

Towards sustainable agriculture: introduction of the best agricultural practices in Ukraine

Prof. L. Moklyachuk

Dr. O. Butrym

Dr. I. Yatsuk

PhD M. Draga

PhD S. Romanova



Institute of soil protection of Ukraine (ISP)



Institute of agroecology and environmental management (IAEM)

Legal regulation in Ukraine 2016-2019

Climate Change Performance Index 2019

Ukraine 2016-2019

In this year's edition of the CCPI Ukraine moved up to 18th place. Its position among 20 high performing countries is mainly a result of a relatively high rating for GHG Emissions as well as a high to very high performance in all indicators in the Energy Use category <https://www.climate-change-performance-index.org/>

The Paris Agreement was ratified on July 14, 2016. Ukraine was one of the first European countries that have ratified this global Climate Agreement.

In order to implement the Paris Agreement, conceptual recommendations on climate policy for the period up to 2030 were adopted in 2016.

The strategy of low-carbon development for the period up to 2050 has already been developed in Ukraine. The strategy is recommended for submission to the UNFCCC. Strategy has no official status yet.

Table 1. Changes in the laws of Ukraine

<i>Law of Ukraine: "About the protection of the environment"</i>	<i>1991, Revision dated October 12, 2018</i>
<i>Law of Ukraine: "On the Protection of Atmospheric Air"</i>	<i>1992, Revision dated December 18, 2017</i>
<i>Law of Ukraine: On environmental impact assessment</i>	<i>2017, Enactment, held on December, 18, 2017</i>
<i>Law of Ukraine: "On Land Protection"</i>	<i>2003, Revision dated December, 18, 2017</i>
<i>Air Code of Ukraine</i>	<i>1993, Revision dated November, 4, 2018</i>
<i>Code of Ukraine on subsoil</i>	<i>1994, Revision dated April 4, 2018</i>
<i>Water Code of Ukraine</i>	<i>1995, Revision dated December 18, 2017</i>
<i>Land Code of Ukraine</i>	<i>2001, Revision dated August 9, 2019</i>
<i>Law of Ukraine: "On animal by-products not intended for human consumption"</i>	<i>2015, Revision dated October 19, 2016</i>

GREEN GROW OF AGRICULTURE

1. The OECD's Survey on Environmental Perspectives to 2050 predicts an increase in the share of agricultural land due to the need to provide food to a growing population in the coming decades.
2. According to the OECD, the green growth paradigm characterizes economic progress based on environmentally sustainable development.
3. Achieving natural balance is especially difficult for agroecosystems. As agroecosystems have a lack of self-regulation mechanism, we need to bring nutrients into them.
4. The use of insufficient nutrients in crop production is as dangerous as their excess.
5. Good Soil Condition is the basis of Green Growth of agricultural.
6. The main indicator of green growth, proposed by OECD is the balance of nitrogen and other nutrients.



Igor Yatsuk,
Lidiya Moklyachuk
Environmental indicators of
green growth of agriculture

Unfortunately, not everyone understands that the way out of the crisis in agriculture is the transition to green growth.

Table 2. Assessment of soil condition by main indicators of green growth of agriculture

Indicators	Criteria	Soil condition of Ukraine
Percentage of plowing territory	Percentage of plowed territory	The average share of ploughed-up lands in Ukraine is 78,4 %.
Concentration of organic matter in soil	Positive trend of soil organic matter content	Organic matter content in Ukraine has decreased from 3,65 to 3,17 % on average.
Balance of organic matter in soil during production of crop production	Balance of organic matter concentration in agricultural production	Balance of organic matter is deficient, making 0,13 t/ha estimations evidence deterioration of the condition of soils.
Dynamics of content of nitrogen,	A sufficient amount of easily hydrolyzed nitrogen for plant nutrition	Low nitrogen content prevails in Ukrainian soils (93.1% of the surveyed areas on average).
Nitrogen balance	Balance of nitrogen concentration in agricultural production	The average nitrogen balance was -33kg / ha. Insufficient application of nitrogen fertilizers has led to the deterioration of soil conditions.
The content of movable phosphorus compounds	A sufficient number of movable forms of phosphorus to feed the plants	Movable phosphorus content may be considered satisfactory, 89,6 % of the examined areas are characterized by an average and increased phosphorus content, and only 10,4 % exhibit a low phosphorus content.
Phosphorus balance	Balance of concentration of movable forms of phosphorus in the process of agricultural production	Estimations carried out based on statistical data evidence that for many years phosphorus as the main element of nutrition of agricultural crops has not been returning to the soil in amounts that are removed with the harvest.
The content of mobile potassium compounds	Sufficient potassium content	More than 90% of the soils studied in Ukraine are characterized by a high content of natural mobile potassium compounds. The weighted average content of mobile potassium compounds in the studied areas is 120.5 mg / kg of soil.
Soil solution reaction	Measures to maintain pH tolerant plants	In recent years, a tendency has been identified for the use of mainly mineral nitrogen fertilizers, which are physiologically acidic and create conditions for further acidification of the soil solution.

Conclusion

An analysis of Ukrainian soils by environmental indicators of green growth confirmed that long-term intensification and excessive plowing led to an alarming state of soils. Measures are proposed for the transition to green agricultural growth, the main condition of which is to improve soil fertility, balanced use of nutrients and stopping the loss of soil organic matter.

Table 3. Number of poultry in EE demoregion (01.01.2019)

Region Oblast	Number of poultry, thousand
Vinnitsia	32588,6
Ivano-Frankivsk	2172,8
Lviv	3972,7
Odessa	142,8
Ternopil	2034,9
Khmelnitsky	4830,0
Chernivtsi	962,0
EE Demoregion	46703,8
Ukraine	210788,4



The number of poultry in Ukraine in all categories of farms: 210.8 million (State Statistics Committee of Ukraine,).



The translation is not adapted to the conditions of Ukraine; it has a fact-finding character, and is not an official document.

The authors: Shabtai Bittman, Martin Dedina, Barbara Anton, Harald Menzi, J. Webb, Karin Groenestein, Tom Misselbrook, Nick Hutchings, Helmut Dohler, Klaas van der Hoek, Steen Gyldenkerne, Laura Valli, Christian Palliere, Clare Howard, Oene Oenema and Mark Sutton.

Scientific bases of optimization of agro production for minimizing climate change



Organic and organic-mineral fertilizer from poultry wastes was tested at the Skvirsky experimental station of the organic production of IAEM while growing wheat, barley and oats. Fertilizers provided a yield increase of 25-29%.

Technology of processing poultry manure into organic fertilizers

- Economic indicators of technology:
- The cost of organic fertilizer 2,68 UAH / kg
- The content of organic matter 70-75%
- Amino acid content 7-9%
- The cost of fixed assets - depending on the capacity
- (up to 700-900 thousand UAH)
- Payback period 2-3 years
- The possibility of creating a mobile complex.
- The dose of organic fertilizer use is 10-20 t / ha,
- yield growth by 25-30%



6 (Oleg Mineralov at al.)



Microbiological preparations have been created to optimize the composition of the microbial community of agrocenoses by activating nitrogen fixation from the atmosphere, stimulating growth and improving the nitrogen and phosphorus nutrition of plants.



Joining up the nitrogen cycle for a more sustainable world.

“Together these issues are now being addressed in a new process established in partnership between the United Nations Environment Program (UNEP) and INI, with funding through the Global Environment Facility. It is being termed “Towards INMS” – developing the International Nitrogen Management System – a process of science evidence gathering and synthesis that can support international policy development.

It is a way of bringing issues together, of scientists working with governments, business and civil society to identify the options for change and to help overcome the barriers.

At its heart, however, this must be a process where the world learns to know nitrogen, and citizens realize why we should all care. It is amazing that nitrogen fertilizers sustain half the human population alive today, yet so few realise its importance across all aspects of our environment. Only once they do can we expect that governments and business will be empowered to make the changes necessary. From better water treatment to smart farming practices, this is exactly where the scientific guidance of INMS will help”.

Mark Sutton

Clare Howard

Will Brownlie



Thanks you for your attention! (Eng.)

Дякую за увагу! (ukr.)