

## **Using Capitalization Method to Assess Monetary Value of Agricultural Land Under Rental Considerations and Its Component**

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### **Abstract**

The article deals with the expert valuation of agricultural land plots with the rent capitalization method (by its components), as well as with the impact of land rent and its all components on expert money valuation of land plots on the basis of "Ukrainian lan-2" nature metric model. The analysis of the study proved that this model allows high-precision expert monetary valuation of agricultural land in compliance with the International Valuation Standards and National regulations.

**Keywords:** Expert monetary evaluation, Land plot, Land rent, Agricultural method, Rent capitalization

## **Tarım Arazilerinin Bileşenleri İle Birlikte Kiralama Şartlarında, Kapitalizasyon Metodu Kullanılarak Kira Karşılığı Değerlemesinin Yapılması**

### **Özet**

Bu makale, "Ukrainian lan-2" doğa metrik modeli temeline dayalı arazi parçalarının tüm bileşenlerini dikkate alan kapitalizasyon faiz oranı yöntemi ile arazi kirasının belirlenmesini kapsamaktadır. Bu çalışmanın analizi, bu modelin tarım arazilerinin yüksek hassasiyetli uzman parasal değerlemesine, Uluslararası Değerleme Standartları ve Ulusal Düzenlemelere uyumlu olarak izin verdiğini kanıtlamıştır.

**Anahtar Kelimeler:** *Uzman Parasal Değerlendirme, Arsa, Arazi Kiralama, Tarımsal Method, Kapitalizasyon Faizi*

### **Introduction**

Topicality of land's monetary and evaluation has been increasing lately, and the the scope of its applying is being expanded. Land is one of the basic elements of production, through which a state creates its wealth. At the same time, land is a natural object that already exists and is not created by the mankind. The monetary valuation of land is an economic mechanism of land relations, land privatization, land mortgage, taxation and land market establishment. Expert monetary valuation of land plots and ownership rights to them is carried out in order to determine the value of the

assessment object, under carried out civil law agreements regarding land plots and the ownership rights, except for the cases as defined by the Law of Ukraine "On Land Valuation". The inclusion of agricultural land into economic cycle is inextricably linked to the resource pricing and its expert money valuation. Revenue land pricing (and, accordingly, expert monetary assessment) is based on the land rent. Land rent is a nature product actualized in the process of labor activity.

Thus the amount of rent depends on the nature and characteristics of the acquired land, its location, the degree of applying scientific and technological progress. Being a

complex and multifaceted concept, the notion of land rent includes a lot of species and varieties, their clear definition and high-precise size measuring makes it possible to explain nature of the land correctly, and it is a prerequisite of high quality land expert money valuation. Land rent is manifested as landowner's income. It is obvious that the study of land rent essence has attracted the attention of many scientists since long ago.

Particularly intensive research on the essence of land rent began at the beginning of the nineteenth century. (Petty, 1993; Smith, 1935; David, 1911) made a fundamental contributions to the study of land rent essence and relationship between land rent and land price (value). K. Marx summarized their research and presented the labor theory of rent in a completed form (Adoratskyi, 1938).

However, economic development and human practice required further achievements of land rent nature and land prices. An important contribution to the study of land rent and land valuation made by A.S. Danylenko, M.Ya.Dem'yanenko, V.Ya.Mesel-Veselyak, N.S. Kruchok, S.I. Kruchok, V.M. Kilochock, A.G. Martyn, A. M.Tretyak, A.V.Chupis, M.M.Fedorov, O.M. Shpychak etc.

Among the latest research on land rent and its genetic relation to the land price the paper "Determination of rent as a precondition for land expert money valuation" by N.S. Kruchok (2009) deserves consideration. The paper deals with the basic types (components) of land rent and discloses the procedure of their calculations.

In that paper we aim to clarify the nature of land rent and its impact on the land price and land expert evaluation. We have determined the essence of rent on the basis of abstract logical method and the method

of scientific knowledge. The relationship between the land rent and the land expert money valuation was investigated with applying mathematical and calculation-constructive methods using the research records of "Svytyaz" scientific research farm, Bila Tserkva district, Kyiv region (the farm name changed).

## Material and Method

There is no unified approach to defining the essence of land rent in foreign and domestic science. The limited scope of the article does not allow detailed analysis of various interpretations of the land rent nature and its content during the past centuries. But we consider such generalizations of the interpretations enabling to conclude the following: land rent, as it has already been noted, is a product of nature, which is realized in the process of labor activity. N.S. Kruchok identified the following types (components) of rent in respect of agricultural land (Kruchok, 2009):

*Fertility rent* depends on the natural characteristics of land and human impact on them (both positive and negative).

*Technological rent* is derived from scientific and technical progress application level.

*Product quality rent* depends on the ecological state of land (ecological rent) as well as on other factors affecting the quality of products. It is realized through the price of products considering possible additional cost.

*Redistributive (price) rent* arises when the equivalence of prices for agricultural products and resources required for its production is violated.

*Location rent* includes the territorial and road rent.

*Territorial rent* is determined considering land plot connection with suburban, resort and recreational areas and so on. Realized through the products price.

*Road rent* is determined by the roads distance and their state - from the land plot to the nearest settlement, from this settlement to sales markets. The road rent affects the costs".

In our opinion, the abovementioned definitions of the rent components have not only necessary theoretical foundation, but are of great practical importance as well, since they direct the scholars and practitioners' searches into the quantitative measurement of these components, and thus into improving the accuracy of land plots expert money evaluation.

The impact of rent along with all its components on expert money valuation of a land plot can be determined with a formula developed on the basis of

"Ukrainian land" nature metric model (Kruchok, 2009; Kruchok, 2001):

$$O_v = \frac{[(P \times V_y + P_t \times \partial Y) \times V - E - I_N] \times k}{0,01DR}, \quad (1)$$

## Results and Discussion

The calculation of land rent with the above formula [5] is made on the example of the 3rd section of 1st field crop rotation in educational farms "Svityaz" ERF of Bila Tserkva, Kyiv region. The calculations results are presented in Table 1.

Table 1: Svityaz\* ERF of Bila Tserkva, Kyiv region land plot characteristics

No	Index	Index value
1	Fertility, points	90,8
2	Integral index of physical, chemical and agro-climatic characteristics of the land plot, factor	0,874
3	winter wheat yield increase due to applying scientific and technical progress achievements (considering $P_q = 1$ ), c / ha;	30
4	Distance from the plot to the settlement it relates to, km	0,2
5	Field road condition	good
6	Distance from the settlement to the sales market (Bila Tserkva), 1 <sup>st</sup> group of roads	4
7	Territorial peculiarities of location	Bila Tserkva suburban zone
8	Town population, thousand people	227
9	Ecological state	satisfactory
10	Field technological group	I

\* Authors' calculations

It is not only this rent calculation that is important in expert money valuation with land rent capitalization method. Equally important is the choice of reasonable capitalization rate (the discount rate). Discount rates for land, depending on the level of Ukrainian economy development were grounded by V.O.Melnychuk (2007).

These rates were used in our calculations. All the calculations were done in US dollars.

Land rent, gained by the land plot described in Table 1, is based on the version of "Ukrainian lan-2" with formula. It is 194.84 \$ ha<sup>-1</sup> and the land plot expert money valuation is 4059.17 \$ ha<sup>-1</sup> (formula 2).

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times 15,76 - 338,38 - 238,23] \times 1}{0,048} = 4059,17 \quad (2)$$

Thus, we can conclude that the land plot decreases, its land rent and expert money valuation (formula 3) are affected negatively. If the land plot fertility is highly fertile.

$$O_y = \frac{[(60 \times 0,25 + 0,875 \times 30) \times 15,76 - 297,32 - 185,38] \times 1}{0,048} = 3487,50 \quad (3)$$

Technological rent is essential in agriculture. Widespread use of scientific and technical progress increases the land rent, and the high level of economic development provides lower interest rates (formula 4):

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 50) \times 15,76 - 408,83 - 399,07] \times 1}{0,024} = 9973,00 \quad (4)$$

Redistributive rent is important in Ukrainian agriculture. Outrunning prices for industrial agriculture production tools compared with the prices for agricultural products results in withdrawing the rent portion and a corresponding reduction in the assessed value of agricultural land (formula 5):

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times 14,18 - 380,68 - 159,87] \times 1}{0,048} = 3181,25 \quad (5)$$

The distance of the land plot from the settlement also affects land rent and hence land's expertly monetary assessment. The following changes occur with the distance increasing from 0.2 to 10 km (formula 6):

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times 15,76 - 388,75 - 204,46] \times 1}{0,048} = 3693,68 \quad (6)$$

As the distance to market grows from 4 to 30 km the land rent reduces as well (formula 7) and If the evaluated land was not located in Bila Tserkva suburban area, the land rent would decrease (formula 8):

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times 15,76 - 374,25 - 214,24] \times 1}{0,048} = 3792,01 \quad (7)$$

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times 15,00 - 338,38 - 213,36] \times 1}{0,048} = 3783,54 \quad (8)$$

The deterioration of the land plot ecological state reduces rent due to lowering prices for agricultural products grown in this region, as well as due to connection with possible additional costs associated with the grown products quality control. A significant deterioration of the ecological condition can

cause significant reduction in grown products species, or land removal from agricultural use.

The reduction of land rent under the land plot ecological state deterioration is calculated with the formula (9):

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times (15,76 - 1,58) - (338,38 + 7,00) - 182,21] \times 1}{0,048} = 3451,46 \quad (9)$$

A Land plot which is conducive to cultivation makes significant impact on land rent. The land plot under estimation belongs to the 1<sup>st</sup> Technology Group (best convenient

for cultivation). If it belonged to the 4<sup>th</sup> Technology Group (the worst), its expertly monetary assessment would be the following (formula 10):

$$O_y = \frac{[(90,8 \times 0,25 + 0,875 \times 30) \times 15,76 - 405,56 - 193,26] \times 1}{0,048} = 3576,80 \quad (10)$$

## Conclusions

1. The identified above rent types actually exist and can be determined quantitatively on the basis of "Ukrainian lan-2" nature metric model.

2. The impact of rent on land prices and, consequently, land plots expert money evaluation is very significant.

3. Supply inelasticity will be an important factor influencing land plot price, due to the specifics of land as the product.

4. The presence of high-precision techniques of agricultural land expertly monetary evaluation is one of the necessary preconditions for the creation of a civilized land market in Ukraine. The creation of such techniques is one of the important directions for further research in the area of land relations.

## References

- Adoratskyi, V., 1938. Gospolizdat - Institute of Marx-Engels-Lenin of the CC PCP (b), Marx and Engels Archive, Moscow, Vol. 5, P. 258.
- Volkov, G.A., Holychenkova, L.K., Kozyr, A.M., 1998. Land Market Development: Legal Aspect, *Economy and Law*. №2. P.50.
- Vorob'ev, Ye.M., Gritsenko, A.A., Lisowski, Ye.M., Economic theory. Higher School Manual. "Corwin" Ltd. P.172.
- Shul'ga, N.V., Anisimov, A.V., Bahay, V.O., 2004. Land Law of Ukraine: Textbook Yurinkom Inter, P.43.
- Kruchok, N.S., 2009. Determination of Rent as A Precondition for Land Expert Money Evaluation, *Land Management*, №4, P.48-51.

- Kruchok, S.I., 2001. On Appraisal and Monetary Value of Arable Land, *Bulletin of National Agricultural University*, № 43, P.13-18.
- Melnychuk, V., 2007. Expert Monetary Valuation of Agricultural Land, New Approaches to Capitalisation Rent Assessmentg, *AIC Accounting and Finance*, №1-2 (27-28). - P. 109-114.
- Mykytenko, Yu.I., Sharyi, G.I., 2007. State Regulation: Economic Methods and Interest System under Conditions of Land Market Formation. Poltava area.- P: IAC "Podiia", P. 22.
- Mohylova, M.M., 2000. Land Market as an Important Condition for Efficient Production Development, № 2, P .77.
- Novakovskiy, L.Ya., Tretyak, A.M., 2000. Key Regulations of Land Reform Concept in Ukraine, Land Reform Center, 96 p.
- Nosyk, B., Constitutional and Legal Bases of Land Market Formation , *Land Management Bulletin* ,№1, P. 13-15.
- Pestsova, A.S., 1998. On Land Market Reforming in Ukraine, *Bulletin of Agricultural Science*, P. 23.
- Petty, B., 1993. Treatise on Taxes and Fees , Analogy of Economical Classics: "ЭКОНОМ" and "КЛУЧ",. - P. 7-78.
- Syroedov, N.A., Law Regulation of Land Plots Circulation, State and Right, № 9, P. 41-52.
- Smith, A., 1935. Investigation of Human Wellness Nature and Causes. Leningrad: National social economic publishing house, Moscow, Vol.3 , Page71.
- Fedorov, M.M., 1999. Organizational and Legal Problems of AIC., № 1, P. 100-104.
- Shestyko, A.E., Land Market Formation Conditions , *Bulletin of Agriculture Science*. Vol 310, P.12-18.
- David, R., 1911. The Principile of Political Economics and Taxation. London: A.M.Dent and Sons, LTD.