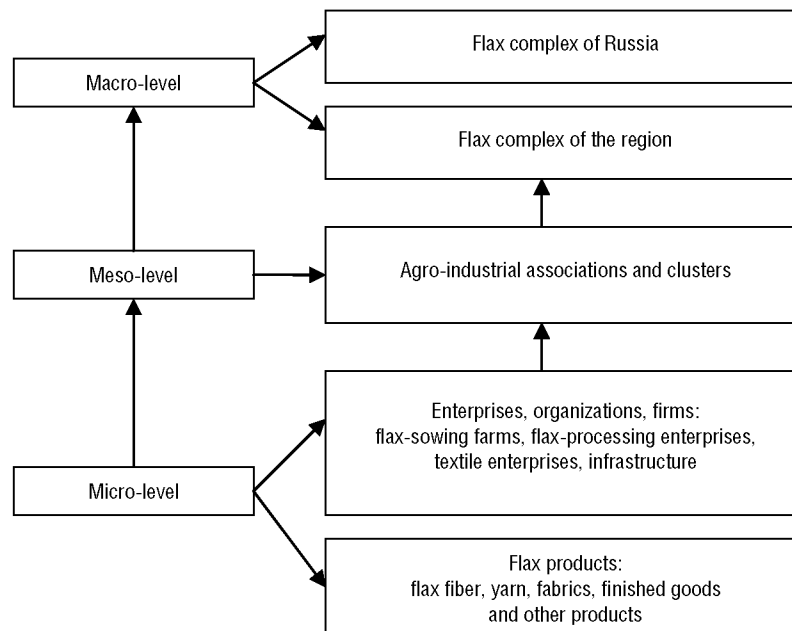
micro-level (specific types of products, productions or enterprises).

Basing on the selected hierarchies of objects of competitiveness we identified the following hierarchy levels of competitiveness in the flax complex (*fig. 1*).

It must be noted that while the created agro-industrial associations (clusters) inside a separate region being established, operated and consolidated, the competitiveness of its flax sub-complex will be associated with the competitiveness of the created cluster. Thus, the regional flax complex in the form of its economic clustering is a subject of meso-economic structuring.

Modern economic literature pays enough attention to the issues of methodology for assessing the competitiveness, but in our view, the choice of assessment methods should be determined by the choice of the level and the objects of analysis, as well as the researcher's approach to interpretation of the term "competitiveness". The economic literature lacks for agreed definition of the category

Figure 1. Hierarchy levels of competitiveness in the flax complex



“competitive enterprise”, and it is proved by, for example, more than 30 definitions identified by H.A. Faskhiev [8]. In addition, A.P. Dorogovtsev and A.V. Maklakhov [4] noted that enough frameworks for forming regional clusters have already been formed in Russia, and to estimate the regional clusters and to determine the nature of control actions upon the competitiveness of the region one can use the analysis of competitive forces of the cluster participants, the evaluation of the results of its operation, the internal motivation of initiation and maintenance of clusters, etc.

Competitiveness of flax production depends on many factors, which can be divided into external and internal. This stage of development of the flax cluster assumes possible, first of all, to have a directorial impact on the internal factors, but with the influence of environmental factors. The factors determining the competitiveness of the flax cluster are shown in *table 1*.

To assess the cluster competitiveness we have adopted the technique based on the assessment of product competitiveness as a priority technique.

Despite the objective shortcomings of the existing method, we believe that the higher is the competitiveness of production manufactured by enterprise (cluster), the higher is the competitiveness of enterprise (cluster). On the other hand, the consequence of what products the company produces is its economic and financial conditions, that is, the product competitiveness is determined by its performance of economic and financial situation, as well as marketing activities to promote the product on the market. In this regard, we share the view of many contemporary economists voiced N.S. Yashin [9], L.P. Dashkov, I.E. Sorokina [2] and others that the commodity competitiveness is a relative characteristics of the capacity of the enterprise and the conditions of its operating.

However, the relatively healthy financial state of enterprise can be largely determined by, for example, non-productive activities which sometimes can't take into account the current market competitive advantage.

The flax fiber is almost a unique (except for the flax seeds) article in the structure of sale

Table 1. The factors determining the competitiveness of the flax cluster

External factors	Internal factors
Climatic conditions	The variety of flax and its qualitative characteristics
The state of the world market of flax and flax products	The condition of material and technical base
The state of the world market of textile fibers (artificial, synthetic, cotton)	The level of costs for growing, harvesting and processing of flax and production of finished goods
Fashion trends in textiles and clothing	Use of modern technology and equipment
The level of state support and regulation of industry	The self-sufficiency of cluster participants with the raw flax
The standardization and certification level	Cluster control system
The solvency level of consumers	Marketing activity of cluster participants
The level of scientific and technical developments in the flax industry and allied industries	The provision of the cluster participants with qualified personnel
The level of regional support and regulation of the industry	

goods in the agricultural sector of flax complex, the fabric – in the textile sector, respectively, the competitiveness of these products largely determines the competitiveness of enterprises in the cluster, as well as its financial and economic state and reputation.

Interpreting the opinion of N.S. Yashin [9], the correlation of hierarchy levels of competitiveness in the flax complex of the region is akin to an iceberg in the ocean: its tip (external display) is the competitiveness of flax products, its inner essence is the competitiveness of the regional flax cluster, and the ocean is the region's competitiveness.

In summary, the interdependence between the levels of hierarchy of competitiveness in the flax complex of the region is shown in *figure 2*.

Further we will believe that the competitiveness of the flax cluster is **an ability of the final product of the cluster to satisfy the needs of external demand and to be in demand at the market which is external to the cluster, provided the best supply of domestic demand for intermediate products.**

According to generally accepted basis for determining the competitiveness of products it is expected to use economic (price) indicators such as production cost, selling price, consumption price, etc. along with the complex quality index. This point is indisputable, if the product is the commodity which is completely ready for sale and consumption.

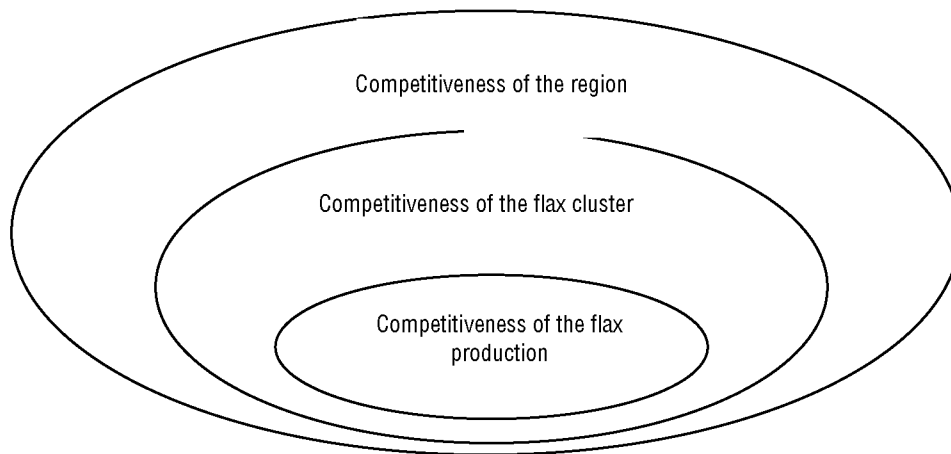
Due to the nature of flax production and the flax cluster chosen by us as an assessment object, the calculation of the index of economic characteristics of the price of various types of flax products seems to be difficult to perform because of the following reasons:

- firstly, the flax industry is currently subsidized, that's why we consider it is incorrect to use the cost of sales excluding subsidies as valid values of the price indices;

- secondly, the estimating of the amount and the rate of subsidy is currently related to the competence of the regions, and the order of payment of subsidies in a given region is changing and improving almost every year, so the use of price indices of flax products including subsidies, in our opinion, distorts the results and makes the price indicators including subsidies incomparable to assess the competitiveness of products in the dynamics or in the comparative assessment of product competitiveness of different regions.

Analysis of the methodological developments of competitiveness assessment shows that they disclose mainly the methods for assessing the quality of industrial products, while the specific features of production of agro-industrial associations haven't been researched enough.

Figure 2. The interdependence of levels of competitiveness in the flax complex of the region



As for the assessing the competitiveness of flax production it is necessary to take into account the number of process stages in its production and the complexity of manufacturing processes for its processing. In addition, the fact that the flax cluster combines both agricultural sector for growing and producing the flax fibers and textile sector for producing the finished products made of flax.

Based on our economic analysis of the flax farms and processing enterprises of the Vologda region and the revealed factors of low competitiveness of products manufactured by them, we suggest the following author's method of assessing the competitiveness of the flax cluster.

Table 2 represents the individual indicators of competitiveness for each type of flax products, which have, in our opinion, the greatest influence on the competitiveness and efficiency of the flax cluster.

So far as the end products of the agricultural sector is flax fiber and those of the textile sector (at this stage of the cluster) is fabric, we consider it reasonable to exclude the intermediate items of agricultural products and secondary products of textile sector from the calculation. While creating the in-sourcing clothing production in the flax factories and introducing the technologies of deep processing of flax

and wastage of in-house production, these figures will have a significant impact on the competitiveness of the cluster as a whole.

According to the author's definition of the cluster competitiveness, to calculate we use the following criteria as the basic criteria of competitiveness:

- the criterion of the competitiveness of major products of the cluster (flax fiber, flax seeds and flax fabrics);
- the criterion of provision of the cluster textile sector with flax seeds and flax fiber produced by local agricultural and flax processing enterprises (hereinafter –the own raw material).

Calculation of criteria and rate of the competitiveness of the cluster is carried out in accordance with the formula of weighted arithmetic mean:

$$C_{cl} = C_{ffiber} \times a_1 + C_{fs} \times a_2 + C_{ffabr} \times a_3 + C_{prov} \times a_4, \quad (1)$$

where  $C_{ffiber}$  – value of criterion of the competitiveness of flax fiber;

$C_{fs}$  – value of criterion of the competitiveness of flax seeds;

$C_{ffabr}$  – value of criterion of the competitiveness of flax fabrics;

$C_{prov}$  – value of criterion of provision of the cluster textile sector with its own flax fiber;

$a_1, a_2, a_3, a_4$  – coefficients of criteria weight.

Table 2. The individual indicators of production competitiveness of the flax cluster

Cluster sector	Item of production	Competitiveness indicator	
		Name	Measurement unit
Agricultural sector	Flax straw	Crop capacity per sown area	centner/ha
		Quality	N <sub>e</sub>
	Rotted straw	Crop capacity per sown area	centner/ha
		Quality	N <sub>e</sub>
	Flax seeds	Crop capacity per sown area	centner/ha
		Quality	Reproduction, class
	Flax fiber	Crop capacity per sown area	centner/ha
		Quality	N <sub>e</sub>
		Share of long fiber	%
	Textile sector	Yarn	Blend composition
Fineness of yarn/titer			N <sub>e</sub> /tack
Tensile strength			cH/tack
Colour gamma			Number of kinds
Fabrics		Fiber composition	Number of kinds
		Fabric weight (minimum and maximum value)	g/m <sup>3</sup>
		Kind of weave	Number of kinds
		Colour gamma	Number of kinds
		Type of finish	Number of kinds
		Width (minimum and maximum value)	cm
Finished goods (cloths, table linen, bedclothes)		Conformance to fashion	score
		Variety of styles	Number of kinds
		Variety of sizes	Number of kinds
		Brand (vogue)	score
Other products		Item of production, including the products made from enterprise's own waste	Number of kinds

Algorithm for calculating the competitiveness of the cluster by the proposed procedure includes the following steps:

1. To determine the coefficients of criteria weight of the competitiveness of the cluster.

The coefficients of criteria weight are defined by the author on the basis of her own studies considering the experts' opinions of the Department of agriculture, trade and food resources of Vologda region:

$$a_1 = 0,2; a_2 = 0,1; a_3 = 0,6; a_4 = 0,1.$$

2. To choose the optimal unit index of the competitiveness of products.

3. To determine the basic (optimal) value of unit indices and their weight.

When assessing the competitiveness the following things can be used as a basis for comparison:

- a particular product having the largest share of sales in the market;

- a competing product;
- a group of analogue goods;
- the value of the required useful effect;
- a hypothetical example;
- the needs of customers, etc.

In order to assess the competitiveness of flax products of the cluster we propose to use the needs of cluster members (for the intermediate products) and the requirements of customers (for the end products) as basic samples.

In view of the fact that the performance of the cluster at its initial stages is determined, above all, by the degree of provision with the intermediate types of products of each successive link of the cluster due to the supply of the previous link, the base value of competitiveness indicators of intermediate products (flax fiber etc.) may be determined based on the participants' needs in the regional cluster and the national average figures (for products

supplied to the domestic market) and the world average figures (for exports) of flax industry of Russia in a number of recent years. However, in this study as a basic value of unit indices of the competitiveness of flax production we have taken their quantitative values which allow the flax industry to operate with positive profitability. For instance, B.A. Pozdnyakov [5] believes that the conditionally permanent costs for the cultivation of long-fibred flax are compensated by proceeds from the sale of the fiber only if the yield is at least 7 centner / ha, and the acceptable level of profitability can be achieved if the quality of long fiber is not less than number 12 and the yield of flax seeds is not less than 3 centner / ha, provided a half of seeds has sowing condition. The researches of A.A. Simonov [6] show that flax growing is efficient if the yield of flax fiber is not less than 6.5 centner / ha, and the calculations of N.A. Belyakova and P.M. Sovetov [1] argue that the profitability of flax production is positive if the rotted straw yield is not less than 17-18 centner / ha, which corresponds to the yield of flax fiber of 7 centner / ha on an average. Based on these researches and adjusted for the regional peculiarities of cultivation of long-fibred flax and the needs of cluster members we have generalized and suggested the following values of basic indices of the competitiveness of flax fiber and flax seeds in *tables 3, 4*.

The basic indices of end products (flax fabrics) and their weight are determined in consideration of the needs of external customers of the cluster as a whole (by the structure and

the volumes of sales of flax fabrics produced by the public joint-stock company “Vologda Textile”) (*tabl. 5*). For the calculation we have used the results of researches carried out by the publishing and consulting firm “Alt” in 2007 [7], the author’s own research and the data of the official site of the OJSC “Vologda Textile”.

Each basic value of the unit indices of the competitiveness of linen fabrics for compatible assessment is given 1 point, all indices are positive (their increase involves an growth of the competitiveness level). The weight of each unit index is calculated by the author on the basis of its importance for consumers, their sum is assumed to be 1, the group distribution of the values of indices weight are shown in *figure 3*.

4. To determine the actual values of unit indices.

The purpose of this evaluation phase is to analyze the dynamics of the competitiveness of flax production “before the project” and “during the project”. For a comparative assessment we have used the data from the author’s research for the period of 2003 – 2008 (before the project) and for 2009 – 2010 (during the project).

The value of the actual unit indices of the competitiveness of flax fiber and flax fabrics is defined as:

$$g_i = \sum \frac{\Pi_i}{\Pi_{i\text{basic}}} \times 100\% \quad (2)$$

where  $\Pi_i$  – the value of  $i$  index of the competitiveness;

$\Pi_{i\text{basic}}$  – the basic value of  $i$  index of the competitiveness.

Table 3. The basic values of indices of the flax fiber competitiveness and their weight

Index	Value of index	Note	Weight of index
Yield of flax fiber (in terms), centner/haa	7 centner/ha	No less	0,4
Quality of long fiber, №	№ 12	No less	0,3
Output of long fiber, %	8 %	No less	0,3

Table 4. The basic values of index of the flax seeds competitiveness

Index	Value of index	Note	Weight of index
Yield of flax seeds, centner/ha	3 centner/ha	No less	0,1

Figure 3. Distribution of the weight values of unit indices of the competitiveness of linen fabrics

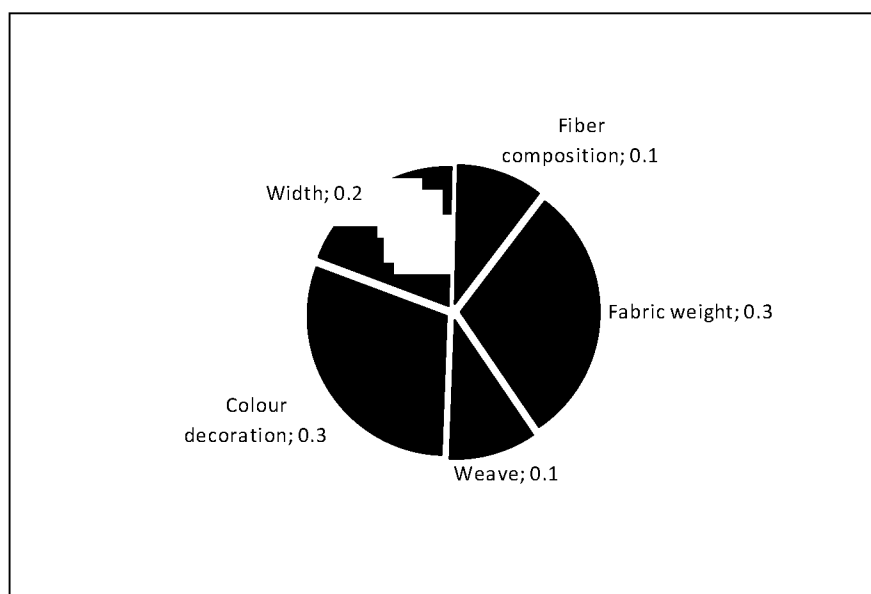


Table 5. The basic values of indices of the flax fabrics competitiveness and their weight

Index	Value of index	Note	Weight of index
Fiber composition	1	Flax 100%	0,02
	1	Flax + cotton	0,02
	1	Flax cotton	0,02
	1	Flax+ wool	0,02
	1	Flax + lavsan	0,02
Total by fiber composition			0,1
Fabric weight		Vesting (Fabrics for shirts)	0,15
	110 -130 gr/m <sup>3</sup>	Fabrics for costumes	
	130-190 gr/m <sup>3</sup>	Fabrics for household linen and	0,08
	more than 200 gr/m <sup>3</sup>	underwear, tapestry and others	0,07
Total by fabric weight			0,3
Kind of weave (number of kinds of each type)	1	Linen weave	0,02
	10	Armure	0,04
	10	Large pattern weave	0,04
Total by weaves			0,1
Colour gamma and kind of finishing (number of kinds of each type)	1	Unbleached	0,00
	1	Bleached	0,03
	20	Tapestry	0,10
	20	Printed	0,10
	10	One-coloured	0,07
Total by finishing			0,3
Width (minimum and maximum value), cm	40-100 cm	Fabrics for towels	0,02
	150 cm	Fabrics for clothing	0,05
	200 cm	Table linen	0,06
	300 cm	Bed linen	0,07
Total by width			0,2

The main end product of the agricultural sector in the cluster is flax fiber, its length and quality is expressed by its number. Long fiber number 12 and above is the most valuable one and of high quality. Such fiber is necessary for producing thin lightweight linen and semi-linen fabrics. Short fiber (№ 3 – 8) is used to produce technical fabrics and fabrics for special purposes, and it also can be processed into flax cotton and other types of flax products. To generate fabrics of mixed structures it is also necessary to have cotton fiber, wool fiber, chemical fibers and other textile raw materials, so the need of textile plants for fibrous materials can't be fully satisfied by domestic products of the cluster. Consequently, as a base value of provision of the textile sector with flax fiber we have taken the planned percentage of provision with its own fiber in 2012, according to the long-term regional program "Development of flax complex of Vologda region in 2009-2012" it is 88% [3].

5. Calculation of index of the cluster competitiveness according to the formula (1).

The calculations show that the creation of the flax cluster in Vologda region has already made it possible in the first two years to increase

the index of the flax production competitiveness by 1.6 times, and it is a clear evidence of positive trends in the industry.

Thus, the proposed technique allows us to assess the competitiveness of some certain elements of the flax cluster in the form of its major products competitiveness criteria and the provision with them within the cluster. While developing the flax cluster in Vologda region and creating a vertically-oriented groups in other regions of Russia, the use of this technique will give us an opportunity to conduct a comparative assessment of competitiveness, to reveal the strengths and weaknesses of the cluster and to propose some concrete measures to improve its effectiveness.

In addition, as far as the cluster being expanded and the new flax products being produced (chaff, medical cotton wool, nonwovens, etc.), this technique can be supplemented by the criteria of competitiveness of these products, and the use of their own raw materials including less valuable species and processing products of its own waste to manufacture them will have an impact on the increase in the criterion of provision with raw materials of the companies in the cluster.

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