No-till farming in Russia: challenges and prospects in the context of sustainable agriculture development (case study of Rostov and Samara regions)

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The aim of the study: to provide policy measures to support crop producers converting to the no-till farming in European regions of Russia.

No-till is a central element of Conservational Agriculture (CA) approach and one of climate-smart practice for sustainable soil management (SLM).

- No-till farming adoption has been increasing in Russia since 2000 for cultivating grains, leguminous and oilseeds mainly in regions of the forest-steppe, steppe and dry-steppe zones.
- In the Concepts of agricultural development in some regions, in the national reports and regional recommendations on the intensification of crop production, the prospect of introducing No-till is recognized.
- But the Government of just one (Belgorod region) had implemented the regional program for the biologization of agriculture in frame of which 25% of arable land was converting to No-till from 2011. ...Why?

Source: FAO, Региональный Альянс Почвозащитное и ресурсосберегающее земледелие в Центральной Азии
According to FAO statistics and expert estimates, about 180 million hectares are cultivated in the world using no-till/CA approach. The average annual rate of global expansion of CA cropland area since 2009 has been some 10.5 M ha (A. Kassam, T. Friedrich and R. Derpsch, 2019).

In Russia CA is spread over an area of up to 5 million ha. 

**Crop producers survey results:**

6 crop producers
Year of starting: 2008-2014; area of farms: 650 - 85,000 ha

**Motivation for converting to No-till:**

- Diesel and labor costs reduction up to 50%
- Increasing the efficiency of agricultural production
- Reduction of water and wind erosion, soil fertility conservation
- Improvement of product quality

**Main difficulties for wider spread:**

- Lack of scientific justification for adopting no-till to the local soil and climatic conditions;
- High economic risks
### Survey results

Comparison of fuel consumption in traditional, minimal and no-till for cultivation of grain and row crops (*Mokrikov V.I., “Donskaya Niva”*)

<table>
<thead>
<tr>
<th></th>
<th>TRADITIONAL</th>
<th>MINI TILL</th>
<th>NO TILL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CEREALS</strong></td>
<td></td>
<td>17 technological operations;</td>
<td>11 technological operations;</td>
</tr>
<tr>
<td></td>
<td>fuel consumption 73,1 l/ha</td>
<td>fuel consumption 37,6 l/ha</td>
<td>fuel consumption 27,0 l/ha</td>
</tr>
<tr>
<td><strong>TILLED CROPS</strong></td>
<td>14 technological operations;</td>
<td></td>
<td>8 technological operations;</td>
</tr>
<tr>
<td></td>
<td>fuel consumption 70,6 l/ha</td>
<td>11 technological operations;</td>
<td>fuel consumption 27,0 l/ha</td>
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<td></td>
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<td>fuel consumption 45,9 l/ha</td>
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</tbody>
</table>

How to support crop producers in implementing no-till and who will be the key stakeholders?

Shoots of winter wheat on plant residues of predecessor crops: on the top - flax, on the bottom - sunflower.
Key stakeholder groups

- Crop producers
- State structures (federal, regional & municipal levels)
- Research and educational organizations
- Non-profit and non-governmental organizations
- Producers of machinery and equipment, seeding material, fertilizers, PPP
- Population (consumers of crop production)
Key stakeholder groups

• **Crop producers** high interested in more cost-effective and efficient production and sustainable soil and water resources management, are the driving force behind the CA implementation will win in the case of being provided with scientific based recommendations for adoption, knowledge spillovers, financial support, agricultural insurance.

• **Ministry for Agriculture of the Russian Federation and regional Rostov and Samara Ministries for Agriculture and Food Security and subordinate organizations** – do not show real evident interest and do not provide measures for supporting, but can win in the case of sustainable crop production intensification due to no-till implement. Centers and Stations for agrochemical Surveys, organizations involved in crop products control, laboratories – will win in case of government order for supporting no-till.

• **Research and educational organizations** should be very actively involved and will win in case of government order for supporting researches on no-till adoption.

• Wide spread of no-till farming in the World took place due to the unions, associations, non-governmental and non-profit organizations of farmers and machinery producers.
Policy measures that can contribute to the development of no-till farming

In the context of the Russian Federation’s goal to increase agricultural exports to $45 million by 2024, intensification of agricultural production and increased pressure on the agroecosystems of the regions concerned are inevitable.

Measures could be provided:

- Regulation of the federal and regional scientific and technical policy in the field of sustainable intensification of crop production.
- Providing regulatory and institutional support for the implementation of the no-till in the regions
- Economic measures for supporting no-till development.
- Creation of a system for dissemination knowledge on no-till / extension service
**Policy measures that can contribute to the development of no-till farming**

**Option 1.** To create in the Rostov and Samara regions innovative farms based on the private-public partnership for conducting long-term comprehensive research on the no-till introduction.

The innovative pilot farms will focus on the latest achievements of world agricultural science and modern farming technologies such as mulched, strip and direct seeding with the use of mineral and liquid fertilizers; the CTF system, technologies for agricultural monitoring (GIS, remote sensing materials, drones with hyperspectral imaging cameras), the innovative methods of agrochemical and soil research.
Policy measures that can contribute to the development of no-till farming

In 2013 a pilot public-private project of the innovative farm had been launched in the Samara region based on Orlovka-AIC LLC.

Several stakeholders, including the State Ministry of Agriculture, the Ministry of Agriculture of the Samara Region, National Movement for Conservational Agriculture, agricultural businesses, and producers of agricultural equipment and fertilizers, support the project.

Tests on the use of liquid biological preparations and granular bioactivated fertilizers.

http://orlovka-aic.ru/about/
Policy measures that can contribute to the development of no-till farming

Option 2. The creation of an association of crop producers, who are active in adopting innovative technologies and communication with academia, business and the state, may become an enabler in deploying no-till.

- Today such activities are carried out by National Movement for Conservational Agriculture, but the organization needs to be expanded and strengthened.
- This association should monitor changes in food and nutrition security legal framework, as well as sustainable intensification trends to assess the applicability of no-till.
Option 3. Creation of a system for knowledge dissemination

There is a need for the best practices promotion and support services in regards to CA. Demand for training courses on plant protection systems with CA, on the production of environmentally friendly products with minimal chemicals may be growing.

Online platform for knowledge on no-till and CA

https://agriecomission.com/
Policy recommendations

✓ Development of innovative **pilot public-private farms for long-term comprehensive research on CA deployment on the basis of modern farms, which apply zero tillage for at least five years**;
✓ Development and support of an **association of crop producers who actively support CA deployment**.
✓ Development of a Nomenclature of CA, including updating GOST-16265-89 “Agriculture. Terms and Definitions»
✓ Promotion of CA inclusion in regional agrarian policy documents.
THANK YOU FOR ATTENTION!