

Field located in the forest-steppe zone under Organic Agriculture with Reduced Tillage (Yurii Z)

Organic Agriculture with Reduced Tillage (乌克兰)

Organic Agriculture

This organic agriculture technology combines reduced tillage with organic farming practices to enhance soil health, increase carbon sequestration, and maintain sustainable agricultural productivity.

This example of organic agriculture is applied primarily in the central Poltava region of Ukraine, which is characterized by undulating plains within the Poltava Plateau. The region's fertile chernozem soils provide an ideal environment for sustainable farming practices. These soils are predominantly deep, medium-humus, medium-loam chernozems, known for their agronomically favourable physical and chemical properties, including high organic carbon content (around 3% in the upper layer) and excellent water retention capacity. The natural fertility of these soils, combined with their relatively high nitrogen and exchangeable potassium content, underpins their suitability for organic farming.

Organic agriculture in this context combines two land management technologies (LMTs): reduced tillage and organic farming. Reduced tillage minimizes soil disturbance, which preserves soil structure and reduces erosion, while organic farming eliminates synthetic inputs and relies on crop rotations, organic fertilizers, and biological pest control to maintain soil health and ecosystem balance. The purpose of these practices is to enhance soil carbon sequestration, mitigate climate change impacts, and support sustainable agricultural productivity. productivity

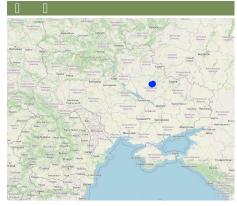
Farming is certified as a producer of organic plant products in accordance with the standards equivalent to Council Resolutions (EU) 834/2007 and 889/2008.

Under this system, shallow tillage is carried out to a depth of 4–6 cm, which helps preserve the natural structure and capillarity of the soil. It employs Horsch cultivators of the "Agrosoyuz," "Scorpion," and "Quant" models. The enterprise also extensively uses disc harrows from the French manufacturer Grégoire Besson, such as the DXRV and DXRV-HD models, which are employed for green manure incorporation. These tools operate at a precisely determined depth, regardless of the micro-relief of the field. Thus, PE "Agroecology" does not use ploughs for inversion tillage but instead prioritizes shallow tillage with cultivators and disc harrows cultivators and disc harrows.

The main crops grown include winter wheat, soy, corn, sunflower, and perennial herbs such as sainfoin. The combination of these crops supports soil fertility and biodiversity while maintaining agricultural productivity. Land Mitigation Technology (LMT) refers to practices and technologies designed to reduce or offset the environmental impact of land use activities. It includes strategies for restoring degraded ecosystems, preventing soil erosion, conserving biodiversity, and managing resources sustainably. LMT is often applied in agriculture, construction, and land development to balance development needs with environmental protection.

Key activities to establish and maintain the technology include transitioning from conventional to organic farming practices, adapting tillage methods to reduced-intensity operations, and maintaining organic soil fertility through natural inputs. These activities require significant initial effort and investment, including soil testing for nutrient content and organic carbon stocks, stakeholder engagement for field planning, and long-term monitoring of soil health indicators. The establishment process also involves collaboration with scientific institutions, such as ISSAR and Bioclear Earth, to ensure effective implementation and validation of the technology.

The primary benefits of this technology include improved soil structure, increased biodiversity, reduced greenhouse gas emissions, and enhanced carbon sequestration. The technology has demonstrated the potential to sequester up to 0.4 t C ha⁻¹ yr⁻¹, with minimal yield trade-offs. Additionally, the resilience of the chernozem soils supports similar crop yields in both organic and conventional systems, thanks to their natural fertility and lower input rates in conventional agriculture. Farmers particularly value the long-term sustainability and ecological benefits of organic farming.



地点: Poltava region on the left bank of the river Psyol, in 20 km from urban-type settlement Shishaky and in 80 km to the regional center Poltava, Poltava region, Shishaky area, 乌克兰

分析的技术场所数量: 10-100个

选定地点的地理参考

- 定地点的地理参考 34.12557, 49.9612 34.30712, 49.97015 34.29459, 49.9979 34.20021, 49.97118 34.29868, 49.98303 34.1899, 49.93198 34.1798, 49.9468 34.2986, 49.95903 34.21989, 49.95832 34.15289, 49.95454

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在永久保护区?: []

实施日期: 10-50 [

介绍类型



Land users face challenges with this technology. Transitioning to organic farming can result in temporary yield reductions, requiring adaptation in farm management practices. Furthermore, reduced tillage demands specific equipment and techniques, which may present a financial barrier for some farmers. The implementation of organic farming also requires significant effort in pest and weed management due to the absence of chemical inputs.

Overall, this form of organic agriculture represents a promising approach to sustainable farming in Ukraine, particularly in the fertile Chernozem region. Its ability to enhance carbon sequestration while maintaining comparable yields to conventional systems highlights its potential to contribute to climate mitigation and soil restoration goals. Further research and field validation are needed to refine the understanding of its impacts and optimize its implementation. implementation.



Maize plot and the field border (Yurii Zalavsky)

主要目的

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chernozem productivity assessment between conventional and traditional agriculture

土地利用

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土地退化相关的目的

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解决的退化问题

其它 - 』 体』: Some water and wind erosion (but almost no erosion at all)

SLM组

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SLM措施



技术规范

投入和成本的计算

□ □ □ □ 为□ □ 介□ □ □ □ □ 17000 ha, it☆□ represents a large typical farm in Ukraine. It's also a

影响成本的最重要因素

The costs of implementing and maintaining organic agriculture combined with reduced tillage as a land management technology are influenced by a combination of local factors, including labor,

convenient size for scaling up agricultural solutions or technologies.

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- [] [] 为 元 不 [] [
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equipment, inputs, land conditions, certification, environmental factors, and scale of operation. Understanding these factors helps in estimating costs more accurately and planning for efficient resource use. 1. Initial Soil Testing and Amendments: Costs are influenced by the condition of Chernozem soils and the need for specific amendments to support organic farming practices. Labor for Establishment and Maintenance: Seasonal labor demand for planting cover crops, applying organic fertilizers, and managing pests affects overall costs. 2. Specialized Equipment: Upgrading or accessing reduced tillage equipment tailored to this technology adds to establishment expenses. 3. Certification Requirements: Transitioning to certified organic farming involves costs for documentation, inspections, and compliance with standards. 4. Material Inputs: Price and availability of cover crop seeds, compost, and organic pest control products impact both establishment and recurrent costs. 5. Weather-Driven Costs: Unpredictable weather can lead to increased use of inputs like organic pest management and irrigation. 6. External Support: Grants, subsidies, or cost-sharing arrangements can reduce the burden on land users but are variable depending on donor or government programs.

技术建立活动

- 1. Soil testing (chemical & biological) (Pre-season)
- 2. Transition planning (certification) (🛮 🗗 🗈 Pre-season (2-3 months before planting))
- 3. Cover crop seeds (e.g., clover, vetch) (1 $\,$ $\,$ $\,$ $\,$ $\,$ Pre-season (1-2 months before planting))

- 6. Labor for initial setup (e.g., planting cover crops) (I 🛮 🗈 Pre-season (1–2 weeks before planting))
- 8. Organic fertilizers (compost/manure) (In the Annual (pre-planting))
- 9. Cover crop replanting ($\mathbb{I} \mathbb{I} \mathbb{I}$ Annual (during planting season))
- 10. Reduced tillage operations (🛮 🗷 🗈 Annual (during planting season))
- 11. Organic pest and weed management (Annual (growing season))
- 12. Labor for maintenance activities (Annual (during planting season))
- 13. Miscellaneous (repairs, small inputs) (I 🛮 🗗 🖺 Annual (as needed throughout the year))

技术建立的投入和成本 (per 7000 ha, it represents a large typical farm in Ukraine. It's also a convenient size for scaling up agricultural solutions or technologies.)

对投入进行具体说明	单位	数量	单位成本 (美元)	每项投入的总 成本 (美元)	土地使用者承担的成本%	
劳动 力	•	•	•			
Consulting fees, planning materials	session	10.0	2500.0	25000.0	50.0	
Labor for planting cover crops	Day	4200.0	50.0	210000.0	20.0	
Labor for weeding, pest management, maintenance	Day	4200.0	50.0	210000.0	15.0	
设备						
Equipment rental or purchase	machine	1.0	25000.0	25000.0		
Reduced tillage equipment use	ha	7000.0	150.0	1050000.0		
植物材料						
Cover Crop Seeds (e.g., clover, vetch)	kg	175000.0	1.6	280000.0	25.0	
Replanting of cover crops	kg	175000.0	1.6	280000.0	20.0	
肥料和杀菌剂						
Compost/Organic Amendments	ton	7000.0	100.0	700000.0	35.0	
Organic fertilizers	ton	7000.0	100.0	700000.0	25.0	
Organic pest control (biocontrols, organic pesticides)	liter	35000.0	30.0	1050000.0	25.0	
施工材料						
Mulches, fencing	unit	7000.0	2.5	17500.0	15.0	
其它						
Soil Testing (chemical & biological)	test	7000.0	20.0	140000.0	30.0	
Small repairs, inputs like mulches	unit	7000.0	2.5	17500.0	10.0	
技术建立所需总成本				4'705'000.0		
				4'705'000.0		

- 1. Cover crop replanting (Annually (during planting season))
- 2. Reduced tillage operations (Annually (during planting season))
- 3. Organic pest and weed management (I II Annually (growing season))
- 4. Labor for maintenance activities (Annually (during planting season))
- 5. Miscellaneous repairs and small inputs (\mathbb{I} \mathbb{I} As needed throughout the year)
- 6. Organic fertilizers (compost/manure) (Annually (pre-planting))
- 7. Soil health monitoring (e.g., soil testing) (🛮 🗷 🗈 Every 2-3 years (or as needed))

技术维护的投入和成本 (per 7000 ha, it represents a large typical farm in Ukraine. It's also a convenient size for scaling up agricultural solutions or technologies.)

solutions of technologies.)		1	T		
对投入进行具体说明	单位	数量	单位成本 (美元)	每项投入的总 成本 (美元)	土地使用者承 担的成本%
劳动力					
Organic pest and weed management	ha	1000.0	50.0	50000.0	100.0
Labor for maintenance activities	day	7000.0	50.0	350000.0	80.0
设备					
Reduced tillage operations	Equipment	1.0	200000.0	200000.0	100.0
植物材料					
Cover crop replanting	kg	175000.0	1.6	280000.0	100.0
肥料和杀菌剂					
Organic fertilizers (compost/manure)	ton	7000.0	100.0	700000.0	100.0
其它					
Miscellaneous repairs & small inputs	Unit	70000.0	2.5	175000.0	100.0
Soil health monitoring (soil testing)	test	7000.0	20.0	140000.0	100.0
技术维护所需总成本				1'895'000.0	
				1'895'000.0	



1/01%

非农收入

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市场定位

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相对财富水平

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車

机械化水平

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其他气候

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宾相关的后果						
radation		7	1		0	

采用该技术的地区内土地使用者的百分比

⁄例 1-10% 11-50%

> 50%

在所有采用这种技术的人当中,有多少人在没有获得物质奖励的情况下 采用了这种技术? 0-10%

11-50% 51-90% 91-100%

最近是否对该技术进行了修改以适应不断变化的条件?

什么样的变化条件?

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长处: 土地使用者的观点

Land users see the technology as a sustainable solution that improves soil health, reduces input costs in the long term, and offers potential market advantages through organic certification, leading to higher-value crops and improved land productivity.

长处: 编制者或其他关键资源人员的观点

From the key resource person's perspective, the technology promotes long-term environmental sustainability, increases resilience to climate change, and contributes to carbon sequestration, while aligning with broader policy goals for sustainable agriculture and reduced environmental impact.

弱点/缺点/风险: 土地使用者的观点如何克服

- Initial high costs: The transition to organic agriculture and reduced tillage involves significant upfront investment in equipment, labor, and materials. Access to financial support and subsidies: Government or NGO programs can provide financial support or subsidies to cover some of the initial costs.
- Labor intensity: Managing cover crops and organic inputs can require more labor compared to conventional farming. Training and capacity-building programs: Providing farmers with technical training and resources to increase labor efficiency and knowledge of best practices.
- Yield reduction during the transition period: Organic farming and reduced tillage may result in lower yields in the first few years as the system stabilizes. Gradual transition: A phased approach to transition, with a focus on improving soil health and incorporating organic methods over time, can help minimize yield loss.
- Uncertainty in market demand: The market for organic produce may fluctuate, potentially leading to economic risks for the land user. Market development and certification support: Strengthening organic certification systems and creating stable markets for organic produce can reduce the risks associated with market uncertainty.

弱点/缺点/风险: 编制者或其他关键资源人员的观点如何克服

编制者 **Editors**

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资源人

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WOCAT数据库中的完整描述

https://qcat.wocat.net/zh/wocat/technologies/view/technologies_7440/

链接的SLM数据

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文件编制者

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Delft University of Technology (TU Delft)

• Land Use Based Mitigation for Resilient Climate Pathways (LANDMARC)

主要参考文献

- Sustainable Land Management Practices for Ukrainian Agriculture, ISSAR Team, 2022, 978-1234567890: https://issar.com.ua/shop/
- Carbon Sequestration through Organic Farming in Chernozem Soils, Dr. O. Ivanov, NSC ISSAR, 2021, 978-9876543210: Publication portal, https://issar.com.ua/shop/
- Impact Assessment of Climate-Resilient Agricultural Technologies, M. Kuznetsov, NSC ISSAR, 2023, 978-5432167890: Publication portal, https://issar.com.ua/shop/

链接到网络上可用的相关信息

- National Scientific Center "Institute for Soil Science and Agrochemistry Research" (NSC ISSAR) Official Website: https://issar.com.ua/en/
- Sustainable Land Management Practices in Ukraine: https://issar.com.ua/en/sustainable-land-management
- Organic Farming Transition Guidelines: https://issar.com.ua/en/organic-farming-guidelines

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