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GREENING POLICIES FOR THE AGRICULTURAL SECTOR OF THE REPUBLIC OF MOLDOVA: CURRENT SITUATION AND FUTURE PERSPECTIVES

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Abstract

Agricultural sector of the Republic of Moldova is currently facing a series of challenges, an important part of them being related to the greening of the sector. The existing public support schemes for greening agriculture are more related to mitigation of the climate change effects, with less focus on preserving the environment, and their share in the total public support is relatively low. The paper aims to analyze the existing public support schemes related to climate change adaptation and greening of sector and provide a series of recommendations for their improvement. In order to achieve the main aim of the paper, the following scientific methods have been used: generalization of empirical and applied material, induction and deduction methods for making the paper conclusions, comparison method and analytical one. In order to be in line with current greening EU policies, Republic of Moldova must adapt some of its public support schemes for the agricultural sector and pay more attention to development of a coordinative mechanism and advice services.

Key words**:** *agriculture, greening, policies, public support*

INTRODUCTION

Republic of Moldova is highly vulnerable to climate variability and change (Taranu, 2014) [13]. Climate change has a significant influence not only on the environment, but also on the economy, as a whole, and the agricultural sector, in particular. Having a share of over 10% in GDP, about 21% of active population being employed in the agricultural sector and over 57% of people living in rural areas, agriculture is of particular importance for the national economy. More than 45% of Moldovan exports are of agri-food origin; transport sector is also strongly connected with agriculture, as well as food processing industry. This means that climate change could have particularly severe effects on the livelihood of people in rural areas because of their greater dependence on agriculture, their more limited ability to adapt, and the high share of income they spend on food. Climate impacts could therefore adversely affect food security and economic growth in vulnerable rural areas and undermine the progress that has been made in poverty reduction (FAO, 2020) [7].Therefore, the socio-economic costs of climate related natural disasters such as droughts, floods and hail are significant and both their intensity and frequency are expected to further increase as a result of climate change (Taranu, 2014) [13].

Although being located between two large rivers, agriculture of the Republic of Moldova faces important shortages of water in years with small number of precipitations. On the whole, Moldova is located in an area with quite limited water resources, which results in a high frequency of droughts. For example, from 1990 to 2010 the country has undergone nine droughts, and the most serious one in 2007, and two major floods in 2008 and 2010 (Ivanov, 2012) [10].The most recent droughts that have occurred in 2020 and 2022, have recorded significant reductions in crop production. Increasingly frequent droughts mean agriculture requires higher volumes of

water and irrigation. This water is often delivered through inefficient systems, leading to large losses. Thus, besides a high volume of water intake per capita and a relatively high level of water stress, Moldova still experiences significant water losses due to transportation with no sign of improvement (EU4Environment, 2021) [5]. In the same vein, some of the most direct consequences of climate change to agricultural sector include water scarcity and issues related to e.g. water supply, reduction of animal feed, lowering agriculture outputs, crop and animal diseases and forest degradation (FAO, 2020) [7].

Being accepted as a Candidate country in the EU in 2022, Moldova will be necessary complying with a series of EU policies, most important for the agricultural sector being the Common Agricultural Policy. Greening of this sector represents a priority in the new CAP, some of the objectives being related to promotion of sustainable energy, taking appropriate measures for climate change mitigation and adaptation, enhancing the efficient administration of natural resources and their durable development, preservation and improvement of ecosystems, etc. (European Commission, 2023) [6].

Therefore, it is becoming very important to align the agricultural policies to CAP and to observe which of the current support measures are contributing to greening of the sector and its further development.

The aim of the paper is to provide an outlook to the current state of the green policies for the agricultural sector of Moldova and analyze some future perspectives for their development.

MATERIALS AND METHODS

In order to achieve the main aim of the paper, the following scientific methods have been used: generalization of empirical and applied material, induction and deduction methods for making the paper conclusions, comparison method and analytical one.

The main data used for the analysis is based on annual reports of the Agency for Interventions and Payments in Agriculture [1]. The analysis carried out covers the period 2010 – 2022.

RESULTS AND DISCUSSIONS

In order to adapt to the climate change phenomenon, the Moldovan policy makers have introduced in the subsidy program a series of schemes or measures to support the agricultural producers in this regard. The direct measures targeting adaptation and mitigation of the climate changes events are the following ones: Sub-measure 1.1. Stimulating investments for the production of vegetables and fruits on protected land (winter greenhouses, solariums, tunnels), Sub-measure 2.2. Stimulating investments for the procurement of irrigation equipment, Sub-measure 2.3 Stimulating agricultural producers to compensate the irrigation expenses, Sub-measure 2.4 Stimulating investments for the procurement of no-till and mini-till equipment and Sub-measure 2.5. Supporting the promotion and development of organic agriculture.

In 2022, 1,750 mil. MDL have been allocated in order to support the agricultural sector of the Republic of Moldova. This sum represents the highest figure in the history of subsidies allocations, as in previous years, the amount has varied from 900 mil. MDL in 2018 to 1535 mil. MDL in 2021. The highest share of allocated subsides are post-investments ones, meaning that the investment has to be made by farmer, first, and afterwards apply for compensation of costs. Therefore, the post-investments subsidies are mostly accessible for agricultural producers that poses sufficient financial means or access to credit markets (Herzfeld et al, 2022) [9].

The Ministry of Agriculture and Food Industry, the main policy maker in the field of agriculture is currently supporting, through the Agency for Interventions and Payments in Agriculture, agricultural producers that intend to green their activity and make it more adaptable to climate adverse phenomena. Therefore, investment support for the Sub-measures 1.1., 2.2, 2.3, 2.4 and 2.5 during 2010 – 2022 has amounted to 950.8 mil.

MDL, accounting, on average, for about 8.9% of the total value of the National Fund for the Development of Agriculture and the Rural Environment (subsidy fund). The total value of the Fund has been continuously increasing since 2010, reaching a maximum value of 1750 mil. MDL in 2022, which means an increase of about 4.3 times compared to 2010.

In the same vein, allocations for environmental activities have increased from 14.6 mil. MDL in 2010 to 164.9 mil. MDL in 2022. In 2022, the amount of 164.9 mil. MDL represents the maximum value of allocations for environmental activities from the analyzed period, thus, pointing on the increasing interest from famers with respect to greening agriculture, as well as on the awareness of policy makers on the importance of climate change adaptation and mitigation support measures.

The share of the support for environmental activities in the total support for the sector, from the Fund, varies from 3.7% in 2010 to 9.4% in 2022, the maximum value being reached in 2018 – 13.4%, while the minimum – in 2011 – 1.6%.

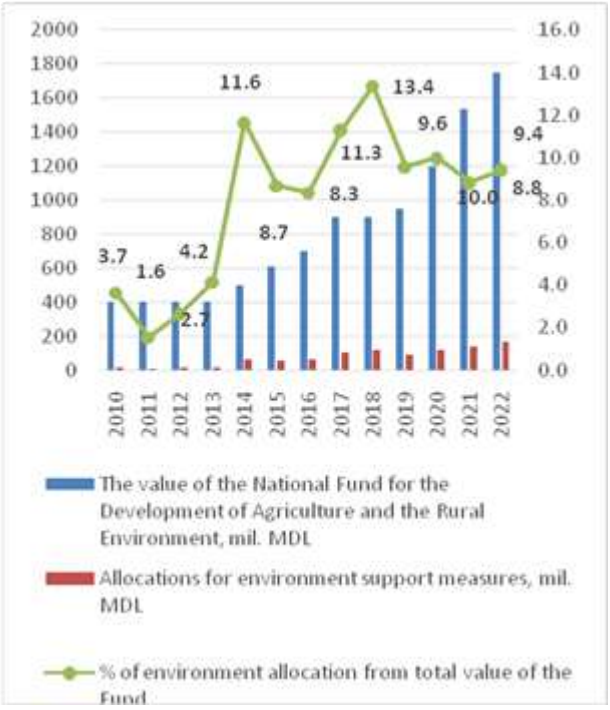

Fig. 1. Budget support for environmental actions, 2010 – 2022, mil. MDL

Source: Agency for Intervention and Payments in Agriculture, 2010 - 2022 [1].

Vegetables are being consider an important crop for Moldovan agricultural sector. Greenhouses for vegetable production require technological improvement (Petrea et al, 2020) [11]. Therefore, with respect to Sub-measure 1.1. Stimulating investments for the production of vegetables and fruits on protected land (winter greenhouses, solariums, tunnels), the support is granted for partial compensation of the cost of new modules for greenhouses, solariums, tunnels purchased starting with two previous subsidy years and put into operation in the subsidy year. The minimum area eligible under this sub-measure is at least 0.1 ha (Guvernul Republicii Moldova, 2017) [8]. During 2010 – 2022, a total of 1,328 applications have been authorized for funding and the amount of authorized subsidies accounted for 197.3 mil. MDL. This figure has been fluctuating over the years, with a growing trend during 2012 – 2014. At the same time, the total number of subsidized greenhouses amounted to 883, 147 solariums and 100 tunnels. The share of sub-measure 1.1 in the total value of Fund amounted to 0.7% in 2022, while in the total environmental support schemes – 7.7%.

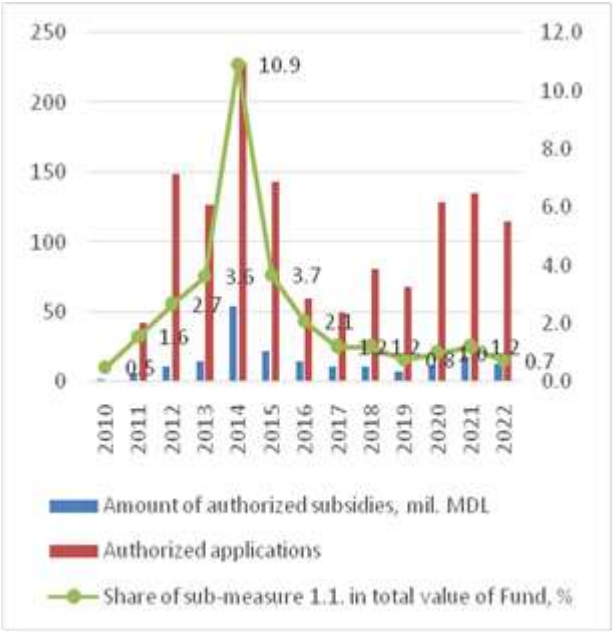

Fig. 2. Budget support under Sub-measure 1.1, 2010 – 2022

Source: Agency for Intervention and Payments in Agriculture, 2010 - 2022 [1].

In the Republic of Moldova, productivity crop plants is largely determined by the pedologic and climatic conditions. During the vegetation period of plants, especially in the months from June to August, virtually every year there are droughts of soil and air. In such climatic conditions, irrigation is a radical measure to optimize water regime of the soil and of crop plants (Cojocaru et al, 2017) [3]. Thus, under Sub-measure 2.2 Stimulating investments for the procurement of irrigation equipment, the amount of the support is calculated in the form of compensation for the new equipment, purchased starting two years prior to the subsidy, put into operation in the subsidy year, in proportion to:50% of the cost of new drip/micro sprinkler irrigation systems, but no more than 1.0 mil. MDL per beneficiary;40% of the cost of the sprinkler irrigation system, mobile irrigation systems, but no more than 800.0 thousand MDL per beneficiary;50% of the cost of the pumping station, fertigation station, geomembrane, geotextile for water capture, but no more than 1.0 mil. MDL per beneficiary;50% of the cost of the equipment that forms the supply and/or distribution networks, but not more than 2.5 mil. MDL per beneficiary;50% of the cost of the irrigation water treatment system, by various methods, including reverse osmosis, but no more than 2.0 mil. MDL per beneficiary (Guvernul Republicii Moldova, 2017) [8].The given support measure was implemented first in 2015. During 2015 – 2022, the total amount of allocated subsidies accounted for 357.04 mil. MDL, with 2013 applications. The share of sub-measure 2.2 in the total value of Fund amounted to 4.2% in 2022, while in the total environmental support schemes – 44.6%. The area under irrigation in 2022 was 7,812 ha. The total number of drip irrigation equipment in the analyzed period was 1549 units, sprinkler irrigation equipment – 274 units, 52 fertigation stations, geomembrane, and 68 supply and/or distribution networks.

Under Sub-measure 2.3 Stimulating agricultural producers to compensate the irrigation expenses, the subsidy is granted to agricultural producers, including through water user associations, for the partial compensation of the expenses incurred when pumping/repumping water for irrigation.

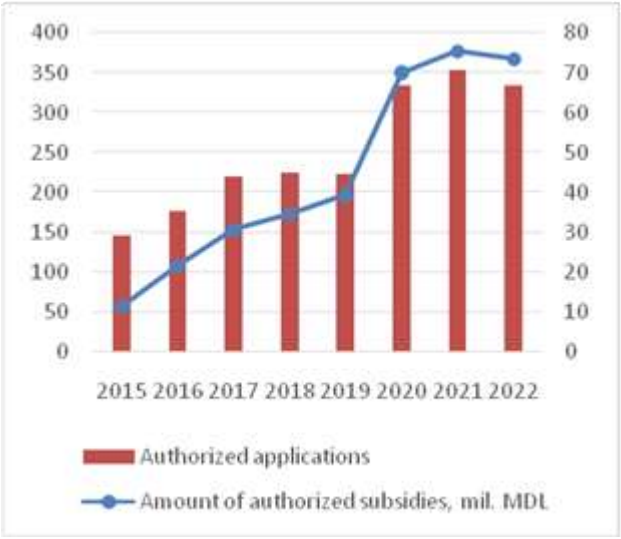

Fig. 3. Budget support under Sub-measure 2.2, 2015 – 2022

Source: Agency for Intervention and Payments in Agriculture, 2010 - 2022 [1].

It is also worth mentioning that the applicants must demonstrate, through a reporting form, that they have obtained an increase in production yield on irrigated land, with the exception of young perennial plantations and agricultural crops intended for seed production (Guvernul Republicii Moldova, 2017) [8]. Thus, during 2013 – 2022, the total amount of allocated subsidies accounted for 49.9 mil. MDL, with 335 applications. The share of sub-measure 2.3 in the total value of Fund amounted to 0.8% in 2022, while in the total environmental support schemes – 8.2%. The irrigated surface in 2022 was about 2380 ha.

Conservation agriculture is widely promoted as a sustainable agricultural management strategy with the potential to alleviate some of the adverse effects of modern, industrial agriculture such as large-scale soil erosion, nutrient leaching and overexploitation of water resources. Moreover, agricultural land managed under CA is proposed to contribute to climate change mitigation and adaptation through reduced emission of greenhouse gases, increased solar radiation reflection, and the sustainable use of soil and water resources (Prestele et al, 2018) [12].

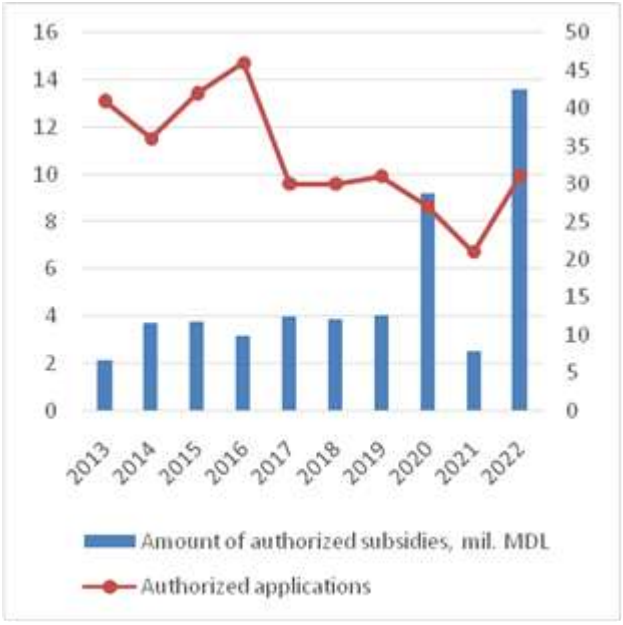

Fig. 4. Budget support under Sub-measure 2.3, 2015 – 2022
Source: Agency for Intervention and Payments in Agriculture, 2010 - 2022 [1].

In the Republic of Moldova, it is practiced on an area of over 50 thousand hectares, mainly in the Northern area of the republic (Cojocaru, 2021) [4].

The Sub-measure 2.4 Stimulating investments for the procurement of no-till and mini-till equipment, aims to enhance the conservation of agriculture. The public support allocated to farmers takes the shape of compensation of 30% of the costs of the investment object, with a maximum available amount of 50o thousand MDL for one beneficiary that has purchased new no-till or mini-till equipment (Guvernul Republicii Moldova, 2017) [8]. Since 2015, the total amount of allocated subsidies accounted for 316.6 mil. MDL, with 1734 applications. The share of sub-measure 2.4 in the total value of Fund amounted to 3.7% in 2022, while in the total environmental support schemes – 39.5%. The total number of purchased equipment accounted for 2091 units. The surface processed with no-till and mini-till equipment in 2022 was about 58,422.5 ha.

Under Sub-measure 2.5. Supporting the promotion and development of organic agriculture, support is granted to producers who are registered in the organic farming system as a compensatory payment for the loss of income and the additional costs incurred by the beneficiaries who conclude voluntary commitments and undertake to stay in this farming system for a period of 5 years.

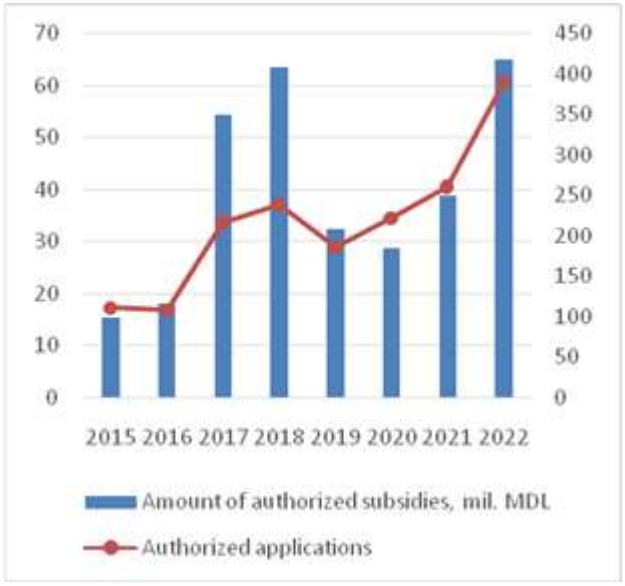

Fig. 5. Budget support under Sub-measure 2.4, 2015 – 2022
Source: Agency for Intervention and Payments in Agriculture, 2010 - 2022 [1].

Republic of Moldova has ones of the most suitable climate conditions for the development of organic agriculture. It is worth noticing that the importance of organic farming has been increasing in the last years. If in 2010, about 19.7 thousand ha of agricultural land were under organic farming, then in 2020 their share accounts for about 1.5% of the total agricultural land of the country (Cimpoies, Cosalic, 2022) [2].

Beneficiaries of the subsidy have to return the received support funds if they do not maintain themselves in the organic farming system for 5 years (Guvernul Republicii Moldova, 2017) [8]. The public support under this sub-measure began to be allocated in 2016. During 2016 – 2022, the total amount of allocated subsidies accounted for 38.6 mil. MDL, with 353 applications. The share of sub-measure 2.5 in the total value of Fund amounted to 0.4% in 2022, while in the total environmental support schemes – 4.2%. The surface intended

for organic agriculture under the call of applications in 2022 was about 353.7 ha.

Table 1. Budget support under Sub-measure 2.5, 2015 – 2022

	2016	2017	2018	2019	2020	2021	2022
Amount of authorized subsidies, mil. MDL	0.6	1.59	7.25	7.85	6.9	7.5	6.9
Authorizedapplications	12	30	69	67	65	59	51
Surface, ha	443	1,439	3,023	2,538.4	2,538.4	720.4	353.7

Source: Agency for Intervention and Payments in Agriculture, 2010 - 2022 [1].

Therefore, the existing of environmental actions support schemes and applications by agricultural producers prove the concern of farmers for mitigation of the climate change effects and introducing of good agricultural practices related to soil preservation, water management, etc.

The steps undertaken in relation to coping with climate change are concerning the following aspects:

-Applying protective measures such as moving vegetable production to greenhouses, including winter green houses, tunnels and solariums, using mulch or other plant protection on soil, installing plant protection belts, and using hail nets (sub-measure 1.1);

-Expanding water supply for irrigation by building small-scale storage reservoirs, harvesting rainwater, and making greater use of local water sources for irrigation, such as creeks and groundwater as well as introducing drip irrigation and sprinkler irrigation systems (sub-measures 2.2 and 2.3).

-Changing agronomic practices, such as using no till techniques, converting to organic production, planting patterns, crop rotation and inter-cropping, chemical soil augmentation, using drought-resistant varieties (sub-measures 2.4 and 2.5) (FAO, 2020) [7].

Moreover, in the light of the most recent climate events like hail or severe droughts from 2020 and 2022 it is very important for the agricultural policy promoted by public authorities to focus on enhancing the possibility of agricultural producers to face the climate risks through well-thought risk management policies.

This policy field yields high synergies with farm extension service. But as weather events might have strong impacts at a regional scale, i.e. several neighboring farms will be affected at the same time, risk management cannot be exclusively delegated to farm managers. Instruments to secure the liquidity of farms might be necessary in addition (Herzfeld et al, 2022) [9].

CONCLUSIONS

Greening of the agricultural sector of Moldova is in continuous evolution. Public support for environmental schemes has increased in the recent years, thus demonstrating the interest of both, policy makers and agricultural producers in this topic. Taking into account that agricultural sector is already passing through important impacts of climate change, adaptation policies might receive a priority, compared to mitigation ones.

Therefore, a series of recommendations are provided for increasing the level of public support in environmental activities. First of all, in order to be in line with current greening EU policies, Republic of Moldova must adapt some of its public support schemes for the agricultural sector and pay more attention to development of a coordinative mechanism and advisory services.

Organic agriculture represents one of the most important directions, when speaking about greening of the sector. The development of organic farming will lead to an increase in the number of agricultural producers engaged in organic sector and, therefore, greening of the Moldovan agriculture. Moreover, the maximum amounts of allocated subsidies for organic agriculture, per request, could be eliminated in order to support the involvement of farmers in this sector. All of these will contribute to a better development of farms,

so that they can handle the existing and potential economic and environmental challenges, as well as ensure sustainable development and increase the competitiveness of the sector.

Another direction might be support for farmer's adaptation, by encouraging the selection of new types of crops and / or seed varieties resistant to drought / arid periods through support programs and improved access to seedling material/using good agriculture practices to reduce impact of harsh climatic conditions and protecting forests. Improved heat-tolerant varieties or new crops with the same qualities allow the plant to maintain yields at higher temperatures, specific in some years to the Republic of Moldova. Heat tolerant varieties could help increase crop yields.

Besides the existing support measures on compensation of costs for purchase of no-till and mini-till agricultural machinery, additional actions are needed to eliminate the consequences of soil degradation and restoration of productivity levels like increasing the areas with cover crops in gardens and perennial plantations, use of soil-friendly agricultural practices, application of crop rotation patterns and provision of additional incentives for an environmentally friendly land management.

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