

Economic Viability of the Viticulture Enterprises: Brief Theoretical Aspect

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Abstract--- *The relevance of the research is due to the fact that the development of new agronomic techniques and process solutions of viticulture for further processing a necessity arose to assess the economic viability of the viticulture enterprises that use innovation approaches and ways of improving the methods of such research. The key method of studying this problem is assessing the economic viability of the viticulture enterprises enabling to determine the economic effect of growing different varieties of grape plantings in detail, assess various grape varieties by standards of production profitability, and determine the economic viability of the capital investments. The paper presents the primary methods for assessing the economic viability of viticulture enterprises. The economic component is reflected and the efficiency of new techniques is scientifically grounded. As a result of state order research by the end of 2021 new knowledge will be obtained on peculiar features of growing table grapes that are promising for Crimea. The obtained research results will allow making recommendations to farms with industrial plantings and nursery base for growing grape varieties and clones under study with the subsequent introduction thereof in the scientific-production associations, farm enterprises and other households with different ownership forms. Proper selection of species and variety composition as well as more uniform use of labor resources and equipment is of great importance in raising the economic viability of the viticulture enterprises. Further investigations will aim at studying the yield capacity as one of the indicators of economic viability of viticulture with the final result – the wine quantity from the vine with due account for the variety range. There will be collected the analytical data of economic parameters of growing the specified table and wine grapes for inclusion in the regulation of measures to prepare “Typical process flow charts for viticulture” in modern conditions. The work was performed by state order within the frameworks of the research activity on the subject: “Elaboration of efficient technologies for viticulture depending on the growing area by means of studying the agro biological economic attributes of new varieties, clones, required sets of equipment and feasibility study of promising process solutions in Crimean conditions” No. 0833-2019-0021.*

Keywords--- *Yield, Profit, Profitability, Pay-back, Capital Capacity, Labor Productivity.*

I. INTRODUCTION

Production of high-quality and competitive products is one of the primary objectives of the viticulture and winemaking enterprises. The federal budget funds are allocated in form of subsidies for reimbursement (not more

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than 80%) of part of costs for establishment and management of young plantings. However such state support cannot guarantee high technology level of vineyards management without proper control. Vineyards are not always established on lands that will have a guaranteed watering, and the quality of planting material is sometimes low.

Currently there is an increased demand to supplement the range of grapes with adaptive, agrobiologically and technologically valuable, and competitive varieties and clones with the developed varietal agrotechnology the introduction of which in production will ensure the rise in profitability of viticulture and winemaking enterprises, stable fruit-bearing, quality products, long-term yielding life of plantings, and economic independence of the production entities.

The relevance of the research is due to the fact that the development of new agronomic techniques and process solutions of viticulture for further processing a necessity arose to assess the economic viability of the viticulture enterprises using innovation approaches and ways of improving the methods of such research.

The research subject are viticulture enterprises growing the clones of wine grapes such as Cabernet Sauvignon, Muscat Blanc, Rkatsiteli, Chardonnay, and Aleatico; and table grapes such as Matilda and Victoria Romanian.

In contemporary literature the economic viability of enterprises growing new varieties of grapes and introduced clones of wine grapes of European origin is poorly studied and covered. The economic effect obtained by the viticulture enterprises is the rise of labor productivity and decrease of labor intensity, material intensity and product costs, as well as growth of income and profitability.

Great contribution to studying economic viability of the viticulture enterprises and gaining economic effect from viticulture as finished product for processing enterprises was made by such scholars and practical men of Russia and former USSR as: Novikov Yu.N., Obolenskiy K.L., Smirnov V.A., Lyannoy A.D., Andryushchenko L.G., Onishchenko S.K., Sheremet A.D., Karaman M.M., Chernyavskiy A.F., Venichenko T.A., Rudenko V.E., Gordeyev V.N., Guseinov Sh.N., Chigrik P.P., Monogarova O.A., Negrul A.M., Merzhanian A.S., Potapenko Ya.I., Zakharova E.I., Amirjanov A.G., Smirnov K.V., Nikiforova L.T., Turmanidze T.I., Aliev N.A., Bondarev V.P., Troshin L.P., Serpukhovitina K.A., Ivanov G.I., Jalal Mir Abdul Kayum, Kraynyuk M.M., Maidanevich Yu.P., Lazareva N.A., Chugunova T.N., Cherven I.I., Shebnina O.V., Korotkova O.V., Maidanevich P.N., Zagotov V.A., Boyko N.K., Safonova V.I., Polyukhovich E.A., Vorobyev N.N., Tsvetkov N.A., Stankevich A.A. et al.

The following scholars-viticulturists also dealt with the development of agricultural technology in viticulture: Vernovskiy E.A., Ivanchenko V.I., Alyosha A.I., Matchina I.G., Likhovskoy V.V., Oleynikov N.P., Korsakova S.P., Baranova N.V., Rybalko E.A., Tkachenko O.V., Egorov E.A., Petrov V.S., Ravaz L., Shaulis N., Panych N.T., Merzhanian A.S., Tseyko A.I., Dubinko V.K., Karzov V.F., Mikhaylyuk I.V., Sogoyan R.Ya., Amirjanov A.G., Matuzok N.V., Beybulatov M.R., Tikhomirova N.A., Urdenko N.A., Buyval R.A. et al.

II. MATERIALS AND METHODS

Crimea is known as a region of historically established gardening, viticulture and winemaking.

Viticulture is a basis of the viticulture and winemaking complex of Russia ensuring grape production for consumption thereof in fresh and dried form and processing for grape juice, wine and cognac. For a long time the

viticulture was focused on growing wine grapes and clones, therefore the major quantity of grapes was produced for wine.

It is planned by the sector of economic research of the Federal State Budgetary Scientific Institution “All-Russian National Research Institute of Viticulture and Winemaking “Magarach”, Russian Academy of Science” (FSBS ARNRIVW Magarach, RAS) to elaborate modern typical flow process charts within the frameworks of the research activity on the subject “Elaboration of efficient technologies for viticulture depending on the growing area by means of studying the agrobiological economic attributes of new varieties, clones, required sets of equipment and feasibility study of promising process solutions in Crimean conditions” state order No. 0833-2019-0021. The expected result of the work execution by the department of the RAS research institution is as follows: elaborating efficient viticulture techniques, ensuring sustainable economically and environmentally justified production of grapes; determining the most rational combination of elements of varietal agricultural technique for plantings, evaluating adaptability thereof, selecting the required sets of equipment depending on the growing area to introduce promising varieties and clones in the range of Crimea and economic appraisal thereof; “Typical flow process charts” for viticulture in modern conditions and the list of new generation machines for viticulture with the purpose of their inclusion in the “System of machinery for all-round mechanization of agricultural production for the period of 2020-2030;” new efficient elements of the technology for cultivating introduced clones of the European wine and new table grapes compared to the traditional growing technique and economic appraisal thereof.

The obtained research results will allow giving recommendations to farms with industrial plantings and nursery base for growing grape varieties and clones under study with the subsequent introduction thereof in the scientific-production associations, farm enterprises and other households with different ownership forms. The economic component will be demonstrated and the efficiency of new techniques will be scientifically grounded. As a result of research new knowledge will be obtained on peculiar features of growing table grapes that are promising for Crimea. Introducing new table grapes in agricultural production will help improve their conveyer since the promising table grapes under study refer to the group of varieties of very early to very late ripening, which will significantly increase the period of consuming fresh grapes up to 3.5 months. New table varieties are characterized by smart cluster and berries of different color and shape which improves their competitiveness at the market taking into account the indicators of economic benefits, which is relevant when growing grapes in the Republic of Crimea.

It becomes important and relevant to grow such grape varieties that at high yield capacity and application of a certain management technique require minimum costs for vine management and harvesting. Increasing labor productivity in viticulture is a key condition for intensive development of production. One of such conditions today is vine training as per the element of AZOS-1 technique that allowed reducing costs for grape management and harvesting on the farms of the Production-Agrarian Association Massandra. Such results should be summarized, comparative economic analysis should be performed and economic viability of introducing new approaches to exploitation of plantings should be determined.

Place of R&D: sector of economic research at All-Russian National Research Institute of Viticulture and Winemaking “Magarach”, RAS.

The following methods will be used to conduct the research: analytical, comparative, economic-statistical and marketing analysis, expert assessment and photo (time study), target programs; materials of the federal and regional legislative and regulatory documents, international organizations etc., as well as statistical and analytical materials of the Russian Federal State Statistics Service, Ministry for Economic Development, Ministry for Industry and Trade, Ministry of Agriculture, reference materials, data of the Russian Vine and Wine Association, social research data presented in the official reports, scientific publications etc.

III. RESULTS

Basing on the research of Vernovsky E.A. it can be noted that the value of variety as a factor for enhancing yield and improving the output quality plays the key role due to application of varietal agricultural technique. Grape variety is a clonal form of cultivated plant which is characterized by a combination of morphological, biological and economic attributes making its inheritance. For proper characteristic of varieties the Negrul's description scheme is used [1, pp. 20 - 21]. Within one variety there are clones – groups of plants that differ from the primary variety by a number of positive, economically useful or negative attributes enabling to deal with clonal selection. It is one of the ways to intensify the viticulture enabling to enhance the yield capacity of varieties by more than 50%.

Lately the focus is on fully resistant varieties that are highly resistant to diseases, root form of phylloxera and frost enabling to considerably reduce energy- and labor costs in the branch.

Ivanchenko V.I. and Alyosha A.N. believe that “grape quality and quantity depend on the correlation of biological properties of variety with environmental conditions, agrotechnological growing methods, weather conditions of the year and harvesting period. The most available and at the same time economically beneficial measure is the introduction of new selection varieties of domestic origin, introduced varieties and high-yielding clones into production” [2, p. 19].

Vineyards have a limited distribution area. The main areas of vineyards as of January 01, 2018 are focused in the Republic of Dagestan – 1631 ha, Krasnodar Territory – 1602 ha, Republic of Crimea – 674 ha, Sevastopol – 228 ha, Stavropol Territory – 147 ha and Rostov oblast – 70 ha.

In the Russian Federation the vineyards establishment as of January 01, 2018 is represented by 16 constituent territories of RF. These are Southern, North-Caucasian and Volga Federal Districts. By analyzing the area of establishment across the Russian Federation it can be noted that it decreased in 2017 and made 87.83% as compared to 2016. Nevertheless, in certain regions the rise of establishments is observed in 2017: Krasnodar Territory – by 29.51%, Rostov oblast – by 40%, the Republic of Crimea – by 20.57%. A totally different situation is in the Republic of Dagestan where the establishment in 2017 decreased by 12.55% as compared to 2016, in Stavropol Territory – by 37.45 %, in Sevastopol – by 50.11 %, and in Chechen Republic no vineyards establishment was performed in 2017. The analysis of work carried out to manage young vineyards throughout RF in general shows that the costs for reimbursement of these activities grew by 15.15% in 2017 as compared to 2016. The following growth of costs for management of young vineyards is observed in 2017 as compared to 2016: in Krasnodar Territory – by 15.67%, in Rostov oblast – by 8.78%, in the Republic of Dagestan – by 11.74%, in the Republic of

Crimea – by 132.05%, in Sevastopol – by 40%; the reduction of costs took place in the Chechen Republic by 13.76%, and in Stavropol Territory by 2.4%.

Analyzing such type of work as construction of trellis it can be noted that in 2017 as compared to 2016 there was observed a rise by 12.97% countrywide. The growth can be noted in the Krasnodar Territory by 94.33%, in the Republic of Crimea – by 172.73%, in Sevastopol – by 3.2 times, whereas the decrease is noted in 2017 in Rostov oblast and made 52.72%, in the Republic of Dagestan – 28.63%, and in the Chechen Republic – 35.11%. The ratio of the vineyard establishment area to the grubbing area across RF in general demonstrated a growth of 7.8%. If we consider the Republic of Crimea, the area of establishment in relation to the area of grubbing in 2017 showed a negative trend to decrease by 35.64%. In general, vineyards in Russia get old. It is characteristic of all categories of farms.

The first scientifically and methodologically justified theoretical statements on economic viability are presented in the papers of Karl Marx and Friedrich Engels who assessed the trend of capitalistic production as “a necessity to produce commodity at lower costs, and spend the efforts and funds sparingly [3, p. 20]. Lenin V.I. in his writings stated that one should “find the most efficient option of settling economic problems by way of comparing the costs with the obtained effect” [3, p. 4].

According to Novikov Yu.N., Radchenko V.V., and Agafonov N.I. the efficiency of enterprises of the agro-industrial complex is expressed by the increase in production of economically pure food supplies and raw materials in the required range and quality from each hectare of land, on per capita basis, with a regular growth of performance of agricultural labor and reduction of costs per each product unit at rational use of all resources, conservation of land fertility and normal environmental conditions [3, p. 8]

One can agree with the authors that economic viability shows the final effect of using production facilities and human labor, as well as returns of total investments.

With respect to the activity of economic entities of agro-industrial formations such economists as Dobrynin V.A., Libkind A.S., Obolenskiy K.L., and Pukhlyakov P.P. consider the efficiency of agricultural production as “a political-economic category which relations are associated with gaining the maximum quantity of products from each hectare of land at the least costs of human and embodied labor for production of a product unit” [4, p. 67].

Andryushchenko L.A. believes that groups of motivating factors helping to increase labor efficiency can be divided in 4 groups: material and non-material, psychological incentives and favorable labor and living conditions [5, pp. 239 - 251].

Onishchenko S.K. summarizing the opinion of different authors in defining the category of viability of agricultural production stated the following definition: economic feasibility of producing in-demand agricultural products due to production intensification and quality improvement upon condition of preserving the natural and environmental balance ensuring food security at the least spending of resources per unit of product and creation of conditions for reproduction, accumulation and growth of agricultural capital [6, pp. 292 - 296].

Sheremet A.D. by economic viability understands “returns in form of profit of different resources of the enterprise being at its disposal” [7, p. 301].

Ivanov G.I. asserts that in terms of theoretical-methodological aspect the viability of agro-industrial production is characterized not only by its quantitative component, but also by the size and level of costs and resources that ensured a positive final result [8, pp. 24 - 27].

Jalal Mir Abdul Kayum believes that plant selection is one of the most available and efficient means of raising the economic viability of production. The content of production biological assets being a result of long-term human impact on the vegetable world includes vineyards. Products obtained as a result of using biological assets are grapes; products obtained as a result of processing are wine and juice [9, pp. 116 - 121].

The agricultural enterprises are characterized by improvement of agrotechnical measures and introduction of mechanization of production processes. The development of modern technologies also enables to automate some production operations. Automation of production processes is an efficient way of reducing costs of the enterprise for long-term prospects [10, pp. 211 - 213].

It can be noted that introduction of resource-saving technologies is pressing since it is a direction for strategic development of viticulture enterprises. The impact of automation technologies for vineyards in open land and protected ground should be considered separately which is associated with differences in arranging production processes. Automation facilities allow not only performing process operations without human participation, but also improving schedule of execution of these operations by flow process charts.

Taking into account the Crimean profile as a resort region great attention in viticulture is paid to increasing the relative weight of table grapes up to 25% of the total volume of vineyards. Establishment of new vineyards is fulfilled with a simultaneous mounting of drip irrigation system (over 4 thous. ha) [11, pp. 161 - 172].

The farm profile has a great impact on the primary indicators of the branch development. An example of prospects of concentration and specialization of viticulture and winemaking is a winery Zolotaya balka.

According to classification of Lazareva N.A. the primary approaches to assessment of the enterprise performance can be represented as:

- Functional;
- Factorial;
- Process;
- Complex [12, pp. 216 - 222].

IV. DISCUSSION

Scientific interpretation of economic viability can be represented as: constant growth of profit at the expense of the enterprise income increase, reduction of costs for carrying on business or interaction of these two factors. In agro-industrial complex this scientific interpretation is supplemented by specific nature of the agriculture, namely:

conservation and improvement of fertility of land and environment, natural and climatic conditions and influence of biologically active living organisms, as well as obtaining finished product.

In domestic literature the multi-criteria approach to assessing the efficiency of economic entities is well studied.

Basing on the research of Chugunova T.N. [13, pp. 72 - 75] one can propose a three-level system for assessment of the enterprise performance which is based on such parameters as: structural efficiency of the enterprise activity; dynamic efficiency the summing parameter of which is an annual index of labor productivity; relative economic viability of the enterprise activity.

It should be kept in mind that the current indicators should be compared not only to the previous indicators of the enterprise activity but also to indicators of competitors. It is due to the fact that notwithstanding the positive dynamics of proper performance indicators it can fall behind the pace of the market dynamics and primary competitors, which will result in the loss of market share of the enterprise being assessed and drop of its relative performance.

Gradual settlement of problems associated with optimization of the range of Crimean vineyards will contribute to the quality growth of produced wines, cognacs and sparkling wine, stabilization of the branch development, and increase of competitiveness of the viticulture and winemaking enterprises both at the inner and outer markets. Regional governing bodies of Crimea shall regulate the arrangement of vineyards on its territory with due account for soil and climatic conditions of each region and of separate enterprise [14, pp. 46 - 50].

In order to obtain a sustainable and efficient viticulture in Crimea, and grow the culture without crisis phenomena it is required to elaborate a model of perfect arrangement of wine clones and table grapes on the basis of ampelo-ecological assessment of the territory of Crimean peninsula [15, pp. 249 - 255].

It is proposed to establish the organizing structure at a regional level that will coordinate the activity of certain entities in a bank system. The primary objective should be implementation of investment potential of the viticulture and winemaking complex by way of combining financial resources for attracting national and foreign investments and efficient financial management [16, pp. 69 - 72].

One of the essential conditions for raising economic viability of the agricultural production and rational using land resources is the development of regulatory materials and flow process charts.

Information medium for economic objectives of production is flow process charts for viticulture. Economic entities should adjust to changing economic conditions and take a beneficial place at the market of manufacturers. One can optimally use its resource potential only on the basis of modern economic-mathematical models and information technologies.

Flow process charts combined the latest success in the technology of crop growing of the agronomical science with the system of economic standards of costs and labor remuneration, cost of fuel and lubricant materials, fertilizers, chemical pesticides and herbicides [17, pp. 122 - 128].

Flow process charts served as a basis for calculating the monetary value of land by oblasts, regions and farms in the Soviet period of grape production [18; 19]. However, eventually the interest in drawing up this document was

lost and the concept of minimal soil treatment was advanced. In the economic literature of the last years there are no studies devoted to elaboration and observation of the flow process charts of viticulture.

Flow process charts are made with due account for optimal agrotechnical terms for work performance. They help to improve the technology of grape production, regulate agricultural activities with the purpose of enhancing operating efficiency of the machine and tractor fleet, optimal using the material and labor resources and increasing the product yield from the unit of land area [20; 21].

Preparing flow process charts will create a solid regulatory base that can be used to build optimization models for growing clones of wine and table grapes. The yield growth is conditioned not by the factor of changing ownership forms and establishing new land relations, but by the return to compliance with the standards of flow process charts and standards of fertilizer treatment. In the first turn it is required to restore the standards of fertilizer treatment and strictly comply with other standards envisaged by the flow process charts.

Today it is not difficult to make and renew flow process charts using digital platforms by making a matrix of the flow process chart. Using the matrix the content of the chart can be quickly renewed when some parameters change (cost of fuel and lubricant materials, standards of fertilizers treatment, labor remuneration).

It will allow not only calculating new net cost but also predicting cost changes basing on the tendencies and trends. Flow process charts make it possible to determine the economic viability of both separate agronomic methods and separate production technique.

Timely reproduction of vineyards shall be systematic. It allows taking into account the market fluctuation and consumer preferences more accurately, and introducing new technologies enabling to efficiently grow the grapes. Under such approach to constant renewal of vineyards at the enterprise it is worthwhile to create a subdivision dealing with reproduction of perennial plantings only [22, pp. 146 - 150].

Calculation of monetary value of labor resources (viculturists and winemakers) participating in grape production and processing in Crimean farms was proposed by Safronov V.A. with a complex use of the following parameters: labor costs for culture of 1 ha of vineyards, man-hour, wages fund of viculturists and winemakers on a per 1 ha basis, rub., capitalized assessment of the wages fund of viculturists and winemakers per 1 ha. Labor intensity is determined by labor costs per unit of product (m/hrs, m/day) [23, pp. 174 - 180].

The economic viability of the enterprises of agro-industrial complex shall be assessed from the moment of growing the product as a raw material for further processing by industrial organizations. In practice, growing plant products is a resource-intensive process, state support measures do not fully cover the expenses, and processing enterprises evaluate their efficiency beginning from the technological cycle of processing the agricultural raw materials.

The economic effect from production of a final product with least cost of resources is gained by the processing enterprises. In order to assess the efficiency one should use not the profitability calculation formula of growing grapes and producing wine, but scientifically justified models for calculating the efficiency with due account for the contribution of each structural subdivision to production of final product – alcoholic products.

The category of economic viability should be improved using the adapted methods of calculation thereof for each agricultural branch separately, which will allow taking into account their industry-specific features.

To select the methods for assessing the efficiency of economic entities it is essential to state the criteria:

- Actual financial results that differ from that of competitors;
- Expected growth of financial results;
- Available resources to support and develop the activity.

There are structural criteria of performance efficiency by inner characteristics of the enterprise: operating performance of structural subdivisions, properly established organizational structure, loss of time when ensuring communications between subdivisions, enterprise management quality.

When assessing the efficiency one should understand that the previous experience cannot be prolonged in the future period, but can be used as a long term forecast with a number of key parameters: yield index, profitability index of the enterprise and products, factor productivity index.

The yield in viticulture branch differs by a pronounced periodicity, therefore when calculating economic viability it is better to use the data for an even number of years. For the last 10 years the grape profitability considerably decreased. Increasing the economic viability of the industrial viticulture is closely associated with its rational distribution across the country, establishment of new vineyards in specialized farms with optimal level of concentration and specialization of production.

Proper selection of species and variety composition is of great importance for raising the economic viability of viticulture, as growing the varieties of different ripening period and keeping capacity enables to increase the period of consumption and processing of products, ensures the uniformity of consumption during a year and more uniform use of labor resources and equipment.

The inter-farm cooperation and agro-industrial integration plays an important role for reduction of grape loss. Creating a single technological production process, long-term storage, technical processing and sale of fresh products enables to considerably increase the production efficiency.

In enterprises it is important to properly engage additional branches that will help to develop the viticulture and rationally use land and labor resources. In southern regions grape production is well combined with gardening which allows optimal using farm lands and labor force. The recommended area for vineyards is 10-15 ha per 100 ha of gardens.

The most labor-intensive type of work is grape harvesting. Labor costs per hectare of fertile plantings in a regular manner of growing make 500-670 manhour with a yield of 80-120 dt.

In grape production labor costs can be reduced only upon maximum use of high-performance machines. An essential element of intensive viticulture is irrigation, especially in the areas of unstable watering. Improving the product quality plays an important role in provision of the population with grapes and enhancement of the branch profitability. In order to raise the product quality it is required to improve the variety quality of the planting material. Therefore under conditions of intensive viticulture, grows the role of nursery farms producing high-quality variety

material, and virological and biotechnical laboratories where rehabilitation, testing and initial reproduction of healthy purebred clones is performed. The necessity in planting material is specified in accordance with a plan of establishment and reconstruction of plantings in all forms of agricultural enterprises.

The economic viability of viticulture enterprises can be determined using the following parameters:

1. Yield, dt from 1 ha;
2. Revenue from sales of products from 1 ha, rub.;
3. Additional revenue, rub.;
4. Production expenses per 1 ha, rub.;
5. Additional expenses, rub.;
6. Return on additional expenses (ratio of additional revenue to additional expenses), %;
7. Production cost of 1 dt (ratio of production costs per 1 ha to yield), rub.;
8. Sale costs of 1 dt, rub.;
9. Full cost of 1 dt (sum of production cost of 1 dt and sale costs of 1 dt), rub.;
10. Sale price of 1 dt (ratio of product sales revenue from 1 ha to yield of 1 dt), rub.;
11. Revenue per 1 dt of products (difference between the sales price and full cost of 1 dt), rub.;
12. Revenue per 1 ha (ratio of revenue per 1 dt of products to yield), rub.;
13. Profitability level (ratio of revenue per 1 dt of products to full cost of 1 dt or difference between sales revenue and full cost of 1 dt), %.

Since viticulture is a risky field in Russia, the role of integrated system of plant protection directed at long-term hindering of development of harmful organisms at a safe for the harvest level grew.

Vineyards refer to the primary production funds that wear out and transmit their value in parts to cultivated products – grape. Cultivation costs are covered by investments.

In viticulture the great part of capital costs refers to mounting of trellis, as well as to: construction of irrigation systems, roads, fence, and production planting. Over $\frac{3}{4}$ of labor costs falls on these types of work. The greatest part of labor costs falls on two periods: March-April and September-October. When vineyards start fruiting fully the net cost is supplemented by depreciation deductions – 2.5% is a depreciation rate.

In order to determine the economic viability of capital investments, the overall capital investments are calculated as a difference between actual capital investments before the onset of full fruiting of plantings and product sales revenue that was received before the onset of full fruiting of plantings.

The economic viability of investments is calculated by the following parameters:

1. Gross product and net profit per ruble of total capital investments;
2. Payback period of capital investments by net revenue;
3. Yield capacity of fruiting plantings;
4. Gross product and net profit per hectare of fruiting plantings;
5. Profitability of production.

The cost of young non-fruiting vines is not taken into account as they are products in process. The economic viability of capital investments shall be determined once every four years from the moment of full fruiting of vineyards.

Payback period of total capital investments is determined with due account for the time till the moment of vineyards fruiting as a ratio of total capital investments in planting and management of vineyards till their full fruiting to the net profit gained after the onset of fruiting period.

The payback period depends on the natural-economic conditions, variety composition, level of specialization and concentration of production, density of plants per unit of area and other factors.

When selecting the variety of vineyards it is required to calculate the economic viability of production thereof by the parameters focused on the economic value of the variety: yield, cost of gross product per one hectare (product of average yield by varieties for even number of last years and sales prices for years under study); net revenue per 1 dt (full cost is deducted from the sales price of 1 dt) and per 1 ha of fruiting plantings (product of net revenue per 1 dt and yield); profitability level (ratio of net revenue per 1 dt to full cost, %).

The economic assessment of grape varieties is performed by the norm of production profitability:

$$Npp = \left[\frac{GP}{E} - 1 \right] * 100, \quad \text{or} \quad \left(\frac{S-C}{C} \right) * 100 \quad (1)$$

Where Npp is a norm of production profitability;

GP – is a cost of gross product per 1 ha;

C – production expenses per 1 ha;

S – sales price of 1 dt of grape of certain variety;

C – cost of 1 dt of grape of the same variety [24, p. 262].

Vorobyov N.N. and Frolko S.S. believe that in production the economic entity is interested in gaining maximum profit, meeting the consumers' interests, and in minimum environmental pollution at the same time. The authors suggest when considering the economic viability of production to distinguish between the economic, environmental-economic and social efficiency [25, pp. 255 - 260].

We consider that the economic viability of viticulture enterprises is affected by the same factors as the traditional agriculture. However the role of these factors is somewhat different which is largely reflected on the structure of costs. It should be understood that the environmental-economic effect gained by the viticulture enterprises is the difference between the production results and its costs bearing the value of damage. Some authors determine the environmental-economic damage which is caused to the land while using it, by means of monetary estimate of fertility decrease and losses from products that were not received because of yield drop.

Tsvetkov I.A suggests calculating the economic damage caused to land resources of the enterprise as a result of growing agricultural products by the following formula:

$$D_{ec} = D_{degradation} + D_{chemical\ sub-s} \quad (2)$$

$$D_{degradation} = P_l * S * C_v \quad (3),$$

where P_l – is the land price, rub. per 1 ha;

S – area of soils and lands subjected to degradation, ha;

K_3 – coefficient of environmental situation and environmental value of the territory [26].

Environmental and economic efficiency of viticulture enterprises is distinguished by high energy capacity. Depending on fluctuation of prices and availability of different types of energy the performance of the enterprise will change severely.

Socio-economic efficiency is practically not studied presently due to unclear and distorted data on comparing the health condition and average lifetime of the population that acquires only pure products. Socio-economic viability of viticulture enterprises can be determined as a value of prevented social damage characterized by the number of diseases and deaths, labor productivity decrease and growth of social payments for the population due to temporary disability.

In viticulture enterprises the result of socio-economic viability directly depends on natural-climatic conditions and poor division of labor as compared to industrial production, it is more difficult to establish direct dependence between the quantity and quality of living labor and final production results. All this makes barriers for stimulation and efficient combination of incentive and punishment methods which indicates a problem of human resources formation. Fulfillment of potential of each employee in a viticulture enterprise in form of labor productivity growth will allow achieving maximum economic viability in conditions of competitive environment.

The peculiar feature of contemporary development of viticulture is predominance of wine grapes over table grapes. Table grapes predominate in the North-Caucasian and Southern Federal Districts of Russia. The studies showed that the number of plantings grew in 2013-2016, including in the fruiting period by 3.7 thous. ha as compared to 2011-2005. Despite low growth of plantings the gross collection grew due to the yield of the period under study which in its turn increased and made 44.2 dt/ha in average [27, pp. 174 - 179].

Further research will be directed at studying the yield as one of the indicators of economic viability of viticulture with a final result – the quantity of wine from the vine with due account for the variety range [28, pp. 64 - 65; 29, pp. 165 - 168].

The efficient activity in viticulture can be achieved only at regular and active state support with the control over technological processes of growing grapes, beginning with the simplest operations and ending with association of organizational structures of enterprises represented on one local territory (in this case, the Republic of Crimea and merge of the leading enterprises in viticulture). The viticulture and winemaking branches cannot be considered separately, they are complementary in the concept of land economy.

V. CONCLUSION

Summarizing the above it should be noted that production of high-quality and competitive product – wine, is one of the primary objectives of viticulture. The quality of products is largely determined by the quality of raw materials – grapes, therefore, a relevant raw material base is required for successful development of the branch.

In this respect, the present paper is aimed at discovering theoretical aspects, searching for methodologies enabling to perform comparative economic analysis and determine economic viability of introducing new approaches to exploitation of plantings of economic entities presented in viticulture.

The relevance of the research is due to the fact that the development of new agronomic techniques and process solutions of viticulture for further processing a necessity arose to assess the economic viability of the viticulture enterprises using innovation approaches and ways of improving the methods of such research. The key method of studying this problem is assessing the economic viability of the viticulture enterprises enabling to determine the economic effect of growing different varieties of vineyards in detail, assess various grape varieties by standards of production profitability, and determine the economic viability of the capital investments.

The paper presents primary methods for assessing the economic viability of the viticulture enterprises. The economic component is reflected and the efficiency of new techniques is scientifically grounded. As a result of the research by state order new knowledge will be obtained on peculiar features of growing table grapes that are promising for Crimea.

The obtained research results will allow making recommendations to farms with industrial plantings and nursery base for growing grape varieties and clones under study with the subsequent introduction thereof in the scientific-production associations, farm enterprises and other households with different ownership forms. Proper selection of species and variety composition is of great importance in raising the economic viability of the viticulture enterprises since growing varieties with different ripening and keeping capacity allow increasing the period of consumption and processing of products, ensures the uniformity of its consumption during a year, as well as more uniform use of labor resources and equipment.

Further investigations will aim at studying the yield as one of the parameters of economic viability of the viticulture with the final result – quantity of wine from the vine with due account for the variety range. Economic proposals for using new agronomic techniques and process solutions of resource-saving technologies for growing grapes in different areas of Crimea will be justified. There will be collected the analytical data of economic parameters of growing specified table and wine grapes for inclusion in the regulation of measures for preparing “Typical flow charts for viticulture” in modern conditions.

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