

# **Tarariko M.Yu. Economic and Energy Efficiency of the Restoration System of Radioactively Contaminated Sod-podzolic Soils Agroecological Functions**

## **Annotation**

Today agriculture is characterized by narrowing of specialization, introduction short crop rotation, reduced volumes of mineral fertilizers and by-products plant involvement as organic fertilizer, in the absence of manure. In this connection there is a set of urgent issues of economic and energy efficiency evaluation of different agri-environmental soil functions restoration systems. In the systematic use both traditional and alternative restoration systems, with organic fertilizers, especially when plowing low value harvest part, humus content increased, that accordingly had a positive impact on soil energy intensity – 17-23 GJ / ha. Hence, the eco-energy and economic analysis showed that both traditional and alternative of soil system restoration should be encouraged for production depending on the production specialization. That is, when livestock specialization traditional system is to be introduced and with plant growing – an alternative one.

**Keywords:** economic efficiency, restoration profitability, energy, crop rotation, agri-environmental functions.

## **Summary**

Today agriculture is characterized by narrowing of specialization, introduction short crop rotation, reduced volumes of mineral fertilizers and by-products plant involvement as organic fertilizer, in the absence of manure. In this connection there is a set of urgent issues of economic and energy efficiency evaluation of different agri-environmental soil functions restoration systems. In the systematic use both of traditional and alternative restoration systems, with organic fertilizers, especially when plowing low value harvest part, humus content increased, that accordingly had a positive impact on soil energy intensity – 17-23 GJ / ha.

Hence, the eco-energy and economic analysis showed that both traditional and alternative of soil system restoration should be encouraged for production depending on the production specialization. That is, when livestock specialization traditional system introduces and with plant growing – an alternative one.

**The purpose of research:** determining the economic and environmental – energy efficiency of traditional and alternative sod-podzolic soils agroecological functions restoration systems, which is particularly important for radioactive contaminated lands that are returned to agricultural production in the remote post-accident period.

**Methods of study:** The study was conducted in a stationary field experiment that founded in 2004 on experimental field of Polissya Institute of Agriculture of NAAS (village Hrozino of Korosten district, Zhytomyr region). The soil was sandy sod-podzolic, arable layer during laying experiment had a total humus content – 1.27 %, phosphorus – 8,4 and exchangeable potassium – 10.2 mg /100 g of soil pHsol. – 5.0, Ng – 2.25 mg/equivalent for 100 g. 4-fields crop rotation: lupine, winter triticale, potatoes, oats. We analyzed the following restoration systems variants:

1. control without fertilizer (K);
2. manure of 10 tons / ha + NPK (H + NPK);

3. Adverse products of 20 % humidity 3.8 t / ha + green manure 15 t / ha of green mass + NPK (PP + Sd + NPK);
4. manure 10 tons / ha + 1,5NPK (H + 1,5NPK). The studied agricultural technologies economic and energy efficiency were determined by generally accepted methods.

In the experiment crop varieties that are listed in the State Register of plant varieties suitable for dissemination in Ukraine were used.

**Results:** It was established that the average production costs for crops growing are quite high and ranges from 0.9 thousand dollars/ha for control up to 1,4-1,5 thousand dollars/ha fertilized backgrounds. This is due to the high cost of potato tubers, which was 1575.2 UAH/t on average for three years in the Zhytomyr region.

However, the average in the region sales prices of oats grain, triticale and lupine were taken of 183, 155 and 270 USD/t respectively, of potato tubers – 211 USD/t, of by-products – 11.3 USD/t. On the natural fertility backdrop this situation ensures gross and net income, at 1.0 and 0.08 thousand dollars/ha respectively, in variants with traditional soil restoration systems application – at 1.9 and 0.4 dollars/ha, alternative one – 1.8 and 0.4 thousand dollars/ha. As a result, on the control the level of profitability was 3 times lower than with agricultural technologies based on the systematic restoration systems use.

**Conclusions.** Hence, the eco-energy and economic analysis indicate that production should be encouraged both traditional and alternative soil restoration system depending on the production specialization. That means, that traditional system introduces for livestock specialization and an alternative one – for plant growing.