Republic of Moldova

TECHNOLOGY NEEDS ASSESSMENT FOR CLIMATE CHANGE ADAPTATION

REPORT III

TECHNOLOGY ACTION PLAN (TAP)

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ENERGY, CLIMATE AND SUSTAINABLE DEVELOPMENT

AIT Asian Institute of Technology

PREFACE

The Republic of Moldova has signed the United Nations Framework Convention on Climate Change (UNFCCC) on June 12, 1992, ratified it on March 16, 1995 and for our country the Convention entered into force on September 7, 1995. On January 28, 2011 the Republic of Moldova has associated with the Copenhagen Agreement of the United Nations Framework on Climate Change. Under this Agreement, our country has set a new target aimed at Greenhouse Gas (GHG) emissions reduction, specifying " reduction of total national levels of GHG emissions by not less than 25% by 2020 compared to the reference year (1990). Hereby, it is determined that this target shall be achieved by implementing global economic mechanisms focused on mitigating climate change in accordance with UNFCCC principles and decisions."

The recent and underway policies of the Republic of Moldova on climate change mitigation are aimed at promoting energy efficiency and renewable energy sources in all sectors of the national economy, systematic afforestation activities and rational land management, promoting innovative approaches and environmentally friendly technologies and exploring carbon financing mechanisms.

In conformity with the general objective of the Convention, which sets as a target the maximum global average temperature growth until 2100 by no more than 2^0C, the Republic of Moldova has decided to undertake a transition to a low GHG emissions development path. The first step in this direction was made in 2011 when development of the Low-Emission Development Strategy and Climate Change Adaptation Strategy started. Approval of these strategies is planned for 2013, which will allow access to the long-term financing mechanisms under the Convention to implement the so-called Nationally Appropriate Mitigation Actions (NAMA) and adaptation measures. Technology needs assessment in the context of climate change mitigation and adaptation is a crucial first step in achieving the objectives of these strategies. Methodological aspects of evaluation and identification of appropriate technologies in climate change mitigation and adaptation revealed during the TNA will serve as a starting point in promoting them nationwide. In the future the Republic of Moldova will address climate change issues so, that they can be included in all national and sector development policies and strategies of the country. This status will allow our country to get integrated in the global process of climate change mitigation and adaptation to this phenomenon at the national level.

ACKNOWLEDGMENTS

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ABBREVIATIONS

ACSA	National Agency for Rural Development (Moldova)
ALRC	Agency for Land Relations and Cadastre
MH	Ministry of Health
MAFI	Ministry of Agriculture and Food Industry
ME	Ministry of Environment
MF	Ministry of Finance
MEc	Ministry of Economy
SAUM	State Agrarian University of Moldova
MCDA	Multicriteria Decision Analysis
LPA	Logical Problem Analysis
RIFC	Research Institute of Field Crops
TNA	Technology Needs Assessment
TAP	Technology Action Plan
NGO	Non-Governmental Organisation
FNC	First National Communication
SNC	Second National Communication
UNFCCC	United Nations Framework Convention on Climate Change
SEI	Sate Ecological Inspectorate
NCHI	National Company for Health Insurance

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FOREWORD

I am proud to provide a foreword to this report, which is one of the outputs of the 'Technology Needs Assessment' (TNA) conducted in Moldova. The TNA process was coordinated by the Ministry of Environment through Climate Change Office (CCO), who, with the help of local experts, conducted a thorough stakeholder consultation and analysis of the technical and policy options for increasing the use of low-carbon and climate-resilient technologies in Moldova.

Following methodological and technical assistance provided by the UNEP Risø Centre, the CCO facilitated a stakeholder-led Multi Criteria Analysis for the prioritisation of both mitigation and adaptation-side technologies. This was followed by stakeholder consultations regarding the most important barriers to the uptake of these technologies, and what can be done to overcome them.

The TNA process has finalised with Technology Action Plans (TAPs) that provide a clear and realistic road map to reforming market incentives and attracting investment in specific technologies. As such, these documents allow us to facilitate the transfer of key climate technologies that also serve to drive economic growth and development. Above all, the TAPs offer practical solutions for the sustainable development of the country's agricultural sector, upon which we depend heavily for our income and livelihoods.

Gheorghe Șalaru

Minister of Environment of the Republic of Moldova

March 2013

Report III

Technology Action Plan

Executive Summary

During the Barrier Identification phase of TNA Project, was applied Logical Problem Analysis (LPA) for development of Problem and Objective Trees of each technology; Market Mapping techniques used in a participatory manner with a contribution of experts and stakeholders' representatives, a number of general and specific barriers were identified for each prioritized technology and measures proposed to overcome the barriers and support technology transfer. The current, third phase of TNA Project is based on the main developed materials of the Report II and represents the Technology Action Plan (TAP) of each prioritised technology for two sectors Agriculture and Human Health.

During the implementation of the third phase of TNA Project, the working groups of Adaptation component have received guidance from UNEP Rios Center Regional and Country Coordinators, Asian Institute of Technology (AIT). The groups have applied methodological guidance provided during the TNA workshop in Bangkok (21-24 February, 2012) and following the methodological sources: *Overcoming barriers to the transfer and diffusion of Climate Technologies (Boldt, J.*, UNDP Handbook *Technology Needs Assessment for Climate Change*[1], Climate TechWiki website,[2] TNA guide *Technologies for Climate Change Adaptation, Agriculture sector*[3].

Technology Action Plan (TAP) of each technology was developed by national experts (consultants) working in Agriculture and Human Health sectors in association with stakeholders participating in this phase of the Project (Ministry of Environment, Ministry of Agriculture and Food Processing Industry, Ministry of Health, research institutions, academia). Their insights have contributed to the development of a series of measures addressing general and specific barriers of technology diffusion. The Report consists of two chapters dedicated to TAP of Agriculture sector technologies and TAP of Human Health sector technologies.

The sub-chapter dedicated to actions at sector level for both sectors consists of brief description of the role of the sector, the challenges related to climate change impact, now in force regulatory documents. The existing laws, regulations and policies are presented in form of tables (tables 1.1.1; 1.2.1), indicating the name of document, when it was adopted or modified, the main content and current technology profile, which consist of brief description of now mostly used technologies in the sector and description of compliance of proposed technologies with specific regulation or law, future targets. The tables provide information about the legislative framework for actions in diffusion of each selected technology. For Agriculture sector were identified 15 regulatory documents and for Human Health sector 13 documents.

The proposed for diffusion technologies are not totally new to Moldova's agricultural practitioners; however, due to many barriers identified during TNA Project, currently they are not widely adopted. The general barriers to meet targets of each technology were described and measures to overcome them proposed. For both sectors, the top challenge was considered that of finance identification, as it is very difficult to finance high demand growing needs of Agriculture and Human Health sectors from limited resources of budget. Proposed measures have been prioritised considering this crucial aspect, based on cost-effectiveness analysis and, in fact, they are low-cost adaptation options, particularly for Agriculture sector. However, technologies, particularly from Agriculture sector require much effort for operating at large- scale and in a long-term and have to be supplemented with establishment of local capacities. For rural entrepreneurs/farmers to take up these adaptation options there is a need to set up financial support via preferential subsidies or low interest loans. For wide diffusion of these technologies other important accompanying aspects are to be changed in order to reach the targets set. For both sectors legislative framework has to be more elaborated and the most important to be "operational," the policies and legislation to be implemented and respected at any level of social and administrative organisation.

Action Plan was developed for each of three technologies of Agriculture sector: (i) Conservation system of soil tillage without herbicides for winter wheat; (ii) Vetch field as green fertilizer into 5 year crop rotation; (iii) Applying 50 t/ha of manure with bedding to agricultural soils once per five years and two technologies/health care measure of Human Heath sector :(i) Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat waves; (ii) Rural population supply with potable water of guaranteed quality. Building of local water supply systems. These technologies have passed prioritisation phase, during which were assessed against developed set of indicators applying MCDA. The working group of each sector has considered them cost-effective climate change adaptation

[1] *UNFCCC/UNDP. Technology Needs Assessment for Climate Change. Handbook, 2010*
[2] *http://tech-action.org/guidebooks.htm*
[3] *UNEP/GEF Technologies for Climate Change Adaptation , Agriculture sector .TNA Guide, 2011*

measures. Technologies of Agriculture sector are long term large scale technologies, addressing soil management and soil improvement issues; application of conservative agriculture practices for soil improvement with long term local and regional benefits. Their overall targets aim at solving basic sector issues, have long term of their implementation (5-30 years), with significant coverage of arable land area (200, 000 ha). Proposed technologies/measures of Human Health sector are short term technologies (up to 5 years) with immediate social, economic and environmental benefits. Each technology brief description is given in the chapter dedicated to the sector.

Performed barrier analysis has been instrumental in providing information about the specific barriers to meet each technology targets and measures to overcome them. Main technology specific barriers of Agriculture sector are: not sufficiently developed local environment for technology transfer, most of the services are in place, but weakly developed or outdated. Land fragmentation is one of most difficult to take barrier, as it refers to property ownership. Specific barriers of the Human health sector refer to institutional type, cross- sectoral barriers as they need involvement of actors other than from health care sector (Water Resources Department, The Agency for Geology and Mineral Resources of the Republic of Moldova , “Apele Moldovei" Agency).

Proposed health care measure Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat waves is a response-specific approach to heat waves and oriented toward development of heat health actions plan, therefore, specific barriers are much related to management of implemented actions, cross-sectoral coordination. Rural population supply with potable water of guaranteed quality. Building of local water supply systems technology specific measures refer mostly to coordination actions at community level, commitment of local administration, lack of capacity and awareness to involve local population, anticipatory information on potential climate events risks.

Technology Action Plan (TAP) of each technology was developed by experts and discussed within the Adaptation groups of each sector, with high consideration of stakeholders’ inputs, is directly related to set targets and consistent with the existing policy framework. Proposed measures were discussed in terms of its necessity, responsible implementing entities, estimated timelines, costs, funding opportunities, indicators of success and risks.

A cross cutting common enabling policy applied to all technologies of both prioritised sectors Agriculture and Human Health is Moldova 2020: National Development Strategy. According to targets set by the Strategy, the main concern is to promote the people’s welfare in a healthy environment. Proposed measures that imply coordination among participating actors encourage collaboration and are oriented toward addressing cross— sectoral cutting issues. In response to poor access to finances and investment capital as a measure was proposed to seek investments form regional and global funding organisations.

Table1. Some of high relevance measures included in each technology TAP of Agriculture .

S. No.	Measure	Why the measure/actionis needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 y., 5-10y. , 10-20 years)	How much the measure will cost, how it can be funded (domestic, international funding)	Indicators of success, risks
Conservation system of soil tillage without herbicides for winter wheat							
1.	Enforce promotion of climate technologies through allocation of subsidies to farmers who comply with the requirements of a good farming system by respecting and implementing the whole farm plan.	This way it would be possible to replace stimulation of economic profit by stimulation of environment and social services provided by farmers.	Government, banks.	A monitoring system should be established (MAFI) in order to differentiate the level of farm sustainability and select farms that comply with requirements of a good farming system.	0-5 years	Domestic funding. At least 100 mln mdl which consists 25% from the actual fund for subsidies in agriculture. Farmers own investments.	✓ Decreased soil degradation by erosion. ✓ More farmer practicing climate technologies. ✓ Improved quality of ground water. ✓ Reduced use of pesticides.
2.	Regarding soil conservation and soil management.	There are no good rules for farm management system.	Parliament of Moldova, MAFI, rural entrepreneurs	The law should provide incentives for farmers respecting the requirements for good agricultural practices.	0-5 years	Domestic funds. The cost for the elaboration of the Law by Parliament is 8, 000 mdl	✓ Improving the quality of soils and water. ✓ Increased resilience of soils to climate risks.
Vetch field as green fertilizer into 5 year crop rotation							

S. No.	Measure	Why the measure/actionis needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 y., 5-10y. , 10-20 years)	How much the measure will cost, how it can be funded (domestic, international funding)	Indicators of success, risks
1.	Provisions on soil management responsibilities in the Land Code and in the Law of the Republic of Moldova on Environmental Protection.	To specify by law the responsibility of farmers for the soils quality.	MAFI , Agency for Land Relations and Cadastre (ALRC)	Supplementing the Land Code with a paragraph providing for penalties for degradation and deterioration of agricultural soils	By 2015 year.	Financial means from the ALRC budget for development of land legislation. 5, 000-8,000 mdl mdl per legislative initiative.	✓ It will become binding for agricultural businesses, land lessors to use soil protecting agricultural technologies.
2.	Cadastre Agency Intensifying land consolidation process.	To build a system of profitable, environmentally safe modern agriculture (conservative) on consolidated lands	Agency for Land Relations and Cadastre jointly with local public administration, MAFI.	By cooperation with private land owners	10-20 years	200,000 euro –international funds: "Land consolidation" project, WB, FAO. 100,000mdl- local budget .	✓ Farms with an area greater than 200 ha suitable to implement modern agriculture and soil protection systems.
Applying 50 t/ha of manure with bedding to agricultural soils once per five years							
1.	Develop appropriate law or regulation with stipulation of assignments and	Existing laws do not stipulate the responsibilities for collecting, processing, storage and soil	Ministry of Agriculture and Food (MAFI) jointly	Development and implementation of legislation (a	A law or regulation has to be developed	Financing from the budget of agencies	✓ It will increase the responsibility of the governing bodies and farmers for proper use

S. No.	Measure	Why the measure/actionis needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 y., 5-10y. , 10-20 years)	How much the measure will cost, how it can be funded (domestic, international funding)	Indicators of success, risks
	responsibilities of all actors involved in collection, preparation, storage, transportation and incorporation of manure into the soil.	incorporation of manure. Implementation of this measure will contribute to effective technology management.	with the Ministry of Environment (ME)	law or regulation) will make it binding for the central and local public administration and farmers to organize integrated manure management	prior to 2015 (during three years)	subordinated to MAFI and ME, or from grants. 5,000-8,000 mdl per legislative initiative.	of manure ecologically and economically wise.
2.	Raising the awareness of the local public administration and population on the problem of manure from environmental, economic, social and sanitary perspectives .	It will raise the interest of local governments and farmers for manure as fertilizer. The population will become aware about manure as a hazardous source of environmental pollution.	Agronomists of District Directorates of Agriculture, ACSA consultants, invited lecturers	By creating rural consultancy centres within the municipalities.	Starting with 2015	100, 000 mdl annually from ACSA, budget sources for awareness and municipalities resources	Improved knowledge of the local population about the features of conservation agriculture and the role of manure as fertilizer for the implementation of this system of agriculture.

Table 2. Some of high relevance measures included in each technology TAP of Human Health sector.

S. No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 y., 5-10y. , 10-20 years)	How much the measure will cost, how it can be funded (domestic, international funding)	Indicators of success, risks
Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat waves							
1.	Enforce the legal and regulatory framework support in order to assure proper functioning of the posts of temporary emergency care and rehabilitation.	Because of the inefficient legal and regulatory framework in carrying out medical emergency care in public places in critical period of heat waves.	Republic of Moldova Government	By governmental decision	0-5 years	5,000-8,000 mdl per legislative initiative. Amount determined by the National Statistics Office.	✓ The set of legal and regulatory framework assuring proper functioning of the posts of temporary emergency care and rehabilitation.
2.	Facilitate emergency care and prompt rehabilitation services in agglomerate public places during critical periods of heat.	There are no heat related emergency plans for providing increased health care services to urban populations. No guidance on when, where to act during heat wave periods.	State Hydrometeorologic Service, Ministry of Health , Ministry of environment, local government.	To identify temperature thresholds when provisional posts of emergency service to provide increased services to city population.	0-5 years.	Estimative costs are 100,000 mdl. Budget funding, international finance support.	✓ Developed emergency plan where, when and how (heat alerts) to act during heat wave periods in urban communities. ✓ Improved quality and timing of heat alert intervention.
Rural population supply with potable water of guaranteed quality. Building of local water supply systems							
1.	Promote financing of water supply projects in rural areas.	It is crucial for water supply system building.	State Agencies, private sector, foreign donors.	Allocating grants, budget sources.	0-5 years	Popularize this measure through roundtables, media. (mdl 50,000 annually, budget sources).	✓ Project documentation approved in the established manner. ✓ The risk – unskilled specialists in designing

S. No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 y., 5-10y. , 10-20 years)	How much the measure will cost, how it can be funded (domestic, international funding)	Indicators of success, risks
							water supply system.
2.	Building the water supply system.	To ensure secure access to drinking water of rural population under all circumstances and all time it is necessary to build up of water supply system.	Local authorities, private sector, Government, international water supply funds.	Implementing water supply projects in rural areas.	5-10 years	426, 000 € for the first year and 46,900 € every year as a depreciation of equipment. The value of this measure depends on the value of the whole project.	✓ Water supply systems functioning. ✓ The risk slackness of central and local authorities.

Chapter1. Technology action plan, Agriculture Sector

1.1. Actions at sectoral level

Short sector description. Agricultural sector plays a critical role for Moldova's economic and social development addressing food security, poverty eradication and sustainable rural development. This sector is important also in creating jobs providing 27.5% of total employment[4], with high contribution to GDP, 31.2%-11.9% during 1993-2010years[5]. The cultivable area is estimated at almost 2.6 million ha, which is 76% of the total area of the country[6]. By far the most significant land use is arable land for annual crop production. Much of this arable land sits on highly fertile and productive black chernozem soils, which cover 75% of the country, especially the northern districts and the Nistru river valley. High quality soil resources, along with various microclimates, support a wide array of annual and perennial crop production across the country. By area, the major annual crops grown are maize, wheat, sunflowers and barley. Cereals constitute 0.95 million hectares and other crops about 0.7 million hectares.[7] Vineyards and fruit trees are the main perennial crops. As nearly 90% of this production is rain-fed, there can be significant changes in the crop mix and area planted on a year-to-year basis, depending on the timing and quantity of rainfall and associated extreme events, like drought.

Agriculture sector of Moldova is already substantially affected by current climate variability. According to assessments undertaken during Moldova's First (FNC, 2000)[8] and Second (SNC, 2009)[9] National Communications under the United Nations Framework Convention on Climate Change (UNFCCC) it faces distinct challenges of droughts, floods, frosts, hails and heavy rains. The climate is expected to become more arid and risky for agricultural production, due to increasing temperatures and longer dry periods. The impacts of climate change will necessitate shifts in land management applying a range of sustainable technologies related to land conservation and rehabilitation.

According to its natural composition and fertility, the soils of the Republic of Moldova make part of the most valuable soils, characterized by a remarkable diversity, related to the local vertical and horizontal zone differences, covering 75% of the land find area. The big diversity of soils with limited areas represents favorable environmental niches for some crops such as vineyards, fruit trees, vegetables, etc. The average level of fertility of arable land constitutes 68 points. 84.8% out of agricultural lands have a good and very good fertility rate, 9.9% - average and 5.3% - low fertility. From the economic point of view, soils are the most valuable composition of the natural resources. Taking into account the global trends in the depreciation and losses of agricultural land as well as the development of agriculture, the issue of preserving agricultural lands became a strategic concern of national security for our country[10].

As part of its development policy framework, the Government of Moldova has prepared a number of sector strategy documents, sectoral polices and development plans promoting and supporting soil conservation and soil quality improvement actions, as efficient climate change adaptation measures. These policy documents incorporate targets carrying out agro-technical measures for soil protection – anti-erosion crop rotation; agro-technical anti-erosion; growing of cereals in a sustainable mode.

The Program for Soil Fertility Conservation and Enhancement 2011-2020[11] has as long-term objective the preservation of the quality and productive capacity of soils for food security of the country. Their quality level influences largely crop yields, livestock sector development, agricultural exports, welfare and environmental situation in the country.

The Program of Strategic development for the period 2011-2015 years of Ministry of Agriculture and Food Industry of RM [12] includes a number of important targets for soil conservation and rehabilitation: to create and enhance the

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[4] *National Bureau of Statistics (2011), Annual Statistical Yearbook of the Republic of Moldova, 2011, Table 3.1.4 "Distribution of employment by economic activities" (see on page 73).*

[5] *National Bureau of Statistics (2011), Annual Statistical Yearbook of the Republic of Moldova, 2011, Table 13.21 "Share of main economic activities in the generation of gross domestic product" (see on page 269).*

[3] *World Development Indicators, 2009, World Bank.*

[7] *Area harvested is estimated based on linear trends using FAO reported data from 1995-2008 due to annual fluctuations in area harvested (FAO 2011).*

[8] *UNDP/Ministry of Environment and Territorial Arrangement (2000), First National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change. Chisinau, 2000. – 87 p.*

[9] *UNEP/Ministry of Environment and Natural Resources (2009), Second National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change. Chisinau, 2009. – 316 p.*

[10] *National Agriculture Sector and Food Processing Industry Sustainable Development Strategy of the Republic of Moldova for 2008-2015: http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=327309.*

[11] *http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=339882*

technical and scientific basis to ensure implementation of soil quality improvement activities , stopping the active forms of soil degradation by 2020, application of conservation measures and improving soil fertility on an area of 1.7 million hectares by 2020, creating conditions for implementation of modern technologies and know-how growth in agriculture, implementation of no till technologies in agriculture.

According to Moldova 2020: National Development Strategy[13] medium- and long-term the main concern of authorities is to promote the people's welfare based on a clean environment. In this context, the Government's strategic vision over medium and long term is the reconciliation between the need for accelerated economic development and environmental protection in conformity with European standards.

An important document-recommendation that establishes targets and practices is the *Moldovan Code of Good Agricultural Practice*[14]*,* which represents a series of generalizations taking into account the achievements of good practices allowing the prevention and diminishing of the negative impact of agriculture on the environment.

Diffusion of efficient agricultural technologies/practices are critical for agriculture sector, however, a supportive policy, regulation, law and institutional environment are also essential. In the table 1.1.1 are given supportive legislative acts of agriculture sector and the current technology profile.

The following framework is intended to support diffusion of proposed by TNA Project technologies of Agriculture sector. It will provide guidance in respect to diffusion and implementation of technologies, plan investments, ensure responsibility and accountability of actions taken under TAP of each technology at all administrative levels, establish cross-sectoral cooperation, promote stakeholders engagement to support climate change adaptation actions.

[12] *Strategic priorities for the activities of the Ministry of Agriculture of the Republic of Moldova in the years 2011 to 2015.*
[13] *Moldova2020: National Development Strategy: 7 solutions for Republic of Moldova.(2012)*
[14] *Moldovan Code of Good Agricultural Practice* . http://www.bsnn.org/pdf/GoodAgriculturalPractice-DRPII-21728.pdf

Table.1.1.1 Existing policies in the Agriculture sector and current technology profile

S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
1.	Moldova 2020: National Development Strategy.	Adopted by the Parliament of RM on 11.07.2012.	According to the targets set by the Strategy, the main concern is to promote the people's welfare based on a clean environment. In this context, the Government's strategic vision over medium and long term is the reconciliation between the need for accelerated economic development and environmental protection in conformity with European standards.	Technologies prioritized during Technology Needs Assessment Project represent measures for sustainable management of country's natural resources, promoting resources efficiency, enhancing resilience to climate variability and change, with a special focus on soil characteristics improvement, management, protection and sustainable practices. Deployment of these technologies will contribute to build in Moldova a more resilient agriculture system from climatic and economic viewpoints. **TNA prioritized technologies**: These technologies are not totally new to Moldova's agricultural practices; however, due to many barriers identified during TNA Project, currently they are not widely adopted by farmers and agri-business. The proposed general and specific measures have the purpose to overcome barriers and support wide diffusion of technologies. **1. Conservation system of soil tillage without herbicides for winter wheat.** The existing technologies of growing winter wheat have been intensively utilized during the period of agricultural industrialization. Because winter wheat is sown after late harvested predecessors without respecting the requirements to a proper alternation of crops, more chemicals (nitrogen from mineral fertilizers and pesticides) are required for crop nutrition and weed, pest and disease control. This aspect has a detrimental impact on the environment, particularly on soil quality. The proposed technology of growing winter wheat is based on appropriate crop rotation by sowing winter wheat after early harvested predecessors, which allows reducing herbicides for weed control and lowering the rate of nitrogen from mineral fertilizers. This is consistent with the strategic purpose of achieving a clean environment. Targets: Stimulate using of resource conserving agriculture at least by 50% of agricultural producers in 2020 and 70% of sowing areas by 2030. **2. Vetch field as green fertilizer into 5 year crop rotation technology** The advantages of this technology are: common tillage habits; total

S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
				incorporation of vegetal wastes, weeds and their seeds; reliability due to simple construction of the plough; soil loosening effect (intensive mobilization of soil fertility, complete assurance of crops with nitrogen for 4 years due to return into soil of about 400kg/ha of nitrogen with vetch vegetal wastes; significant rehabilitation of physical quality of the soil, biological improvement of the soil. It develops a balance of humus, carbon, nitrogen and CO2 emissions from soil. The technology can be successfully implemented by all agricultural businesses during 5-10 years, on each field in crop rotation every year, the total area is 40 000 ha / year. Targets: Introducing technology provides 40, 000 ha annually beginning with 2016 (2016-2020). Stabilizing effect of technology will occur over 3 to 4 turns of crop rotations, by 2030 y. During 2013-2015y.y. – the technology will be tested and establishment of fall and spring vetch seed stock. **3. Applying 50 t/ha of manure with bedding to agricultural soils once per five years.** The technology is attributed to sustainable system of agriculture, restoring the soil quality, increases the production capacity of soils, and eliminates the risk of worsening the environmental, sanitary-epidemiological conditions and polluting the ground waters and streams. The proposed technology implies return of the biophile elements that are contained in dung, urine and vegetal residues of the bedding for cattle back to the biological cycle in the fields. One ton of manure with bedding at 50-55% humidity contains about 15-18 kg of phosphorus nitrogen and potassium. The technology helps maintain a stable content of organic matter in soil, as humus and soil carbon content becomes balanced. The arable layer becomes looser, more resistant to compaction and erosion, more assured with reserves of water accessible to plants. Using manure as organic fertilizer in the field, it solves one of big environmental problem caused by its concentration in individual farms located in the rural communities and being the main source of pollution of groundwater (from the wells) and streams. Targets:

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S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
				Implementing the technology on the area of 200,000 ha by applying to 50 t / ha manure with bedding once in five years on one field in a 5 fields crop rotation scheme (on 40,000 ha annually). Restoring the soil quality over an area of 200, 000 ha in three agri-climatic zones of Moldova: North, Central, and South over the next 20 years.
2.	The Program of Strategic development for the period 2012-2014. Ministry of Agriculture and Food Industry of RM.	Approved by Government decision Nr 179 of 23.03.2011.	Strategic Development Programme is the basic document of the Ministry of Agriculture and Food Industry, which complements the strategic planning system in the central public administration authorities, ensuring prioritization of various objectives, reflected in many policy documents and identifying gaps in skills and tools/methods the authority uses to achieve its objectives.	Currently most utilised technologies in the sector: 1. Technologies of growing field crops with conventional ploughing methods. The techniques for field lay-out with casting pattern and gathering pattern with completing the headlands. Techniques used: a) basic works: ploughing, loosening tillage (paraplow, chisel), deep loosening, plowing with heavy disc harrow; b) seedbed preparation work: levelling, rolling, work harrow, work with combiner, with milling work, work with complex aggregates; This technology dominates in Moldova, almost 1M ha of arable land is ploughed and 70 % of farms practice it. The problem in using this technology is Moldova's hilly relief, which contributes in great extent together with torrential rain and high percent of raw crops in the structure of sowing area to significant soil losses as a result of water erosion. 2. Technology of growing field crops with contour ploughing with a reversible plough. Techniques used: crop maintenance work: rolling, harrow work, hoeing, levelling of the ridges. This technology helps to reduce soil erosion along with expenses for field cultivation by its leveling. Unfortunately, this technique is used only by corporative farms, with big area under the field crops; currently this is 7-10 % from the total arable land. The number of farmers applying this technique is ~ 2-3% from the total number of farmers. 3. Technology of growing field crops with occasional downhill ploughing on sloping land. This technology is implemented on ~3% from the total arable land in Moldova and it is considered as an inadequate technology because of huge soil erosion losses. Its implementation is the consequence of mistakes during privatization of land, when territories were fragmented without considering relief peculiarities and almost 25-30 % of farmers have plots on these types of slopes.

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S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
				Prioritized by TNA technologies: Maintaining the production capacity of agricultural land is a strategic national security concern. Amongst the priorities in the medium term for MAFI is the implementation of conservative agriculture, including: 1) Conservation system of soil tillage without herbicides for winter wheat; 2) Vetch field as green fertilizer into 5 year crop rotation technology; 3) Applying 50 t/ha of manure with bedding to agricultural soils once per five years**.** Implementation of environmentally friendly technologies in agriculture to increase soil fertility and prevent pollution is considered one of the main priorities of the strategic development of agricultural sector of Moldova. This issue can be addressed by implementing of whole farming system, based on preventing soil degradation and pollution. It means that modern technologies of growing field crops, including cereal crops should cover a proper crop rotation, optimal system of soil tillage and fertilization allowing reducing the dependence from non-renewable sources of energy and their derivates (mineral fertilizers and pesticides). The proposed technologies allow reducing the rate of nitrogen from mineral and pesticides for weed, pest and disease control. The proposed optimal system of soil tillage in crop rotation is integrated with the system of crop rotation and soil fertilization. Conservation agriculture should lead to soil fertility improvement and to preservation in the long-term soil quality and their productive capacity.
3.	The Programme for conservation and improvement of soil fertility for 2011-2020.	Approved by Government decision Nr. 626 of 20.08.2011	Implementation of environmentally safe farming methods to increase soil fertility, use as organic fertilizer manure and green manure, application of minimum tillage and no-tillage.	**Prioritized by TNA technologies** The reasons of soil degradation are known and the whole system for land improvement is proposed as solution, including respecting technologies of growing cereal crops on degraded soils. 1. **Conservative agriculture, including soil tillage without herbicides for winter wheat.** This system of agriculture avoids ploughing and keeps the crop residues on soil surface. Soil should be covered at least with 30% of crop residues. A number of soil tillage techniques are used in conservative system of agriculture :

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				• No-till. No-till supposes direct drilling without any soil tillage operations. This system works only (at least at the moment) by simultaneous use of herbicides. It is used on small areas in Moldova and only by corporate farms (30-35 thousand ha of land). High cost of equipment and lack of knowledge regarding the agronomic efficiency are the main barriers of its implementation on big areas • Vertical tillage. Vertical tillage is operated by chisel plow and paraplow without turning the soil. • Minimum tillage. Minimum tillage is the most suitable for Moldova. It involves refusing use of the moldboard plow in the favor of no reversible soil tillage with blade working tools, chisel, paraplow, disking etc. It supposes also soil tillage with combinators, which allows applying different tillage operations by one passage on the field of agricultural machines. • Integrated system of crop rotation. • Whole farming system based on preventing soil degradation ,polution. • Fertilization in accordance with existing recommendations for different crops in crop rotations. 2. **Vetch field as green fertilizer into 5 year crop rotation technology.** 3. **Applying 50 t/ha of manure with bedding to agricultural soils once per five years.** Both technologies perfectly comply with the scope of the Programme and their large diffusion would be an efficient contribution to improvement of currently damaged soil and solve important environmental problems related to animal wastes pollution of rural communities.
4.	Strategic priorities for the activities of the MAFI of the Republic of Moldova in the years 2011 – 2015.	Approved by MAFI Directive of 21.10.2011	Promotes conservation agriculture leading to increase of soil fertility and preserve long-term quality and productive capacity of soils.	In implementation of strategic priorities of MAFI for 2011-2015 year currently are used technologies specified in p.p. 2, 3 of the present table. Proposed for diffusion technologies totally fit into MAFI priorities, particularly those of conservative agriculture.
5.	Land Consolidation Program	Approved by Government Decision no. 554	Detailed law governing land consolidation process under Chapter 10 of the Land Code, to create conditions	Fragmentation of land doesn't allow implementation of efficient technologies of growing field crops, including cereals, the main crops cultivated in Moldova. Completion of land consolidation will allow

S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
		of 22.05.2006.	for the implementation of a space-based modern agriculture crop rotation and use of organic fertilizers.	implementation of modern and sustainable technologies with use of appropriate techniques, modern machinery. Currently in Moldova activate: • 232 agricultural cooperatives with the total area of 126.3 thousand ha (6.3 %, of the total surface of land intended for agriculture, the area average of 1 cooperative - 544 ha) ; • 161 companies with total surface area of 40.4 thousand ha (2 %, average area of 1 companies - 251 ha); • 4624 Companies with limited liability to the area of 683.2 thousand ha (34 %, average area of 1 limited company - 148 ha). Proposed by the TNA Project technologies are efficient when operating at large scale; therefore, their implementation would be an incentive for spatial re-organisation of farming activities through consolidation of fragmented plots. **1. Conservative agriculture, including soil tillage without herbicides for winter wheat.** **2.Vetch field as green fertilizer into 5 year crop rotation technology** **3. Applying 50 t/ha of manure with bedding to agricultural soils once per five years.**
6.	Law regarding payment for the pollution of the environment.	Law Nr.1540-XIII of 25.02.1998	Penalties for the pollution of the environment are included and measures for preventing pollution of the environment. This law aims at: a) a system of economic activities, were it becomes inconvenient causing any environmental damage. b)stimulation of construction and operation of systems to capture and neutralize pollutants; c) creating eco-funds for financing of activity oriented toward improving the quality of the environment.	In order to avoid penalties for environmental pollution are favored preventive actions preventing negative consequences on the environment by respecting the Code of Good Agricultural Practices, where the requirements to proper crop rotations, soil tillage, soil fertilization and crop protection are indicated. The proposed technologies of **growing winter wheat** allow preventing the negative consequences on the environment. This way the payment for pollution of the environment can be avoided. The technology with application of **50 t/ha of manure with bedding to agricultural soils once per five years** solves major environmental problems related to manure concentration in rural areas and being the the main cause of the spread of hepatitis and other infectious diseases in rural areas.

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S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
7.	Soil protection and improvement. Land Code	Land Code nr.828 from 25.12.1991; revised 04.09.2001 (Monitorul oficial Nr.107.)	The document is describing legal procedures governing the protection of soil and land reclamation works; the registration of land by the state authorities; the competence of authorities at different levels ; penalties in case of non-rational use of land etc. This regulation favors prevention of pollution and degradation of the environment instead of controlling the consequences of mismanagement in agriculture.	Conservative agriculture, including crop production of cereals (other crops) with the ability to improve soil quality and reduce losses of soils. It includes the whole system of technological measures(crop rotation, soil tillage, fertilization)oriented not only towards high level of yields, but also towards restoration of soil fertility. 1. **Conservative agriculture, including soil tillage without herbicides for winter wheat.** The winter cereal crops have higher ability to protect soils against erosion but the capacity of soil to resist under the influence of torrential rain is determined by soil quality. The proposed technology of growing winter wheat will allow to improve soil quality and in such way to reduce losses of soils. 2. **Vetch field as green fertilizer into 5 year crop rotation technology**. 3. **Applying 50 t/ha of manure with bedding to agricultural soils once per five years**.
8.	Regulation of land ownership Land Code Act, Chapter X	Adopted at 25.12. 1991 by Resolution no. 828 of the Parliament of RM. Article no. 817 modified on 09.04.2001	The law is meant to ensure local authorities, enterprises, institutions, organizations and citizens with land status information for rational use and protection of the organization and regulation of land relations, land tenure system, land payments grounding, evaluation of economic activity.	The proposed technologies promote long-term responsibilities for soil quality and management and perfectly fit in the law. They are supportive to long term sustainable soil management, apply techniques oriented towards soil protection and diminishing the negative influence of droughts, rain storms and floods.
9.	National Agriculture Sector and Food Processing Industry Sustainable Development Strategy of the Republic of Moldova (2008-2015).	Approved by Government decision No. 282 on 11.03.2008	The Strategy establishes measures contributing toward diminishing agriculture's vulnerability related to risk factors and environmental protection. Erosion combating was specified as one of the main measures in soil improvement actions.	This strategy includes measures oriented towards soil protection and reduction of the negative influence of droughts, floods and erosion. This policy is supportive to: a) Conventional agriculture; b) Cereals production without herbicides for weed control and nitrogen from mineral fertilizers; c) Conservative agriculture; d) Reduction in area under row crops with intensive use of chemicals for row crops. Management of composts, including their effective utilization for field crops. Proposed by TNA Project technologies perfectly comply with Sustainable Development Strategy.
10.	The law on ecological food	Law Nr. 115-XVI of 9.06.2005.	The Government Decision includes : • National Program on ecological food	The Law is supporting to technologies of organic/ecological production. Currently, 71 companies have implemented quality systems ISO 9000,

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S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
	production.		production; • Regulation on organic food production methods and principles; • Regulation on inspection and certification system for organic agricultural production.	HACCP and GLOBALGAP respecting the whole farming system based on more intensive use of nutrients and energy, predominantly from renewable sources of energy at the local level, with less inputs from non-renewable sources of energy. The share of arable land under such technologies relatively to the total area under arable crops is small 0, 7%. 1. The proposed technology of **growing winter wheat** can avoid using of Herbicides for weed control and nitrogen from mineral fertilizers, which is in accordance with the requirements to ecological production. 2. Technology using **vetch field as green fertilizer** creates the prerequisites for implementing sustainable agriculture practices. 3. Applying **manure with bedding to agricultural** is a sustainable practice for restoring the soil quality needed in growing ecological/organic vegetable production.
11.	Government Decision regarding the implementation of the Law on ecological food production.	Approved by Government Decision nr. 149 of 10.02.06	The law specifies the requirements for certification of organic food products by OIC "Certificate-Eco" and lists the documents required to be submitted by operators for compliance.	This Government decision is in support to ecological crop production. Proposed by the TNA Project technologies are in compliance with requirements of organic production. By respecting the requirements to ecological production for all crops grown in Moldova can develop a proper ecological production. Local and international organizations already perform the inspection and certification of ecological production.
12.	The law for accession of the RM to the Kyoto Protocol the Framework Convention of the United Nations with regard to climate change.	Law Nr. 29 of 13.02.2003	The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) sets binding obligations on countries to reduce emissions of greenhouse gases.	The Kyoto Protocol is very important in reducing global warming effect. Taking in consideration that the content of carbon in soils at the global scale is 5 times higher than the content of carbon in the above ground vegetation we should promote technologies in agriculture, which are favouring carbon sequestration in the soil and adaptation to global warming. Proposed technologies have synergetic effect: they are efficient climate change adaptation technology, at the same time contributing to reduction of GHG in the Agricultures sector of Moldova.
13.	The Law regarding environmental protection.	Law nr.1515 of 16.06.1993	The Law states, that environmental protection is a national priority, directly affecting the living conditions and health, achieving human, social and	The recommended technologies are in strict compliance with principles of environment protection and are measures for sustainable management of natural resources. Other technologies accepted and applied with concern to environmental

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S. No.	The existing laws, regulations and policies	When enacted/revised	Main content of the document	Current technological profile
			economic interests and capacities for sustainable development of society. It states principles and responsibilities for environment protection.	protection : 1.Ecological/organic crop production 2.Farming systems with reduced inputs of non-renewable sources of energy and their derivates.
14.	The Law regarding the drinking water.	Law nr.2712 of 10.12.1999	The quality of drinking water, measures of protecting good quality of water	The recommended technology of growing winter cereal crops allows to prevent or to reduce significantly the danger of water pollution both on the surface and for groundwater's. Respecting the whole farming system (with different component parts) allows to prevent, but not to control pollution of surface and ground waters.
15.	Waste management, toxic substances, mineral fertilizers and pesticides.	Law on Environmental Protection No. 1515-XII, Chapter VI of 16.06.93	The law is outlined government policy on waste management and the penalties that may be imposed for failure to comply with this policy. Penalties were introduced for creating unauthorized dumps.	Recommended technologies: **Applying 50 t/ha of manure with bedding to agricultural soils once per five years** is a technology that addresses social, agriculture and environmental issues. Its diffusion and adoption would remove manure wastes from human settings being of source of pollution and infections and bring it back in the field and introduce it into biogeochemical cycle. Technologies of growing **winter cereal crops** and **applying vetch field as green fertilizer into 5 year crop rotation** are in complete harmony with the requirements of the environment protection.

1.1.1. General barriers and proposed measures for technology transfer in the Agriculture sector

The working group of Agriculture sector has identified barriers to adoption of proposed technologies in Agriculture and put efforts to understand why despite their many advantages the farmers rarely apply sustainable agricultural practices in Moldova.

The working group has used Market Mapping techniques as a tool for barriers identification and analysis of the challenges the farmers have to coop within in the adoption of soil conservation system. Another tool used in the barrier analysis by the working group was Logical Problem Analysis (LPA) for analysing causal relations and core problems in technology transfer. Problem tree and Objective tree for each technology have been developed in a participatory manner with contribution of experts and stakeholders representatives.

Market analysis for each measure included three components: business enabling environment, market chain actors and services provision.

One of the common barriers holding farmers from adoption of sustainable practices are related to the costs of adopting them, the need of having high up-front investments. Local farmers have difficulties to cope with this critical challenge, as adoption of a sustainable technology requires a change in the equipment or simply discarding old equipment. Another common financial barrier is the high interest rate on loans provided to agricultural entrepreneurs for operational activities (typically 20-24% annually, including commission rates).

Measures addressing these economic and financial barriers consist of considering incentives to attract investments in climate change technologies and setting up of agricultural banks with low rate of interest, which would considerable increase the access of rural entrepreneurs to investment funds.

A common policy and regulatory barriers are related to insufficient legal and regulatory enforcement. The experts and stakeholders insisted on having stated the importance of adoption of the Law on Soil, incorporating all regulatory needs related to soil issues, with special emphasis on climate change adaptation. For this, and other reasons, the adaptation group proposed a number of general and specific measures to enforce relevant legislation and implement it through practical actions. The proposed technologies may only be practically possible under a supportive and effective regulatory framework.

A generic barrier of institutional capacity of Agriculture sector of Moldova is the weak research and innovation development in the area of sustainable agriculture and insufficient knowledge developed about climate change risks for agriculture sector. Knowledge transfer to the farm community and to those working closely with farmers is essential to enable adaptive action.The poor liaison between researches, academia and agricultural business creates big gaps in technology transfer. To address these issues is to improve R&D of agriculture sector, enhance professional capacities of research institution and advisory services, and provide detailed guidance to practically apply the acquired or developed knowledge. There is much need to engage stakeholders to support implementing cost effective climate adaptive practices and technologies. Research community must have a greater involvement in addressing climate issues, including resilience and adaptation to climate change.

Poor market infrastructure is a serious concern of rural entrepreneurs; the market is monopolized by major land-owners leading to group interests and cartel agreements. Small farmers are poorly linked to market, having a limited domestic production. The working group considered as measure to increase the access to market of a larger number of various producers: local and external.

Adaptation working group has considered that is a shortage of information and knowledge about benefits of climate technologies, they are insufficiently promoted and as action it is necessary a higher involvement of media, researchers, consultants to bring up to large audience the importance of adopting environmentally friendly technologies and addressing issues related to climate change risks.

Lack of qualified personnel is often a factor hindering successful implementation of innovative, modern agricultural practices. There is a stringent need in strengthen human capital in agriculture sector of Moldova.

Table 1.1.2 General barriers and proposed measures to overcome barriers to technology transfer in the Agriculture sector.

General barriers		Measures to overcome general barriers
Category of barriers	Type of barriers	
Economic and financial	High up-front investment	Consider incentives to attract investments in climate change technologies of Agriculture sector.
Economic and financial	High interest rates	Create agricultural banks with low rate of interest.
Policy, legal and regulatory	Insufficient legal and regulatory enforcement.	Enforce relevant legislation regarding soil conservation and soil management with emphasis on climate risks.
Institutional capacity	Limited institutional capacity	Improve R&D system in Agriculture sector.
Market failures	Poor market infrastructure	Increase the access to the local market of various producers of agricultural products and equipment. This will increase competition and decrease prices.
Inadequate information	Inadequate information	Increase media interest in promoting climate technologies with larger participation of researchers, consultants and producers; more information about the positive influence of climate technologies.
Human skills	Lack of skilled personnel	Strengthen human capital base in the Agriculture sector.

Specific measures to overcome barriers to technology transfer for each prioritised technology of agriculture sector are given in table 1.1.3 bellow and in details of the Technology Action Plan developed for each proposed technology (tables 1.2.1; 1.3.1; 1.4.1).

Table 1.1.3 Proposed specific measures to overcome barriers to technology transfer in the Agriculture sector

Specific measures			
Technology / Category	Conservation system of soil tillage without herbicides for winter wheat	Applying 50 t/ha of manure with bedding to agricultural soils once per five years	Vetch field as green fertilizer into 5 year crop rotation
Economic and Financial	Reduce taxes for the import of climate technologies.	Developing a system of economic incentives for agricultural enterprises that use manure and green fertilizers.	Release subsides for farmers implementing climate technologies.
	Enforce promotion of climate technologies through subsidies for respecting good farming systems.	Provision in the Ecologic Fund of funds for the construction of collective or inter- communal platform for collection, preparation and storage of manure, and to purchase necessary equipment using the sources from donors coming as grants.	Developing a system of economic incentives for agricultural enterprises that use manure and green fertilizers.

Specific measures			
Technology / Category	Conservation system of soil tillage without herbicides for winter wheat	Applying 50 t/ha of manure with bedding to agricultural soils once per five years	Vetch field as green fertilizer into 5 year crop rotation
		Assigning the responsibility by inserting certain provisions in the Land Code and the Law on Environmental Protection.	
Institutional capacity	Creation of an Agency (preferable Government al) responsible for organizing and monitoring of sustainable land management.	Cadastre Agency intensifies of land consolidation process.	Cadastre Agency intensifies of land consolidation process.
Network working	Organize national and regional networking groups for farmers interested in promoting climate technologies.	Assure an efficient coordination between the main actors of organic and green fertilizers chain.	Assure an efficient coordination between the main actors of green fertilizers chain.
	Organize Foundation of a consumer association in order to make a connection between agricultural producers and policy makers, to do lobby for a sustainable system of food production.		Organize national and regional networking groups for farmers interested in promoting climate technologies.
Market imperfection	Develop the logistic for procurement by agricultural producers of equipment for climate technologies.	Establish regulatory and organizational framework to promote effective management of communal platforms. Local municipalities to build up staff servicing the platforms and organize the contractual relations between manure producers and agricultural businesses.	Develop the logistics for the procurement by agricultural producers of equipment for climate technologies.
	Lobby at the consumer association for consumption of ecological agricultural products.		
Policy, legal and regulatory	Enforcement of relevant legislation regarding soil conservation and soil management.	Introduce fiscal and regulatory measures for reduction of manure wastes and promotion of manure utilization.	Increase accountability of farmers for long-term maintenance of soil quality.
	Reduce restrictive policies for importing technology and equipment, to reduce import taxes.	Accountability assessment by introducing some specific points in the Land Code Act and the Moldovan Law on Environmental Protection.	Provisions of soil management responsibilities in the Law on the Land Code and in the Law of the Republic of Moldova on Environmental Protection.

Specific measures			
Technology / Category	**Conservation system of soil tillage without herbicides for winter wheat**	**Applying 50 t/ha of manure with bedding to agricultural soils once per five years**	**Vetch field as green fertilizer into 5 year crop rotation**
		Introduce fiscal and regulatory measures for reduction of wastes/manure and promotion of manure utilization.	Accountability assessment by introducing some specific points in the Land Code Act and the Moldovan Law on Environmental Protection.
Information and awareness	Increasing media interest in promoting climate technologies with larger participation of researcher, consultants and producers; more information about the positive influence of climate technologies.	Raising the awareness of the local public administration and population about the problem of manure from environmental, economic, social and sanitary perspectives by creating consultancy centers.	Make the agricultural businesses and general public aware about the environmentally friendly practices.
Human skills	Strengthen human capital base in the Agriculture sector.	Promote Programmes for providing training and education on soil management.	Promote Programmes for providing training and education on soil management.

1.2 Action Plan for *Conservation system of soil tillage without herbicides for winter wheat* technology.

The technology passed through technology prioritization phase of TNA Project performed by national experts and completed through a stakeholder consultation process. In Moldova's current economic and social conditions proposed technology was considered a much needed agricultural management sustainable practice with high economic, social and environmental benefits. Deployment of this technology would have a high impact on whole agriculture sector, as it promotes conservative agriculture principles and is an effective measure of adaptation to climate change.

1.2.1. General description of technology

Conservation system of soil tillage without herbicides is a sustainable land management practice that contributes to improving soil fertility and structure, adding high amounts of biomass to the soil, causing minimal soil disturbance, conserving soil and water, enhancing activity and diversity of soil fauna, and strengthening mechanisms of elemental cycling. *Conservation system of soil tillage without herbicides for winter wheat* technology can be extended to other cultivars, such as sugar beet and sunflower.

This technology has advantages comparing to conservation tillage with herbicides or conventional tillage.

- Moldboard plug is replaced by combinator, which contributes to the reduction of soil erosion and uncompensated mineralisation losses;
- By reducing soil erosion and mineralisation losses of soil organic matter we decrease global warming through increased carbon sequestration;
- By reducing the consumption of fuel as a result of replacing the moldboard plow with minimum tillage it is possible to adapt to the limited sources of non-renewable sources of energy, to the fluctuation of prices for non-renewable sources of energy at the international level;
- By keeping mulch on the soil surface it is possible to reduce evaporation of soil moisture and to increase the resistance;
- By using minimum tillage it is possible simultaneously to reduce or even avoid application of mineral fertilizers and pesticides for weed, pest and disease control, which requires a proper soil management system.

The above mentioned advantages allow also to adapt better to the limited sources of non-renewable sources of energy, to the fluctuation of prices for non-renewable sources of energy at the international level, to adapt to global warming by increased carbon sequestration, to increase biodiversity in the soil and on the soil surface through less dependence from mouldboard ploughing and chemicals for pest, disease and weed control.

Minimum tillage system is studied in the long/term field experiments at the RIFC "Selectia". Research results are available for farmers through publications of books, recommendations, articles, TV, radio etc. Farmers are visiting experimental plots of the institute with different systems of soil tillage. Each year we organize seminars for farmers at least two times (in the spring, before sowing spring crops, and in the fall before sowing winter cereal crops). During these seminars farmers can see the equipment in operation for minimum tillage in crop rotation.

Economic benefits:

- Increasing the sustainability of the agricultural sector, including profitability
- Reducing the dependence from non-renewable sources of energy and their derivatives (mineral fertilizers and pesticides), which we have to import at the moment and in the future
- Creating conditions for the development of small and medium enterprises

Environmental benefits:

- Achieving a more sustainable use of natural resources through preventing soil degradation, soil and water pollution, preservation of biodiversity etc.
- Higher carbon sequestration which allows to reduce global warming;
- Reduction of soil erosion and better storage of soil moisture;
- Reduction of pollution of ground water with nitrates;
- Reduction of GHG emission as a result of lower amount of burned fuel.

Social benefits:

- increasing the rural communities stability by maintaining people on the land

- improving health of people
- creation of new working places and increasing the economic stability for the wellbeing of people

1.2.2.Targets for transfer of *Conservation system of soil tillage without herbicides for winter wheat* technology.

1. Stimulate using of resource conserving agriculture at least by 50% of agricultural producers in 2020 and 70% of sowing areas by 2030.
2. Adopt conservation tillage on three agro-ecological zones of the Republic of Moldova.
3. Increase environmental beneficial influence via lowering the intensity of soil erosion and higher compensation of mineralisation losses of soil organic matter, reducing the consequences of global warming by higher carbon sequestration, efficient adaptation to climate change. Increase the capacity of soil for a better accumulation of water from atmospheric precipitations as a result of a better soil structure and good soil coverage, which reduces water losses during water erosion.
4. Adopting conservation tillage technology to reduce labour, time and fuel costs by 50% or more compared to conventional agriculture, reduce the economical expenditures on 20-25% per 1 ha of sowed area with winter cereal crops.
5. Promote wildlife (crop residues provide shelter and food for wildlife, such as game birds and small animals, which can result in additional farm revenue), improve air quality (reduced wind erosion, reduced fossil fuel emissions from tractors, reduced release of carbon dioxide into the atmosphere).

1.2.3. Enabling business environment of *Conservation system of soil tillage without herbicides for winter wheat* technology.

- Import taxes and tariff regime. By reducing the import taxes it is possible to promote better technologies.
- Local production is cheaper than imported; stimulation of local production is economically advantageous.
- Elaborated standards for production and trade, quality control and enforcement. They assist in promoting high quality production they promote high quality requirements for producers and consumers.
- Subsidy allocation for farmers. By decreasing the interest rates for credits we can increase the availability of credits for more agricultural producers.
- Legislative acts supporting good agricultural practices: registration of land and property, preservation of natural resources and people's health, legal requirements for contracts. The legislation of the state should promote and support sustainable farming systems, which are preserving natural resources and maintain a healthy society.
- Producers and consumers associations for promoting the common interest of high quality production and consumption. Both producers and consumers develop actions to protect their rights to high quality production and consumption.
- Prevention of corruption on the different levels in society, through Governmental and NGO organizations, help promoting a healthy economy, environmental friendly and socially acceptable.

A number of services are available for technology transfer, among which the most important are:

- Financial services provided by banks, delivery of credits.
- Delivery of information, knowledge and skills; business advice from currently functioning extension service.
- State services for trials of varieties (hybrids), chemicals and agricultural machines. In order to find the best varieties, chemicals and agricultural machines they are tested before importing. Some equipment can be unsuitable for local conditions and can compromise the idea of good climate technologies. Provision of training for technicians and technical specialists.
- Engineering services are provided by equipment maintaining companies, mostly related to fixing of the equipment with some maintenance operation.
- Scientific investigation and innovation activities still exist in the country (even at not needed level) and capacity building developed by research institutions and universities.

1.2.4. Barriers to technology diffusion.

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Economic and financial

- High cost of capital (high interest rate);
- Lack of inadequate access to financial resources (lack of access to credits);
- Inappropriate financial incentives and disincentives (non consideration of externalities);
- Uncertain macroeconomic environment (unstable currency and exchange rates).

Policy, legal and regulatory

- Insufficient legal and regulatory framework (lack of coherent economic policies, inadequate or unwieldy regulation for climate change);
- Inefficient enforcement (insufficient willingness or ability to enforce laws and regulations);
- Policy intermittency and uncertainty (lack of long-term political commitment).

Market imperfection

- Poor market infrastructure (poorly articulated demand, missing of underdeveloped supply channels);
- Underdevelopment competition (insufficient number of competitors);
- Inadequate sources of increasing returns (low ability or willingness to pay among consumers).

Network failure

- Weak connectivity between actors favoring the new technology;
- Lack of involvement of stakeholders in decision making ((stakeholders dispersed and poorly organized, multiple stakeholders collaborative learning and knowledge transfer activities absent or weak).

Information and awareness

- Inadequate information (poor infrastructure for communication of small scale project support, lack of knowledge or access to climate technologies);
- High risk perception of climate technologies (high investment risks, uncertain of complexity

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Table 1.2.1. Proposed Action Plan for *Conservation system of soil tillage without herbicides for winter wheat* technology.

S.No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded (domestic or international funding)	Indicators of success, risks
1.	Encourage creation of agricultural banks with low rate of interest.	To facilitate access of farmers to low rate of interest credits.	Government, private business.	Starting capital should be invested by state agencies.	0-5 years	Domestic and international funds: 200 mln - 250 mln mdl.	✓ More farmers accessing credits in the bank. ✓ More profit generating farms. ✓ Increased access to climate adaptation technologies.
2.	Reduce or avoid for profit taxation for farmers promoting sustainable farming system with good agricultural practices.	This will facilitate reorientation of farms from maximum profit to environment friendly agricultural practices.	Banks, fiscal authorities, Government agencies, private business.	To establish a good monitoring system under the sustainability of farming system. Taxation will be avoided or reduced only for most sustainable farming system.	0-5 years	Domestic funding according to calculations considering real possibilities. At least 1 mln. mdl costs for ecological expertise.	✓ Increased soil fertility. ✓ Reduced rates of mineral fertilizers and pesticides.
3.	Reduce taxes for import of climate technologies and equipment.	It will facilitate implementation of advanced climate technologies and equipment.	Fiscal authorities, Government, NGOs, entrepreneurs, farmers.	To avoid taxation for the imported new climate technologies and equipment. The state will gain more from such technologies than from taxation	0-5 years	Domestic funding. Costs depend on the imported quantity of equipment.	✓ Reducing the negative consequences of drought. ✓ Reduced soil erosion.
4.	Enforce promotion of climate	This way it would be possible to replace	Government, banks.	A monitoring system should be established in	0-5 years	Domestic funding. At least 100	✓ Decreased soil degradation by

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S.No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded (domestic or international funding)	Indicators of success, risks
	technologies through allocation of subsidies to farmers who comply with the requirements of good farming system by respecting and implementing the whole farm plan.	stimulation of economic profit by stimulation of environment and social services provided by farmers.		order to differentiate the level of farm sustainability and select farms that comply with requirements of good farming system. Promotion of climate technologies through the allocation of subsidies could be made for the amount allocated nowadays in agriculture considering the implementation of the whole farming system.		mln.mdl, which consists 25% from the actual fund for subsidies in agriculture. Farmers own investments.	erosion. ✓ More farmer practicing climate technologies. ✓ Reduced use of pesticides.
5.	Create an Agency (preferable Governmental) responsible for organizing and monitoring of sustainable land management.	Currently is not an established level of soil fertility. There are not assigned responsibility for the state of soil fertility.	Cadastre Agency, ministry of Agriculture, Ministry of Environment.	For each farm it should be worked out a plan for rational land use, a system of soil quality monitoring.	0-5 years	Domestic and international funds. Based on existing infrastructure, to put in place efficient managerial actions.	✓ Better land management (ecologic, economic indicators). Increased resilience to climate risks. ✓ Improved population health.
6.	Enforcement of relevant legislation regarding soil conservation and soil management.	We need rules for good farm management system.	Parliament of Moldova, Ministry of Agriculture, rural entrepreneurs.	The law should provide incentives for farmers respecting the requirements for good agricultural practices.	0-5 years	Domestic funds. The cost for the elaboration of the Law by Parliament is 8	✓ Supporting progressive farming systems. ✓ Improving the quality of soils and

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S.No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded (domestic or international funding)	Indicators of success, risks
	Adoption of Law on Soil.					thousand mdl	water. ✓ Increased resilience of soils to climate risks.
	Develop the logistic for procurement by agricultural producers of equipment for climate technologies.	To facilitate the access of farmers to different equipment produced by diverse international companies. Will be possible to lower equipment costs by applying tougher competition	Private or State agencies, rural entrepreneurs.	Branches (affiliations) of international companies must operate in Moldova.	0-5 years	Incentives have to be applied to encourage foreign companies to invest in agriculture sector of Moldova.	✓ The amount of equipment sold in Moldova; ✓ The improved economic efficiency and environment parameters etc.
7.	Establish of a state extension service as a component part of the whole, system: research-education-extension network (technological transfer). (Improve R&D system of Agriculture sector).	It will provide connection between researchers and producers, researches and educational workers and feedback for both research and educational sector	Government , ACSA Agency, Universities, research institutions.	To involve experienced researchers, professor from universities and producers from different districts in a national network.	0-5 years	The infrastructure is here already, but a good coordination work is missing. Domestic and international funds are required.	✓ A faster implementation of know how in production. ✓ Better access to knowledge for more farmers.
8.	Increasing media interest in promoting climate technologies with larger participation of	Large audience has to be aware and have general knowledge about climate technologies and	TV, radio, researchers, Universities, NGOs, consultants, producers.	TV, Radio and newspapers information about climate technologies. Scientific and popular publications	0-5 years	Domestic and international funds.	✓ More information about the positive influence of climate technologies.

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S.No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded (domestic or international funding)	Indicators of success, risks
	researcher, consultants and producers.	environmentally friendly agriculture techniques.		disseminated.			✓ More people interested in climate technologies.
9.	Organizing national and regional network groups of farmers interested in promoting climate technologies.	The will allow to share gained experience in promoting climate technologies	Farmers, entrepreneurs, NGOs.	Participants of networking groups are voluntary.	0-5 years	Self-supporting	✓ More farmers involved in promoting climate new technologies
10.	Lobby at the consumer association for consumption of ecological agricultural products.	Consumers should serve as an engine to growing food of high quality and environmental health	Non-governmental organizations.	Different categories of consumers should be involved together with producers, processors, retailers, lowers etc.	0-5 years	Domestic and international fund	✓ Better quality of agricultural products. ✓ Better health indexes.
11.	Support to national /international cross disciplinary research program on sustainable, including ecological type of farming. (Improve R&D system of Agriculture sector).	Majority of researches have been done for conventional agriculture and they are supported by transcontinental companies interested in promoting chemicals, seeds, agricultural machines etc.	Government, regional and international, research programmes.	The interdisciplinary researches should be done on competitive basis with international evaluation and regional coordination.	5-10 years	Domestic and international funding. The cost should be at least 500,000 euro.	✓ New data regarding possibilities of transition to a more sustainable agriculture ✓ Reducing the use of chemicals etc.
12.	Support to long-term	It is necessary to collect	Preferable	To do the evaluation of	5-10 years	Domestic and	✓ Indicators for

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S.No.	Measure	Why the measure/action is needed	Who (government agency, private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded (domestic or international funding)	Indicators of success, risks
	field experiments on sustainable farming systems. (Improve R&D system of Agriculture sector).	data regarding the environmental impact of different farming systems. By using these data it would be possible to work out the criteria for determining the level of sustainability of farming systems.	Government Agency. There is an increasing role attributed to State in providing funds for interdisciplinary researches, excluding short term interest.	the existing long-term experiments by determining their relevance to the subject of sustainable development of agriculture.		international funds, cooperation at the international level is crucial here. Costs will depend upon the number of selected long-term field experiments.	the evaluation of the level of farm sustainability will be obtained. ✓ Will be developed a tool for evaluation of global warming risks.

1.3. Action Plan for *Vetch field as green fertilizer into 5 year crop rotation* technology.

The technology passed through technology prioritization phase of TNA Project performed by national experts and completed through a stakeholder consultation process. The Adaptation working group of the Agriculture sector has considered the many advantages of this technology referring to simplicity in its application, as it is based on common tillage habits using relatively simple construction of plough with many benefits to environment and communities. It is also an efficient management practice oriented toward assigning to land owners the responsibility for long-term maintenance of soil quality. Diffusion of this technology will bring to Moldova's agricultural businesses and general public experience of sustainable management of natural resources, contributing to climate change resilience.

1.3.1. General description of Vetch field as green fertilizer into 5 year crop rotation technology.

Climate aridization along with classic cultivation leads to dehumification of agricultural soils, soil structure damage and strong secondary compaction of the arable layer. Currently the arable layer of agricultural soils lost its natural ability to compaction resistance. Dehumification, dissolution and secondary arable soil compaction is a global problem[15], but particularly acute in Moldova where 80 percent of soils are characterized by fine texture[16]. These soils have a high production capacity only if their structure is agronomical favorable and contributes positively to regulate air-fluid and nutrient regimes, ensuring optimal conditions for plant growth and development. In a compacted layer of soil moisture reserves are almost by two times less accessible than in the same loose layer with agronomical favorable structure. Therefore, soils with a high content of humus, agronomical favorable structure and loose arable layer are more adapted to climate change. To adapt to increasing desertification due to dehumification, dissolution and secondary compaction of the arable layer of soil generated by climate change, 6 technologies described below are recommended.

The advantages of this technology are: common tillage habits; total incorporation vegetal waste, weeds and their seeds; reliability due to the simple construction of the plug; soil loosening effect (intensive mobilization of soil fertility, complete assurance of crops with nitrogen for 4 years due to return into the soil of about 400kg/ha of nitrogen with vetch vegetal waste; significant rehabilitation of physical quality of the soil, biological improvement of the soil. Two crops of vetch per one agricultural year accumulate about 20 t / ha of dry organic matter in the soil which ensures synthesis of 5 t / ha of humus or 2.9 t / ha of carbon. It develops a balance of humus, carbon, nitrogen and CO2 emissions from soil. The technology can be successfully implemented by all agricultural businesses on cca 200-400 thousand ha during 5-10 years, on each field in crop rotation every year, the total area is 40 000 ha / year. This amount of humus is sufficient to create a positive carbon and nitrogen balance in soil during 5 years. The arable layer will become structured, loose, will contribute to a favorable air-fluid and nutrient regime and will increase the plants resistance to drought. Technology entails environmental friendliness of agriculture, more effective use of water and nutrients from the soil.

This technology can be successfully implemented on all agricultural lands of farmers. It can be implemented under any land cultivation system. In order to implement this technology, it is necessary to create the autumn and spring vetch seed production operation. The autumn vetch shall be planted, as appropriate, in late August or early September and spring vetch – in early May of the next year after incorporation of autumn vetch mass into the soil.

Environmental benefits. It stops soil degradation, makes the humus and soil carbon balance positive or well-balanced, cardinally improves the soil biota status, increases resistance of soil to pollution and of plants to drought.

Social-economic benefits. The social - economic effect of this technology implementation will be the following: it will increase the turnover and quality of agricultural production on arable soils, well-being of rural population, decrease migration, create the economic prerequisites for projects to improve the ecological status of villages.

1.3.2. Targets for transfer of Vetch field as a green fertilizer into 5 year crop rotation technology

- Creating prerequisites for implementing sustainable agriculture practices on an area of 200,000 ha by introducing a "field of vetch as green manure (2 yields per year)" in a 5 field crop rotation.

[15] *Guj P., Rusu T., Bogdan I. Asolamentele, rotația culturilor şi organizarea teritoriului. Cluj-Napoca: Risoprint, 2004. 219 p. ISBN 973-656-566-1*

[16] *Cerbari V., Scorpan V., Ţăranu M., Bacean I. Remedierea stării de calitate şi capacității de producție a cernoziomurilor obişnuite din sudul Moldovei sub influența unor măsuri fitotehnice. În: Mediul Ambiant. Nr. 1 (61), Februarie, 2012. p. 38- 43. ISSN 1810-9551*

- Improving the soil quality in an area of 200,000 ha, 40 thousand ha annually, by creating a positive balance of humus and carbon, and nitrogen fixation in soil as a result of systemic use of green fertilizer (autumn vetch of *Violeta* variety and spring vetch of *Moldavscaia 82* variety) on an area of 200,000 ha of arable lands. Stabilizing effect of technology will occur over 3 to 4 turns of crop rotations, by 2030 y. During 2013-2015y.y. – the technology will be tested with establishment of fall and spring vetch database.
- Restore the ecological balance in the existing agricultural systems on an area of 200,000 ha by reducing practically total CO2 and N2O emissions from soils as a result of biological fixation of carbon and nitrogen by the leguminous crop used as green fertilizer.
- Increase production capacity of the soils in an area of 200,000 ha as a result of improving physical, chemical and biological characteristics of anthropically degraded soils, as a result of systemic use of green fertilizer.

1.3.3. Enabling business environment of *Vetch field as green fertilizer into 5 year crop rotation* technology.

- Amendments to the Land Code are regarding responsibility of agricultural lessors for the soil quality. Making the long term land lease rules and the monitoring of the quality of leased soils more specific.
- Consolidation of agricultural lands into agricultural exploitations larger than 400ha managed by one operator. Sustainable profitable agriculture is only possible in big farms.
- Developing an indigenous seed pool for autumn and spring vetch. Restoring the seed pool of this crop, which was destroyed during the land reform.
- Setting up a financial incentive fund for farmers implementing technologies which ensure soil protection. Stimulate implementation of environmentally friendly agricultural technologies.
- Improving the land lease system by taking into account of the interests of owners, leasers, soil protection needs. Development of the legal prerequisites for rational farming of lands leased by agricultural businesses.
- Organization and management by the Ministry of Agriculture and Food Industry, relevant bodies of the local public administration of the process of technology implementation. Administration and organizational support in the process of technology implementation.
- Improving the soils quality control and monitoring system. It is necessary to improve the national soil research system and to create control service.
- Support from the state in ensuring the equipment necessary to implement the technology. Low interest loans and longer grace period.
- Introducing diversified crop rotation where the share of weeding crops does not exceed 50 %. To protect the soil from erosion and improve the degraded lands.

A number of services are available for technology transfer, the most important are:

- Ministry of Agriculture and Food Industry (MAFI), the local public administration organize and coordinate the large scale implementation of the technology, contribute to the restoration of the indigenous seed pool of autumn and spring vetch varieties.
- Ministry of Finance (MF) and MAFI protect the local agricultural producer on the market; create favorable conditions to sell the agricultural products.
- MAFI, Associations of Agricultural Producers ensures quality of the products by monitoring the quality in specialized laboratories.
- Companies /owners of specific machinery offer support in providing equipment.

1.3.4. Barriers to the technology's diffusion

Economic and financial

- Scarcity of investment capital
- Lack of finance at low interest rates
- Lack of financial possibility to create a fund for stimulation of agricultural businesses which use green fertilizer.

Market imperfection

- Poor market infrastructure
- Poor quality products, lack of operation and maintenance.
- Lack of interest from businesses for improving the quality of the soil.
- The absence of market prices for the environmental benefits of soil improvement works

- Lack of co-ordination among different interest groups.

Policy, legal and regulatory

- Insufficient legal and regulatory framework.
- Policy intermittency and uncertainty.
- Lack in the Land Code of provisions about the lessor's responsibility for the quality of the leased soil, in the chapter on lease of agricultural lands.

Network failure

- Lack of involvement of stakeholders in decision making.
- Weak connections between actors.

Institutional capacity

- Small Size farms
- Indifference of local public administration about the quality of communal soils.
- Lack of standards and indicators to assess the quality of soils.

Information and awareness

- Lack of awareness about issues related to climate change and technological solutions.
- Unawareness of the relevant bodies of local administration, local business and local population about the need to have an organic matter flow in soils to maintain quality and productivity capacity of the soils.

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Table 1.3.1 Proposed Technology Action Plan for *Vetch field as green fertilizer into 5 year crop rotation* technology

S. No.	Measure	Why the measure/action is needed	Who (government agency,private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded	Indicators of success, risks
1	Develop a system of economic incentives for agricultural enterprises that use manure and green fertilizers.	Incentives for farmers to improve and maintain in the long run the soil quality by increasing the flow of organic matter in the soil.	This system has to be developed by the Ministry of Agriculture and Food Industry jointly with the Ministry of Environment and Ministry of Economy.	By setting up a special financial facility or fiscal policy aimed at reducing taxation for those who implement the technology.	Starting with 2015 y.	Payment of 500 mdl / ha / year to the farmer for technology implementation.	✓ Available financial support for implementation of technology that increases soil resistance to climate change. ✓ Keeping the long-term fertility and the production capacity of the soils for agriculture production. .
2	To reduce/ exempt for profit taxes farmers investing in good agricultural practices, including procurement of equipment.	Tax policy benefiting the farmers who implement the technology will help to spread the technology faster and successfully.	MAFI and ME jointly with local administrations.	Drafting a special law or regulation approved by the Government.	By 2015 y.	Exempting from income tax the farmers who implement this technology: 22,000 for the second year of operation, 15,700 mdl for III year; 7,540 mdl for the IV year; 1,400 mdl for the V year.	✓ Faster and wider implementation of technology on arable land. ✓ Projected are for technology implementation within the terms set.
3	To provide subsidies for farmers implementing climate technologies.	To get farmers interested in implementing environmental friendly practices.	MAFI and ME jointly with local administrations.	Development of a regulation approved by the Government of RM.	By 2015y.	1500 mdl/ha – cost of seeds.	Faster and wider implementation of the technology on arable lands.
4	Increase accountability of	To reduce the risk of anthropogenic	MAFI , Agency for Land Relations and	Building farmers' awareness regarding	Continuously	100,000 mdl / year for the awareness	Informing the farmers

S. No.	Measure	Why the measure/action is needed	Who (government agency,private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded	Indicators of success, risks
	farmers for long-term maintenance of soil quality.	degradation of arable soils in farming practices and increases their resistance to drought and other climatic changes.	Cadastre (ALRC) through subordinated institutions.	personal responsibility for maintaining long-term soil quality.		campaign for farmers on responsibility for maintaining soil quality. Support from local mayoralty, extension service ACSA, grants.	that land, though privately owned, is also a wealth of all the people, and they bear responsibility for maintaining this wealth.
5	Provisions on soil management responsibilities in the Land Code and in the Law of the Republic of Moldova on Environmental Protection.	To specify by law the responsibility of farmers for the soils quality.	MAFI , Agency for Land Relations and Cadastre (ALRC)	Supplementing the Land Code with a paragraph providing for penalties for degradation and deterioration of agricultural soils	By 2015y.	Financial means from the ALRC budget for development of land legislation 5,000-8,000 mdl for each legislative initiative	It will become binding for agricultural businesses, land lessors to use soil protecting agricultural technologies
6.	Accountability assessment by introducing some specific points in the Land Code Act and the Moldovan Law on Environmental Protection.	Farmers to assign responsibility for long-term maintenance of soil quality.	Land and Soil Protection Directorate commonly with State Environmental Inspectorate.	By developing these points and their adoption by the Parliament.	By 2015y.	5,000-8,000 mdl for each legislative initiative.	Will increase the responsibility of the governing bodies and farmers to protect soil quality.
7.	Make the agricultural businesses and general public aware about the	For private farmers awareness and heads of agricultural enterprises on agricultural	MAFI, ACSA, rural entrepreneurs.	Organizing workshops, seminars and round table with rural entrepreneurs.	Annually, during the cold weather of the year.	10,000 mdl for a seminar.	Farmers will be informed of environmentally friendly agricultural practices.

S. No.	Measure	Why the measure/action is needed	Who (government agency,private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded	Indicators of success, risks
	environmentally friendly practices.	environmentally safe techniques.					
8.	Develop the logistics for the procurement by agricultural producers of equipment for climate technologies.	In order to correctly organize the purchase of equipment for farmers implementing green technologies.	MAFI, rural entrepreneurs, farmers.	By organizing tenders for equipment vendors.	2015-2030y.y.	According to existing prices.	Providing the necessary equipment to farmers to promote environmentally friendly agricultural practices.
8.	Cadastre Agency intensifying land consolidation process.	To build a system of profitable, environmentally safe modern agriculture (conservation) on consolidated lands	MAFI, Agency for Land Relations and Cadastre (ALRC) jointly with local public administration.	By cooperating with private land owners.	10-20 years	Continuity of "Land consolidation" project implemented by ACSA and funded by the World Bank and FAO.	Farms with an area greater than 200 ha suitable to implement modern agriculture and soil protection systems.
9.	Improve R&D in soil science.	To implement soil protecting conservation agriculture system.	MAFI through subordinated institutions.	By financial and scientific support of agricultural producers.	10-20 years	1,000, 000 mdl/year from the state budget or from grants. Funding by ALRC.	Protecting soils from degradation processes.
10.	Assure efficient coordination between main actors of organic and green fertilizers chain.	To gradually implement sustainable, ecologically safe agriculture in the	MAFI	Coordinating the process of technology implementation	10-20 years	Within the salary limits of MAFI staff	Control and effective coordination of the said technologies implementation process

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S. No.	Measure	Why the measure/action is needed	Who (government agency,private sector, etc.)	Mode of implementing (How should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost how it can be funded	Indicators of success, risks
		Republic of Moldova.					
11.	Organize national and regional networking groups for farmers interested in promoting climate technologies.	To create a system of conservative agriculture profitable, environmentally safe, based on households' own resources.	MAIF, National Farmers Federation of Moldova.	By working with private land owners.	10-20 years	100,000 mdl annually to promote and implement the technology.	Collective farmers jointly promote and implement technology to help restore soil quality and increase their resistance to pedological drought.
12.	Promote training Programmes on education in soil management.	To train specialists in the proper management of soils, primary input in agriculture, the main natural wealth of the country.	MAFI through subordinated institutions SAUM, profiles Ecology, Plant Protection, free tuition.	Setting up of extension centres within agricultural research and education institutions to improve farmers' knowledge on proper management of soils in the farming process.	5 years	Within the financial resources allocated for education and research.	Farmers with rich knowledge on the proper management of soil resources in the farming process.

1.4. Action Plan for *Applying 50 t/ha of manure with bedding to agricultural soils once per five years* technology.

The adaptation working group of Agriculture sector has prioritised this technology due to its efficiency in solving environmental issues caused by the concentration of manure in villages of Moldova. The environmental solution is complemented by actions contributing to improvement of soil characteristics, through implementation of sustainable practices combating soil erosion. Proposed technology has synergetic effect: it is an efficient climate change adaptation technology, at the same time contributing to reduction of GHG in the Agricultures sector of Moldova. Diffusion of this technology will address environmental, agriculture and health care issues, but also will bring developments in the villages of Moldova.

1.4.1. General description of technology

This technology helps maintain a stable content of organic matter in the soil. The content of nutrients increases, and the soil structure improves. The arable layer becomes looser, more resistant to compaction, better provided with reserves of water accessible to plants. This increases crop resistance to drought.

The technology implies the return of the biophile elements contained in dung, urine and vegetal waste of cattle bedding, in the biological circuit. One ton of manure with bedding at 50-55% humidity contains about 15-18 kg of nitrogen, phosphorus and potassium.

Currently there are no large farms and cattle herd is concentrated in rural households. To use manure as fertilizer, municipalities have to organize the collection, storage, fermentation and storage of manure on special platforms. Technologies for processing and introduction of manure in the soil are provided with specially developed recommendations.[17]

Realistically possible reserves of manure collection in the country do not exceed 2 - 3 million tons, which would be sufficient to fertilize only 200 thousand ha of agricultural lands annually, provided this amount is indeed collected (regretfully the amount collected is ten times smaller). The amount of manure possible to collect is 9 times lower than required.

This technology will ensure long-term preservation of soil fertility - the main means of production of the country, will protect agricultural land from desertification processes which lead to impoverishment of population and migration. It will improve the sanitary condition of rural environment.

Environmental benefits. This technology stops the accelerated degradation of soils, it reduces the risk of nitrate pollution of water in wells in villages, improves sanitary conditions in the villages and health of the population.

Social benefits. The social - economic effect of this technology implementation will be the following: it will increase the turnover and quality of agricultural production on arable soils, well-being of rural population, decrease migration, and increase the earnings for social infrastructure development.

1.4.2 Targets for *Applying 50 t/ha of manure with bedding to agricultural soils once per five years* technology

- Implementing sustainable agriculture on the area of 200,000 ha, based on households' own resources, by applying to agricultural soils of 50 t / ha manure with bedding once in five years on one field in a 5 fields crop rotation scheme (an area of 40,000 ha annually).
- Restoring the soil quality over an area of 200, 000 ha in 3 parts of Moldova: North, Central, and South over 20 years by creating a balance of organic matter, carbon and nitrogen in the soil as a result of systemic use of manure as fertilizer (forming a rational relationship between the field crops and livestock breeding sectors).
- Liquidating the risk of worsening the environmental, sanitary-epidemiological condition and polluting the ground waters and streams by implementing a proper organic waste management in rural areas based on the use of organic waste as fertilizer for arable soils.
- Increase the production capacity of soils in an area of 200, 000 thousand due to improving the physical, chemical and biological characteristics of anthropically degraded soils as a result of organic systemic fertilization with manure.

[17] *Organic Fertilizer User Guide. Ch Pontos, 2012.115p.*

- Widespread dissemination of technology with consideration of specific pedo-climatic zones and the experience to date with the use of manure as fertilizer.

1.4.3. Enabling business environment of *Applying 50 t/ha of manure with bedding to agricultural soils once per five years* technology.

- Development of regulatory documents on collection, processing, storage and application of manure in the soil as organic fertilizer, and stipulate the responsibilities of municipalities for the sanitary-epidemiological conditions in villages and for this technology implementation. It is necessary to reanimate the practice of using organic fertilizers to improve the environment inside villages, preventing ground waters and stream pollution, long-term maintenance of the soil quality.
- Building of individual and communal platforms for manure collection, preparation and storing. To create the core of the manure production system.
- Intensifying the land consolidation process. Sustainable and profitable agriculture is possible in bigger farms.
- Implementation of soil protective crop rotation. To protect the quality of soils.
- Development of a financial incentive fund for the agricultural producers implementing soil protection technology.
- Organization and management by the Ministry of Agriculture of the implementation of soil protective technologies through the legislative framework. To ensure long term maintenance of soil fertility
- Improving the state system of control and monitoring the quality of soils. Improving the national system of pedological and agrochemical research.
- Support from the state for the provision of equipment necessary to implement the soils protective technologies. Low interest loans and longer grace period.

Service providers and services provision of *Applying 50 t/ha of manure with bedding to agricultural soils once per five years* technology.

- Ministry of Agriculture and Food Industry (MAFI) and Ministry of Environment (ME) develop the Regulations on use or organize in rural areas, organization and coordination of the nationwide implementation of the technology.
- Science department of the MAFI develop informational marketing.
- MAFI protect the local producers on the market.
- Agricultural producers, MAFI ensuring quality of agricultural products through monitoring.
- MAFI provides capacity building for business consulting centres for agricultural producers.
- Ministry of Finance, Commercial banks give Loans with low interest rates and longer grace period for farmers.

1.4.4. Barriers to technology diffusion

Economic and financial

- Lack of the Law or Regulations on organic waste.
- Lack of possibilities to finance capital expenditures for building communal platform utilities.
- Absence of financial incentives and punishments for promoting soil improvement technologies.

Policy, legal and regulatory

- Lack of the Law or Regulations on organic waste.
- Lack of responsibility of the local public administration.
- Lack of support from local administration for manure collecting activities
- Lack of support from local administration for communal platform building.

Institutional capacity

- Insufficient institutional and organizational capacity of the government, professionals and businesses in agriculture.
- Excessive fragmentation of land as a result of land reform and the need for land consolidation
- Lack of standards and codes, poor quality products, lack of operation and maintenance.

Market imperfection

- Undeveloped market
- There is no system for manure collection, production and the manure market is not developed.

Network failure

- Lack of co-ordination among different interest groups
- Weak connections between actors.

Information and awareness

- Poor knowledge of rural population about the role of soil in sustainable agriculture.
- Limited knowledge about the importance of the organic: inorganic fertilizer ratio.

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Table 1.4.1. Proposed Action Plan for *Applying 50 t/ha of manure with bedding to agricultural soils once per five years* technology.

S. No	Measure	Why the measure / action is needed	Who shall implement the measure (governmental agency, private sector)	How to implement (How it should be done?)	Timeline (0-5 years, 5-10 years, or 10-20 years)	Cost of the measure and funding sources (internal, international financing)	Success indicators, risks
1	Develop appropriate law or regulation with stipulation of assignments and responsibilities of all actors involved in collection, preparation, storage, transportation and incorporation of manure into the soil.	Existing laws do not stipulate the responsibilities for collecting, processing, storage and incorporation of manure into the soil. Implementation of this measure will contribute to effective management and better quality of technology works.	Ministry of Agriculture and Food (MAFI) jointly with the Ministry of Environment (ME).	Development and implementation of legislation (a law or regulation) will make it binding for the central and local public administration and farmers to organize integrated manure management.	A law or regulation has to be developed prior to 2015 (during three years).	Financing from the budget of agencies subordinated to MAFI and ME, or from grants. 7, 000 mdl for each legislative initiative.	It will increase the responsibility of the governing bodies and farmers for proper use of manure ecologically and economically wise.
2	Promote tax incentives for farmers practicing sustainable production.	A policy providing for lower taxes for farmers who implement the technology will help to spread the technology faster and successfully.	MAFI and ME jointly with the local administrations.	By developing a special law or regulation approved by the Government which provides for tax incentives for farmers who implement the technology.	By 2015	Budget of agencies subordinated to MAFI and ME, grants. 13,000 mdl as exemption from income tax per each platform ; 7,000 mdl per legislative initiative.	It will accelerate the widespread dissemination of technology, leading to loosening of the soil arable layer, increasing its capacity for water, nutrient enrichment.
3	Introduce fiscal and	This measure is	Ministry of	By assigning this	By 2005y.	It is proposed to pay	It will regulate the

S. No	Measure	Why the measure / action is needed	Who shall implement the measure (governmental agency, private sector)	How to implement (How it should be done?)	Timeline (0-5 years, 5-10 years, or 10-20 years)	Cost of the measure and funding sources (internal, international financing)	Success indicators, risks
	regulatory measures for reduction of manure wastes and promotion of manure utilization.	necessary to discipline those who pollute the environment with organic agricultural waste and other origin sources.	Environment	responsibility to local government and tax authorities.		up to 10,000 mdl from each platform to the local budget (municipality).	production and proper management of waste.
4	Provision in the Ecologic Fund of funds for the construction of collective or inter-communal platform for collection, preparation and storage of manure, and to purchase necessary equipment using the sources from donors coming as grants.	To pool the financial resources needed for initial funding of the integrated system for collection, preparation, storage and incorporation of manure into the soil at community level.	Ministry of the Environment jointly with the MAFI.	By allocating part of the State Environmental Fund resources to solve the environmental problem created by manure in rural areas.	Continuously, until complete resolution of the problem, and implementation of integrated self-financing manure management system.	Building a communal platform and purchasing the necessary equipment require capital investments amounting to 370,000 euro, other costs will be paid back from selling manure as fertilizer.	Long term preservation of arable soil quality, creating a well-balanced content of organic matter in soil, increased by 30% of soil productivity, elimination of manure related environmental and sanitary-epidemiological problems in rural areas. The soil will be more resistant to drought.
5	Cadastre Agency intensifying land consolidation process.	To build a system of profitable, environmentally safe modern agriculture (conservative) on consolidated lands.	Agency for Land Relations and Cadastre (ALRC) jointly with local public administration.	By cooperation with private land owners.	10-20 years	Continuation of "Land consolidation" project (WB, FAO, and other international funds	Farms with an area greater than 200 ha suitable to implement modern agriculture and soil protection systems.

S. No	Measure	Why the measure / action is needed	Who shall implement the measure (governmental agency, private sector)	How to implement (How it should be done?)	Timeline (0-5 years, 5-10 years, or 10-20 years)	Cost of the measure and funding sources (internal, international financing)	Success indicators, risks
						with total of 200,000 euro. Budgetary allocations 100,000 mdl.	
6	Accountability assessment by introducing some specific provisions in the Land Code and the Law on Environmental Protection.	It is necessary to assess the accountability of agricultural businesses, primarily lessors, for degradation of soils and to stipulate the procedure of damage evaluation and recovery.	State Ecological Inspectorate, ALRC	By periodic monitoring of the arable soil quality.	Once in 10 years, or at the request of the interested party.	According to existing tariffs for soil surveys. Funding by the Agency for Land Relations and Cadastre and Ecological Inspectorate.	The accountability of agricultural businesses, primarily lessors, for maintaining good quality of soils, will increase.
7.	Assigning the responsibility by inserting certain provisions in the Land Code and the Law on Environmental Protection.	To periodically monitor the quality and ecological status of soils.	State Ecological Inspectorate.	By periodic monitoring of the arable soil quality.	Periodically, at the request of interested parties or in case of damage caused to soil by illegitimate human activity.	According to existing state tariffs. This measure is part of ALRC function responsibilities..	It will raise the responsibility of general population for maintaining soil quality.
8.	Assure an efficient coordination between the main	To plan properly quantitatively and qualitatively various	Agronomic services at the district level and large	By calculating necessary quantities of organic fertilizers,	15-20 years	The cost of the measure is included in the costs required	Effective organic fertilization of crops, based on calculations

S. No	Measure	Why the measure / action is needed	Who shall implement the measure (governmental agency, private sector)	How to implement (How it should be done?)	Timeline (0-5 years, 5-10 years, or 10-20 years)	Cost of the measure and funding sources (internal, international financing)	Success indicators, risks
	actors of organic and green fertilizers chain.	types of organic fertilization of crop systems.	agricultural enterprises.	manure reserves and surface lands where manure will be replaced with green manure		for agronomic service organization at the district level and large agricultural enterprises.	made with consideration of the need in organic fertilizers and possible reserves of manure.
9.	Establish regulatory and organizational framework to promote effective management of communal platforms.	Ensuring self-management and self-financing of the platform after the first year of operation will incentivize the staff to increase productivity and quality of the final product.	Local Public Administration.	By concluding contracts between the municipality, manure producers, the platform staff and farmers who will use the final product as fertilizer. Local municipalities to build up staff servicing the platforms.	5-10 years first phase, 10-20 years – the second phase	Self-financing, starting with the second year after putting the communal platform into operation, provided there is necessary equipment and staff.	It will increase the quantity and quality of manure fermented on the platform.
10.	Raising the awareness of the local public administration and population about the problem of manure from an environmental, economic, social and	It will raise the interest of local governments and farmers for manure as fertilizer. The population will become aware about manure as a hazardous source of	The agronomists in the District Directorates of Agriculture, consultants of the National Agency for Rural Development (ACSA), invited lecturers	By creating rural consultancy centres within the municipalities	Starting with 2015	100, 000 mdl annually from ACSA sources for awareness and financial resources of municipalities.	Improved knowledge of the local population about the features of conservation agriculture and the role of manure as fertilizer for the implementation of this system of agriculture

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S. No	Measure	Why the measure / action is needed	Who shall implement the measure (governmental agency, private sector)	How to implement (How it should be done?)	Timeline (0-5 years, 5-10 years, or 10-20 years)	Cost of the measure and funding sources (internal, international financing)	Success indicators, risks
	sanitary perspective.	environmental pollution					
11.	Promote Programmes for providing training and education on soil management.	Ministry of Agriculture and Food Industry (MAFI) together with the Ministry of Environment (ME).	The introduction of these programs in the faculties of agricultural education plans and Curricula. At SAUM create training courses in agriculture leaders.	By developing appropriate programs and organizing staff training courses at SAUM.	By 2015 y.	Budget financing institutions under MAFI and ME, grants on amount of 200,000 mdl annually.	Development of agricultural professionals able to properly manage the state of soil quality to their use as a means of production in agriculture.

Chapter 2. Technology action plan for Human Health sector

2.1. Actions at sectoral level

The Health care system of the Republic of Moldova is organized according to the principles of universal access to basic health services, equity and solidarity in health services financing from both the state and individuals through mandatory health insurance. Medical facilities are of primary, secondary and tertiary levels subject to their degree of specialization. They provide the whole spectrum of medical services for individuals and some services for the whole population through key programs.

Medical facilities at primary and secondary levels provide services to the community and belong to local public authorities. Primary care is based on family medicine and is provided by family medicine centers and health centers with family doctor offices and health offices in rural areas. Secondary care, which includes specialized ambulatory care and hospital care, is provided by district and municipal hospitals. Medical facilities at the tertiary level provide specialized and highly specialized medical care for the whole population of the country. Primary, secondary and tertiary care providers are directly contracted by the National Health Insurance Company for the provision of medical services under Mandatory Health Insurance. Public medical facilities are autonomous self-financing non-profit-making organizations (Law on Health Protection, 1995).

Institutions with regulatory functions, those supporting the development of health policies and those belonging to the State Surveillance of Public Health (Law No.10 of 2009 year) are financed from the state budget through Ministry of Health (MH) to which they are subordinated. The MH addresses the major challenges in the health sector and promotes the principle of Health for All Policies through multi- and intersectorial collaboration, including the coordination of public health activities within the sector and beyond it as per the Law on State Surveillance of Public Health (2009).

The health care measures are put in actions by the health care system structure and services provided. Sector covers all communities of Moldova, although at varying levels of capability. It has several major, national level entities (Republican Clinical Hospital, Republican Neurological Clinic, Republican Psychiatric Clinic, National Oncologic Clinic, Republican Clinic of Emergency Medicine, Mother and Child National Clinic etc.) along with district facilities (primary health care, specialized healthcare, hospitals, urgent medical assistance, state public health supervision centers, pharmaceutical facilities, rehabilitation facilities etc.) and community level facilities (family doctor centers, pharmacies, social assistants etc.). Sector is composed of both state (highest contribution) and private entities.

The healthcare sector comprises many subsectors including Health Centers, specialized healthcare hospitals, emergency medical assistance, state public health supervision, pharmaceutical facilities, rehabilitation facilities etc., and social assistance that perform health assistance services using various medical practices and participate in on-going surveillance:

Primary health care or Ambulatory healthcare services. The following types of facilities are covered under this law: physicians' offices, dentists' offices, other health practitioners' offices, medical and diagnostic laboratories, other ambulatory healthcare services.

Institutions (subdivisions) of primary medical care and specialized care support - 837, including of the Ministry of Health (MH) – 186, of others ministries – 554, and private enterprises - 283. Additional capability such as mass vaccination, mass casualty and mortality services are also incorporated in primary health care sector. These services may be free standing or privately owned or may be part of a hospital or health system.

Hospitals. The following types of facilities that perform health care services are covered under this law:

General medical and surgical hospitals – 86, including 62 of MH, 11 of another ministries and 13 private hospitals. The total number of beds is 22031, including MH - 19785 (what is 55.6 beds to 10,000 inhabitants); in other ministries – 1949 (what constitutes 61,9 beds to 10 thousand inhabitants), and in all private enterprises – 297 beds. This category on entities includes all types of hospitals such as community hospitals, speciality hospitals (i.e., paediatric), and health care facilities that are qualified to handle major trauma cases (i.e., burns and catastrophic accidents

The above mentioned entities provide a variety of services to support the healthcare needs of a community or individuals:

Laboratory Services, Diagnostic Services, Emergency Care Services, Physical Therapy, Oncology/Cancer Care Services, Dentistry, Dialysis.

Non-surgical services: women's' health/gynecology, general medicine, family practice, specialty clinics (e.g., orthopedics, urology, pulmonology, allergy), paediatrics, and rehabilitative services.

Additional capability such as mass vaccination, mass casualty and mortality services are also incorporated in health care sector.

The sector incorporates pharmaceutical and medical supply services. The sector incorporates pharmaceutical and medical supply services. In 2011 in country functioned 1014 drug stores, including 440 community drug stores. Besides, there are 71 depots and 25 factories or producing laboratories. Pharmaceutical service is provided with professional staff (1874 pharmacists and 1200 of laboratory assistants, which constitute, respectively 5,3 and 3,1 per 1 thousand inhabitants).

The workforce of heath care sector includes healthcare personnel, clinical providers, biomedical engineers, pharmacists, therapeutical health providers, medical material suppliers, transplant and blood product providers, health insurance , mortality services workers, and many others types. The total number of doctors serving the population constitute 12914 (36,3 for 10 thousand inhabitants), of which in the underlying structures of the Ministry of health are activating on 10657 (29,9 for 10 thousand inhabitants) and doctor assistants, respectively, 27445 (77,1 for 10 thousand inhabitants) and 22855 (64.2 10 thousand inhabitants).

National Health Insurance Company is a state body, which has legal personality and non-profit activities in the field of mandatory health insurance, founded by the decision of the Government of the Republic of Moldova nr.950 of 7 September 2001 in order to implement the law on mandatory health insurance nr.1585-XIII on 27 February 1998. In the year 2011 were assured 80,6% of inhabitants from total their number. The company's revenues amounted to 3636,6 thousand mdl, while expenses - 3615,7 m mdl. The share of budget transfers accounted for 54,3%. The size of the insurance premium accounted for 7% of income. 428 medical institutions have been contracted.

Climate change is anticipated to influence population health through a wide range of pathways, largely through exacerbating health risks that exist in the current day. According to the assessments performed during development of Climate Change Adaptation Strategy (in discussion) for health care system of Moldova, six of the identified climate risks are considered to be high priority:

- Increase in heat wave-related deaths;
- Increase in air pollution-related diseases;
- Increased risk of allergic disorders;
- Increased risk of drought and water scarcity; and
- Increase the burden of waterborne and foodborne diseases.

Climate changes do not hit different population groups in the same manner: some groups are obviously more vulnerable than others. For example, the health care services infrastructure is much less accessible in rural areas, and the rural population has a much higher share of persons who are not registered with family physicians (62% of the total non-registered) as well as a much higher share of those not holding obligatory medical insurance (27.3% of the rural population vs. 19.9% of the urban population). Moreover, every third person who does not hold medical insurance is from the fifth poorest quintile. Secondly, the rural population (around 60% of the total) is much more dependent on the decentralized supply of water than the urban population, and the decline in the quality of water will affect the rural population (one of the most vulnerable group to intestinal diseases is children).

The increasing concern over health risks arising from climate change is stimulating greater focus on identifying and implementing preventive interventions. Republic of Moldova Government set a number of preventive measures (their successful implementation could be considered as targets to achieve) to cope with unfavorable climate events, which are specified in the *National Health Policy* (approved by the Government by the Government Decree No. 886 as of 06.08.2007), and provide for creating a healthy and safe environment, controlling infectious and non-contagious diseases, promoting health and disease prevention, etc.

Specific measures in public health sector are specified in the *Law on State Surveillance of Public Health* (2009). In addition to general measures aimed to ensure continuous sanitary-epidemiological welfare of population, the law includes a special chapter, namely, Chapter IX (Articles 54-62).

Other healthcare measures/targets are formulated in the *International Health Regulation*, focusing on preparedness and response to emergencies which are organic part of the UN International Strategy for Disaster Reduction, decision of the Commission on Human Security and the WHO Health Action in Crises. For this purpose the Action Plan for implementation of the International Health Regulation in the Republic of Moldova was developed and approved by the

Government Decree No. 475 as of 03/26/2008. The Plan has a cross-sector nature and most of the measures are implemented.

The healthcare sector is continually changing to meet the needs of population and to adapt to public policy, and incorporate new technologies. In addition, the Government Programme for 2011-2014 also provides program on reforming, e.g. monitoring the activity and performance of all health care providers and health insurance companies, the creation and enforcement of minimum quality standards, reducing administrative corruption in health.

The supporting policies and current technology/measure profile are given in the table 2.1.1.

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Table 2.1.1 Existing policies in the Human Health sector and current technology profile

S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
1	The program of activity of the Government of the Republic of Moldova in the European Integration: freedom, Democracy, Prosperity 2011-2014	Adopted by the RoM Parliament on January 14, 2011.	Activity of the RoM Government in the period of 2011-2014 years. Current objectives of governance of Health Care system in the Republic of Moldova : • Ensuring access for all citizens of the Republic of Moldova to remuneration, health services, medical and pharmaceutical quality, including every Millennium development goals. • Monitoring the work and performance of all service providers and medical insurance companies, the creation and implementation of minimum standards of quality, reduction of administrative corruption in health. • Reform, harmonization and efficiency of the legislative and normative acts related to the financing, allocation of resources and the provision of medical services to provide s and the recommendations of the World Health Organization and European Union standards. • The development and implementation of assurance mechanisms and quality control of medical services provided to the population, through increasing human potential, technical-material endowment with medical devices, laboratory, medicine, technologies and institutions of the State supervision of public health. • Increasing the responsibility of citizens for their	Prioritised by TNA health care measures to adapt to climate change correspond to the objectives of Health Care system of RM and they are part of the national health policy. **1. Provisional posts of medical emergency care and prompt rehabilitation during critical periods of waves.** It is as a short term measure, accomplished with inexpensive, but efficient methods applied during critical periods of heat waves. The experience of many European countries shows that the organization and operation of provisional health posts in public places during critical periods allow preventing many complications generated by heat stress. In the Republic of Moldova it is proposed that temporary health posts to be supplemented by prompt rehabilitation procedures, which ensure the more efficient adaptation of the body to high temperatures. Targets: By 2014-2015y.y. to identify financing sources for purchasing the equipment for Chisinau and Baltsy municipalities; to develop necessary institutional capacities , to train the necessary number of qualified assistants. By 2015-2016 y. to identify financing sources for purchasing the equipment, to develop necessary institutional capacities, to train the necessary number of qualified assistants for rural district centers. The proposed measure is foreseen to be

S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
			own health, risk factors, prevention, protection, health promotion and basic priorities in health insurance, subject to actual or potential risks to health.	implemented by installing 40 provisional posts in Moldova with a 4 month period of operation. By the preliminary estimation there will be needed 8 in Chisinau city, 4 in Baltsy city, the other 28 will be installed 1-2 per town in some of the rural districts. The mentioned numbers have to be made more precise during implementation of the health care measure. 2. **Rural population supply with drinking water of guaranteed quality. Building of local water supply systems.** Community water system for the provision to the village population of ~4,000 inhabitants (1, 500 households) will be pumped through pipes. The water system will need the drilling of well of 100-400 m in depth, construction of the pumping station and development of the adjacent area, installation of a drinking water reservoir of 150m3 with adjacent operational elements, construction of a water supply grid and water pipeline for the household consumers, mounting and installation of electric lines and transformers, other installation and operational components. In cases the well water does not correspond to drinking water standards, it is necessary to build up a water treatment station. Targets: The project idea is developed for one water supply system as pilot project with intention to diffuse it to as many rural communities as possible (depending on funding available), maximum coverage

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S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
				of technology diffusion is 500 villages .
2.	Republic of Moldova National Health Policy 2007-2021	Decision of Government No.886 of 06.08.2007	The purpose of the National Health Policy is to create optimal conditions for achieving maximum health potential of every individual throughout their lives and to achieve adequate standards of quality of life of people.	The policy provisions are in the process of implementation in practice. National health policy represents a set of priorities and directions of development in the field of health in order to strengthen the population's health and to reduce the inequities of the various social groups and regions of the country in health domain. Proposed health care measures to adapt to climate change will be implemented under provisions of National Health Policy.
3.	Program of Strategic Development 2012-2014	Approved by the Ministry of Health Collegial Decision nr.4/3 on 10.12.2012.	The Program is the basic document of the MH, which complements the strategic planning, ensuring the establishment of priorities under different objectives, reflected in the many policy documents, as well as identifying the gaps in the capabilities and tools/methods that MH will in order to achieve its objectives. Priorities of the medium-term policy: Structural reform of the system of health care in order to ensure public health services, medical and pharmaceutical quality and efficiency; improving access to health services by reducing the financial risk and increased equity in the financing of health services; population health protection in accordance with international standards; development of preparation and harmonization of legislative and normative framework in the field of health the provisions of European Union Directives, to the recommendations of the World Health	Healthcare sector implements measures and provide medical services, under 5 sub-programmes: I. Development of policy and management of the health system; II. Priority interventions in public health; III. Individual medical services; IV. The development of health system V resources. V. Special medical programs. Proposed health care measures *to* adapt to climate change *(i) Provisional posts of medical emergency care and prompt rehabilitation during critical periods of waves. (ii) Rural population supply with drinking water of guaranteed quality. Building of local water supply systems* correspond to Strategic Development Program for 2012-2014 and can be implemented under functioning sub-programmes.

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S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
			Organization and the principles of respect of human rights promoted by the United Nations, the Council of Europe etc.; reducing child mortality, improving maternal and infant health, reducing tuberculosis, HIV/AIDS and sexually transmitted diseases.	
4.	Law on State Surveillance of Public Health	Approved by RoM Parliament, No.10 of 03.02.2009	Ensure optimal conditions for achieving maximum health potential of every individual throughout life, through the organized efforts of society in illness preventing, protecting and promoting the health of the population and improving the quality of life. Basic tasks in supervision of the State public health supervision of the State of public health are accomplished by: • population health assessment and surveillance, with setting priorities for public health; • identification, assessment, management and communication of risks to public health, reduction of the negative impact prediction and their health; • protection of health through the development, coordination, monitoring and control of the State of implementation of legislative acts; • authorization of activities, products and services and their impact on the health of the population; • initiate, participate in the elaboration, monitoring and implementation of policies and programmes for public health; • preventing disease through interventions of primary and secondary prevention; • health promotion through information, education and communication;	Prioritised by TNA health care measures to adapt to climate change will be implemented in accordance to law provisions. 1.*Provisional posts of medical emergency care and prompt rehabilitation during critical periods of waves;* *2. Rural population supply with drinking water of guaranteed quality. Building of local water supply systems.*

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S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
			• the assessment of the quality and effectiveness of personnel and public health services to communities; • other.	
5.	Health protection law	No.411 of 28.03.1995	The law defines the principles of operation of the health system and regulates its institutional structure. The law ascertains state provisions in population health protection.	The law provisions are already implemented in practice. Health care system is made up of the curative-prophylactic, sanitary-prevention, anti-epidemic, pharmaceuticals units and of other nature. The provisions of the law are obsolete and need to be updated. Prioritised by TNA health care measures to adapt to climate change will be implemented in accordance to law provisions.
6.	Law with regard to the obligatory healthcare insurance.	No.1585 of 30.04.1998	The law provides for the creation of National Medical Insurance Company and Fund to cover the expenses of medical attendances.	At present the National Medical Insurance Company is functioning and Fund financially supports emergency medical assistance. The proposed health care measure *Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat waves* will be implemented under provisions of healthcare insurance law.
7.	Law with regard to the Service of Civil Protection and Emergency Situations	No.93 of 05.04.2007	This law establishes the legal framework, principles, responsibilities, obligations and rights as the service of civil protection and emergency situations, as well as the conditions of the service/activity in the subdivisions. Its scope is to protect population and provide help in emergency situations	The proposed health care measure *Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat waves* might be implemented during extreme weather, under provisions of Civil Protection and Emergency Situations Law.

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S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
8.	Law with regard to the environment protection.	No.1515 of 16.06.1993	The law provides for the requirements of the environment protection and rational use of natural resources. It assures: -full access, and the operative information on the state of the environment and the population's health status; the right to associate in organizations, to participate in the debate on the draft laws, various economic programs or otherwise directly or indirectly aimed at the protection of the environment and use of natural resources; to address, either directly or through organizations, political parties, movements, associations, environmental authorities, administrative or judicial actions to stop damaging the environment; the right to compensation for injury suffered with consequences of pollution or other environmental damage actions, as well as for the damage caused to human health etc.	Both proposed health care measures totally harmonised with principles of environmental protection.
9.	The law of public services of husbandry	Decision of Government No.1402 of 24.10.2002	The law states for the provision of public services of husbandry, inclusively in emergency situations. The law assure the coordination of activities of public administration bodies in the field of good practice activities in the field of husbandry, the prevention and liquidation of the consequences of emergency situations etc.	The law provisions are already implemented in practice. Implementation of both proposed heath care measures will be in accordance to law provisions.
10.	Strategy for the of the Development of Primary Health Care for 2008-2013	Decision of Government No1471 of 24.12.2007	The aim is strengthening and ensuring sustainability for the primary care system, inclusively in emergency situations	The strategy provisions are in the process of implementation in practice. In terms of public health urgency the primary care is provided to all affected, including the non-assured ones. This policy is supportive to *Provisional posts of*

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S. No	Name of document	No. & when adopted or revised	Main contents	Current technology profile
				medical emergency care and prompt rehabilitation during critical periods of heat waves health care measure, as it assumes to provide help to patients in emergency cases, when individual may not possess policy insurance document, or in cases when individual has no policy insurance.
11.	Government decision approving the Strategy on water supply of localities in the Republic of Moldova	N0.662 of 13.06.2007	The Strategy specifies the measures to improve supply of Republic of Moldova localities with qualitative drinking water and sewer systems. The strategy promotes measures for sustainable development and environmental protection, specifies the strategic objectives in the field of water supply and sanitation in the long term (until 2025), establishes the priorities of the public service in this area, attraction of public and private funds etc.	The law is on the stage of implementation in practice. The proposed technology *Rural population supply with drinking water of guaranteed quality. Building of local water supply systems* perfectly fits into Government Strategy of water supply.
12.	The RoM Government decision regarding the approval of the strategy in the field of food safety for the years 2011-2015	No. 747 of 03.10.2011	The strategy specifies the measures to assure the food safety, inclusively in emergency situations.	The law is at the very beginning stage of implementation. The proposed technology *Rural population supply with drinking water of guaranteed quality. Building of local water supply systems* will be implemented in accordance to potable water standards for securing population safety.
13.	Programme for the Development of Hospital care 2010-2012		The aim of programme is the modernization and increasing the efficiency of hospital care.	Prioritised by TNA health care measures to adapt to climate change will be implemented in accordance to law provisions.

2.1.1. General barriers and proposed measures for technology transfer in the Health care sector

Heat extremes are projected to increase substantially in all cities over the coming decades, emphasizing the need to act now to reduce adverse health impacts. However, there are constraints and barriers to public health adaptation arising from uncertainties of future climate and socioeconomic conditions, as well as financial, technological, institutional, social and individual cognitive limits. The working group of Human Health sector has discussed the characteristics of each technology and used Logical Problem Analysis in both barriers analysis and identification of measures. Problem tree and Objective tree for each technology have been developed in a participatory manner with contribution of experts and stakeholders representatives. Market analysis and market mapping for each measure included: business enabling environment, market chain actors and services provision. The experts have provided cost-effective analysis of the political path shall ensure the successful implementation of the measures from economic and financial viewpoints

General barriers were considered barriers that affect all proposed healthcare measures and technologies of the sector. In the table 2.1.2 are given the general barriers and proposed measures to overcome them.

Economic and financial. Lack of financial resources remains one of the major problems of the sector. Implemented measures require capital investments, while there is no a supportive system to access financial resources. Financial resources accumulated in the local budget of the of mayoralties in the communities needed quality drinking water may cover no more than 10% of the resources needed. There are no financial resources to purchase the equipment and the tools necessary for carrying out medical emergency care in critical periods of heat wave.

Policy, legal and regulatory. Insufficient willingness or ability to enforce laws and regulations insufficient legal and regulatory framework in estimation of drinking water scarcity impact on population health is considered a barrier. The implementation of provisional posts of primary health care in the critical periods of heat waves will become possible after the preparation, approval and implementation by government regulation on both the operation of these structures and the way of informing the population about the possibilities of urgent medical care in public places during the critical heat wave. Lack of decision concerning designing of the centralized water supply system.

Information and awareness. Lack of information about the number of the population suffering from extreme phenomena of climate change and places the events are happening. Poor dissemination of information to technology users. Poor infrastructure for communication of small-scale project support. The removal of barrier requires information campaigns carried out by local government authorities, mass-media and NGOs. To remove the barrier is necessary to start a health promotion activity campaign, provided by Public Health Centers, local government authorities, and the mass-media.

Human skills. Lack of skilled personnel for the operation of climate technologies. The lack of skilled medical attendants reaches 40% of demand, while lack of skilled personnel in rural area reaches 90% of demand

Table 2.1.2. General barriers and proposed measures to overcome barriers to technology transfer in the Human Health care sector

General barriers		Measures to overcome general barriers
Category of barriers	Type of barriers	
Economic and financial	Lack of financial resources	Consider incentives to attract investments in climate change technologies of the Human Health sector.
Policy, legal and regulatory	Insufficient legal and regulatory enforcement.	Enforce the legal and regulatory framework support in order to assure proper functioning of health care measures.
Human skills	Lack of skilled personnel for the operation of climate technologies.	Strengthen human capital base in the Human Health sector.
Inadequate information	Lack of information about the danger caused by extreme phenomena of climate change on human health.	Rising population information and awareness about climate change impact on human health.

The table 2.1.3 includes the specific measures to overcome barriers to technology transfer in the Human health sector for both health care measures.

Table 2.1.3. Proposed specific measures to overcome barriers to technology transfer in the Human Health sector

Measure / Category	Provisional posts of medical emergency care during heat waves	Rural population supply with drinking water of guaranteed quality
Economic and financial	Ensure the assistance of private business, domestic and international donor support.	Promote financing of water supply projects in rural areas.
Institutional capacity	Facilitate emergency care and prompt rehabilitation services in agglomerate public places during critical periods of heat.	Development of institutional framework for provision of centralized distribution of rural population with guaranteed quality of drinking water sources.
Network development	Assure an efficient coordination between urban authorities, services and relevant medical institutions.	Implement measures for increasing of decision-making participation at the ground level.
Policy, Legal and regulatory	Enforce the legal and regulatory framework support in order to assure proper functioning of the posts of temporary emergency care and rehabilitation.	Undertake a national investigation of underground water sources as base for policy enforcement in the area.
Information and awareness	Building up of database on climate related illness with special emphasis on heat related diseases.	Better informing of rural population about health problems related to water quality.

2.2. Action Plan for *Provisional posts of medical emergency care and prompt rehabilitation during critical periods of waves* health care measure.

The Adaptation working group has seen the proposed healthcare measure Provisional *posts of medical emergency care and prompt rehabilitation during critical periods of waves* as innovative, adaptation action to avoid heat stress and dehydration during periods of hot weather, particularly in urban areas. The healthcare measure was assessed against developed set of indicators applying MCDA; it was considered a cost-effective measure, addressing an immediate issue of health impact of climate change. The benefits of implementing the technologies were convincing, such as economic, environmental and social.

2.2.1. General description of health care measure

As climate change progresses heat exposure stands to cause additional heat-related illness and death, especially for the most vulnerable groups such as older people, young children, people with chronic disease and those living in towns and cities. In the recent decades deaths and morbid conditions caused by heat waves become more frequent and pronounced. They turned into a new problem in the region and in the country. Development of modalities to adapt to heat waves is becoming more and more vital, especially for vulnerable groups of population. Increased access to emergency medical care and provision of prompt simple and effective rehabilitation services contribute greatly to saving lives and adapting of population to extreme temperatures generated by climate change.

Prolonged exposure to high temperatures is an obvious risk to the population, especially for the urban population. Heat stress, which develops as a result of prolonged exposure of the body to high temperatures in the environment, is a

pathophysiological state which affects health and may entail sudden death.[18] Certain inexpensive, timely and sufficient measures prove to be effective to reduce heat stress and its consequences. Also, these measures are essential in the process of adapting to climate change, first of all for population in urban areas.

It is as a short term measure, which is part of the national health policy. This measure is accomplished with inexpensive, but efficient methods employed during critical periods of heat waves. The experience of many European countries shows that the organization and operation of provisional health posts in public places during critical periods allow preventing many complications generated by heat stress. In the Republic of Moldova is proposed that temporary health posts to be supplemented by prompt rehabilitation procedures, which ensure the more efficient adaptation of the body to high temperatures.

Support to vulnerable groups of the population is one of the main priorities in social assistance, included in the National Development Strategy for 2008-2011, approved through the Law On approval of the National Development Strategy for 2008-2011, nr. 295 as of 21.12.2007.

Economic benefits. Support to vulnerable groups of population in critical periods of natural disasters is a very effective measure in terms of the national economy as it allows maintaining the human potential of the country.

Environmental benefits. In terms of environmental development it is an indisputable priority, as it creates a better environment for human population during critical periods of heat waves.

Social benefits. Social benefits are obvious due to health care measures, respectively, significant spending cuts for the rehabilitation of people affected.

2.2.2. Targets for technology transfer and diffusion of *Provisional posts of medical emergency care and prompt rehabilitation during critical periods of waves* measure.

The most challenging aspect in transfer of proposed technology is the identification of financial resources. However, this refers only to abilities and rehabilitation procedures, because costs for health care services are insured by the National Company for Health Insurance (NCHI), operating on the basis of the law on compulsory health care insurance, Nr. 1585 from 27. 02. 1998. Neither Ministry of Health, nor NCHI, have any financial resources to purchase the equipment and the tools necessary for carrying out medical emergency care in critical periods of heat wave. Nongovernmental funds do not provide for such expenses. The realization of this project can become a reality with the support of external finance and private business contribution. T*he first preliminary target of this technology is its financial support*.
By 2014-2015yy. to specify the sources of financial support for purchasing the equipment and the tools necessary for carrying out medical emergency care and prompt rehabilitation in critical periods of heat waves in Chisinau and Baltsy municipalities. By 2015-2016 y. to specify the sources of financial support for purchasing the equipment and the tools necessary for carrying out medical emergency care and prompt rehabilitation in critical periods of heat waves in rural district centers.

The second is the necessity *to develop institutional capacities for assuring the urban localities with provisional posts of medical care and prompt rehabilitation during critical periods of heat* in public places. For the moment there have no such capacities. The provisional post should be developed under territorial Health Centers umbrella, which will manage them and will be responsible for their display, provision and sustainable activity. By 2014-2015y.y. to develop necessary institutional capacities for assuring Chisinau and Baltsy municipalities with provisional posts of medical care and prompt rehabilitation during critical periods of heat waves.

By 2015-2016y.y. to develop necessary institutional capacities for assuring rural district centers with provisional posts of medical care and prompt rehabilitation during critical periods of heat waves.

The following target should be *the determination of the number and places of carry out provisional posts of medical care and prompt rehabilitation during critical periods of heat*. The proposed measure is foreseen to be implemented by installing 40 provisional posts in Moldova with a 4 month period of operation. By the preliminary estimation there will

[18] *Environment and Health Risks: the influence and effects of social inequalities. Report of an expert group meeting. Bonn, Germany, 9-10 September 2009, 48 p.*

be needed 8 in Chisinau city, 4 in Baltsy city, the other 28 will be installed 1-2 per town in some of the rural districts. Nevertheless, the mentioned numbers have to be made concrete.

Very important is to provide the provisional posts of medical care and prompt rehabilitation with trained medical staff, medicine and expandable materials. The lack of skilled medical attendants reaches 40% of demand. It may be eliminated by temporarily implicating of medical university students after a short intensive their training. By 2014-2015 y. to train the necessary numbers of qualified assistants in medical cares and prompt rehabilitation in critical periods of heat waves for Chisinau and Baltsy municipalities. By 2015-2016y.y. year to train the necessary numbers of qualified assistants in medical cares and prompt rehabilitation in critical periods of heat waves for rural district centres.

The project idea will be developed for one water supply system as pilot project with intention to diffuse it to as many rural communities as possible (depending on funding available), maximum coverage of technology diffusion is 500 villages

2.2.3. Enabling Environment of *Provisional posts of medical emergency care and prompt rehabilitation during critical periods of heat waves* health care measure/technology.

Available institutional support provided by heath care system facilities. Health care measures are put in actions by the health care system structure.

Institutions with regulatory functions, those supporting the development of health policies and those belonging to the State Surveillance of Public Health are supportive to implementation of health care measures.

A higher income of urban population comparing to rural population is associated to better health.

The MH promotes the principle of Health for All Policies through multi- and intersectorial collaboration, including the coordination of public health activities within the sector and beyond it as per the Law on State Surveillance of Public Health (2009).

Legal and regulatory framework in order to assure proper functioning of the posts of temporary emergency care and rehabilitation is presented in the table 2.1.1.

Health entities provide a variety of services to support the healthcare needs of a community or individuals.

Increased sensitiveness of the international bodies and donors in order to be financially supportive in purchasing of equipment, apparatus and consumer materials necessary for the proper functioning of the posts of temporary emergency care and rehabilitation. National and local budgets can’t cover all charges for medical emergencies that are why external financial support is of a great help.

Increased awareness during the periods of heat waves via collection in all towns and cities the information about the number of the population who suffers from extreme phenomena of climate change, inclusively the need in medical emergency care, and places where the events are happening. The routine collecting of information provides data about the whole number of affected people but do not assure realistic data about the causal factors of impact on health.

National Health Insurance Company is a state body organizing mandatory health insurance.

Trained staff able to provide medical emergency care services during heat waves.

Community engagement and the ability to enact proactive to cope with increased risk are important components of emergency service heat wave planning. Communities are adapted to extreme climate weather by engaging with emergency managers, local administration and non-government organisations to reduce weather impact on health population. This experience e is useful with application to heat wave risks.

State Hydrometeorology Service make awareness to urban population installing awareness codes about period of heat extremes.

Entities providing services in Human Health sector:

Ministry of Health. The regulation on the functioning of the Ministry of Health was approved by Government decision No. 374 of 31 May 2011. According to the mentioned judgment Ministry of Health is the central body of the public administration specialty in health, being subordinated to the Government.

According to the law No. 10 of 10. 02. 2009 on the supervision of the State of public health, Ministry of health (*through subordinate institutions*) evaluates the risk to initiate public health emergencies and proposes a triggering or cancellation of state of national emergency in public health.

Health Centers. According to the "Rules governing the primary health care of the Republic of Moldova, approved through order of the Ministry of health No.695 on 13. 10. 2010 "Concerning the primary medical care in the Republic of Moldova", Health Centers provide primary medical care, inclusive in cases of public health emergencies.

2.2.4. Barriers to the technology/measure diffusion

During Barrier Analysis phase of the Project the working group has identified a number of technology –specific barriers, as well as the inadequacy of polices.

Economic and financial

- Lack of financial resources for purchasing of equipment, apparatus and consumer materials necessary for the proper functioning of the posts of temporary emergency care and rehabilitation. Lack of financial resources for purchasing of equipment, apparatus and consumer materials necessary for the proper functioning of the posts of temporary emergency care and rehabilitation.
- Inadequate access to financial resources. Fewer medical personnel have the knowledge and are motivated to access funding for health care projects.

Policy, legal and regulatory

- Insufficient legal and regulatory framework and enforcement. Insufficient willingness or ability to enforce laws and regulations
- Red tape (bureaucracy). High grade of bureaucracy in local public authority administrations.

Information and awareness

- Inadequate information. Poor dissemination of information to healthcare measure users.
- There is not exhaustive information about the number of the population who suffer from extreme phenomena of climate change and places where the events are happening.
- Poor infrastructure for communication of small-scale project support.
- Lack in information dissemination to population and NGOs
- Lack in mass-media activity.

Network failure

- Week connectivity between actors favoring the new climate technologies.

Institutional capacity

- Limited institutional capacity .Inefficient methodological support.
- Lack of skilled personnel in estimation of dangerous level of climate phenomenon of public health.

Human skills

- Lack of skilled personnel for the operation of climate technologies. Lack of service and maintenance specialists.
- Lack of skilled personnel in estimation of dangerous level of climate phenomenon of public health

Republic of Moldova

Table 2.2.1. Action Plan for *Provisional posts of medical emergency care and prompt rehabilitation during critical periods of waves* health care measure

S. No...	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 y, 5-10 y, or 10-20 y.)	How much the measure/action will cost, how can it be funded (domestic funding or international)	Indicators of success, risks
1.	Enforce the legal and regulatory framework support in order to assure proper functioning of the posts of temporary emergency care and rehabilitation.	Because of the inefficient legal and regulatory framework in carrying out medical emergency care in public places in critical period of heat waves.	Republic of Moldova Government	By governmental decision	0-5 years	Estimated costs of 8,000 mdl for approving a legislative initiative in the Parliament. Amount is determined by the National Statistics Office.	✓ The set of legal and regulatory framework in assuring of durable and proper functioning of temporary emergency care and rehabilitation.
2.	Ensure the assistance of private business, domestic and international donor support.	There are not enough intern financial resources to purchase the equipment and tools for carrying out medical emergency care in critical period of heat waves. Urban heath care system in Chisinau city and other towns of Moldova is under-resourced, not all facilities are able to	Government, international donors, private business, civil society.	Develop a mechanism (project proposal) for bringing together private, public and civil society sectors, and defining roles for international and national actors to support health care measures oriented toward adaption to climate change. In case the funding is	0-5 years	According to the cost-benefit calculation cost of the equipment needed for the functioning of the posts of temporary emergency is 34,000 euro, a sum which can be obtained from donor institutions and/ or international organizations.	✓ An enhanced international cooperation. ✓ A higher involvement of main actors. ✓ The number of sets of equipment and tools. ✓ Risks: lack of insistence on the part of local public administration authorities; ✓ lack of sensitivity of

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S. No...	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 y, 5-10 y, or 10-20 y.)	How much the measure/action will cost, how can it be funded (domestic funding or international)	Indicators of success, risks
		handle emergency conditions.		available, the purchasing of needed healthcare supply will be carried out by announcing local or international tenders.			international donors and funds.
3.	Facilitate emergency care and prompt rehabilitation services in agglomerate public places during critical periods of heat.	There are no heat related emergency plans for providing increased health care services to urban populations. No guidance on when, where to act during heat wave periods.	State Hydrometeorologic Service, Ministry of Health , Ministry of environment, local government.	To identify temperature thresholds when provisional posts of emergency service to provide increased services to city population.	0-5 years.	This is a complex measure with involvement of several entities. Estimative cost are 100,000 mdl.	✓ Identified temperature thresholds for emergency acting ✓ Developed emergency plan where, when and how (heat alerts) to act during heat wave periods in urban communities. ✓ Improved quality and timing of intervention of emergency care.
4.	Assure an efficient coordination between urban authorities, services and relevant medical institutions.	There is coordination deficit in carrying out medical emergency care during critical period of heat waves in public places.	The main stakeholders are civil society, the municipal and national level health sector representatives and the politicians.	By assigning precise responsibilities to all emergency care service providers. By engaging in these activities professional managers.	All time	These managerial duties of involved stakeholders, health sector entities.	✓ Prompt and coordinated emergency health care services.

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S. No...	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 y, 5-10 y, or 10-20 y.)	How much the measure/action will cost, how can it be funded (domestic funding or international)	Indicators of success, risks
5.	Building up of database on climate related illness with special emphasis on heat related diseases.	There are few studies on climate related illness, including heat caused illness in Republic of Moldova. The lack of knowledge and statistical data are barriers for decision makers to act correctly in addressing heat related issues.	Private health agencies, NGOs, public health authorities, Government.	By identifying areas of a high-risk of heat related illnesses and high-risk groups will help to map vulnerable areas and set emergency health care posts with enhanced health care services. The date could be a significant support in developing community level adaptation actions. The data could be used in building up a vulnerability health index.	1-3 years	The collection of data and development of database, it maintenance and constant updating is anticipated to cost 30, 000 ml. The data will be used in developing vulnerability index.	✓ Developed database on climate related illness. ✓ Support in developed vulnerability index of Human Health sector.
6.	Extending the regulations of Unique Program of mandatory medical assurance to patients demanding medical care in public places	There is a need to improve the access to urgent medical care in public places.	Government/ National Company of Mandatory Medical Assurance.	According Unique Program of mandatory medical assurance, approved by the government decision No.1387 on 10.12.2007 Acting in accordance with Unique Program is	All time	The program of mandatory healthcare insurance, approved by Government decision No. 1387 from 10. 12. 2007, updated by decisions of the Government No. 1099 from 02. 12. 2010 and	✓ Number of patients asking for urgent medical care in public places. ✓ The risk – lack of National Company of Mandatory Medical Assurance agreement.

S. No...	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 y, 5-10 y, or 10-20 y.)	How much the measure/action will cost, how can it be funded (domestic funding or international)	Indicators of success, risks
	without medical assurance policy.			important for achieving health equity in urban settings.		No. 184 from 20. 03. 2012.	
7.	Strengthening the university and college training process in medical emergency care in critical period of heat waves in public places	There is a deficit of skilled medical personnel in providing emergency care services.	Republic of Moldova Government Local authorities	By appropriate planning and motivating young people. Implementing participatory learning and action training programes. Training course for public health professionals on protecting health from climate change.	0-5 years	Budget funding scholarships.	✓ Increased number of skilled personnel in providing emergency care services. ✓ The risk – low salary of personnel.
8.	Rising population information and awareness during heat waves.	Most of urban population is not aware of the negative impact of the climate change on their health, have no training on behavioural response	Central and local authorities, NGO's	By promoting the relevant information through mass-media	0-5 years	10, 000 mdl annually for each community involved in the project. This can be supported by the state authorities (Ministry of Health, Ministry of Environment).	✓ The number of people being aware of the negative parts of the climate change for their health.

2.3. Action Plan for *Rural population supply with drinking water of guaranteed quality. Building of local water supply systems technology.*

Providing drinking water to the population is a serious current problem for rural communities in Republic of Moldova and it is foreseen to increase due to climate change. At the same time adequate quality water is essential for the health and well –being of country's population. Despite the efforts put by municipalities, the quantity and quality of water and sanitation services remain inadequate. At the moment the projects funded by foreign donors are carried out in several rural localities, but they do not contribute to the essential reduction of the drinking water deficiency for rural communities.

This measure is part of the global climate change adaptation, reduction of risks caused by deficiency of safe and good quality drinking water in rural areas of Moldova. Prioritising this technology Adaptation team of Human Health sector aimed at increasing investments in this area by promoting private sector participation, also through external investors. Diffusion of this technology will address not only health care issues, but also will bring significant developments in the villages of Moldova.

2.3.1General description of technology

In recent decades both incidence and severity of morbid conditions, as well as deaths caused by extreme phenomena of climate change are becoming more pronounced in Central Europe, including Moldova[19]. They turned into a new problem in the region and the country. Among the worst cases are the heat waves, floods and other weather events that increasingly affect the quality of life and health of a growing number of people.

In the Republic of Moldova the situation becomes alarming because of exhaustion of ground water reserves, as there are more than 150 thousand sources. Intense evaporation from the surface of the soil in summer, especially during heat waves, depletes these reserves. An effective way to adapt to climate change extreme phenomena could be building water supply systems in many rural areas.

This measure is part of the global climate change adaptation, reduction of risks caused by deficiency of safe and good quality drinking water in rural areas of Moldova. In the recent years this measure is being implemented by building of water supply systems, supported by external donors. However, the population of more than 500 rural communities will still suffer from lack of access to safe drinking water.

Environmental benefits. Reducing the volume of water extracted from groundwater will contribute to conservation biodiversity

Social benefits. Social benefits are obvious due to significant reduction of cost for the treatment of acute diarrheal diseases, viral hepatitis and chronic non-communicable diseases. Ensuring access of the rural population to safe quality water sources will substantially contribute to improving the quality of rural life.

2.3.2 Targets for technology transfer and diffusion of *Rural population supply with drinking water of guaranteed quality. Building of local water supply systems*.

Providing drinking water to the rural population is a serious problem despite the fact, that the Republic of Moldova has underground reserves of drinking water of sufficient quantity and good quality. According to the data of the Agency for Geology and Mineral Resources of the Minister of the Environment, groundwater reserves, forecast and confirmed, may cover the need of rural population in the drinking water. The problem however lies in the deficiency of material resources for obtaining and distributing water in rural municipalities.

Financial resources accumulated in the local budget of the mayoralties are designed to ensure educational establishments, health care services and implementation of social projects (construction of roads, overhauls etc.). For other local projects there are not sufficient financial resources. Such activities can be carried out only by a combination of public interest, private sectors and beneficiaries, first of all, external donors. But private interests are very limited, since the private sector is underdeveloped.

The population of more than 500 rural communities will still suffer from lack of access to safe drinking water.

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[19] *Guidance on Water and Adaptation to Climate Change. Economic Commission for Europe, UN. 2009, 130 p.*

At the moment the projects funded by foreign donors are carried out in a number of rural localities, but they do not contribute to the essential reduction of the drinking water deficiency for rural municipalities. So, *the first preliminary target of these technologies is financial its support*.

The traditions and experience in rural area are practically absent. There is a limited institutional capacity and lack of interest in existing institutions. That is why the second target is *to develop local institutional capacities for assuring the rural population with drinking water of guaranteed quality*.

The lack of skilled personnel in rural area reaches 90% of demand. This situation may be eliminated by worker training in the secondary vocational education system which is underdeveloped. Providing with a skilled personal in this field should be carried out by the local mayors or by the relevant consortium supported by beneficiaries or investors. So, the target is *to train skilled workers in the field of potable water facilities*.

In rural area there is a lack of communication and information and public participation in water supply problems. The barrier may be easily surpassed. The removal of barrier requires information campaigns carried out by local government authorities, Public Health Centers, mass-media and NGOs. So, there is a need *to strengthen the information on rural population and intensify its confidence in new water supply technologies and develop relevant traditions, habits, consumer preferences and social biases*.

2.3.3. Enabling framework of technology transfer

In force legal framework is supportive and facilitates the process of water supply in rural localities. Government as major actor, by reviewing and updating government policy contributes to diffusion of proposed technology. Water legislation covers legal basis for water use rights; customary entitlements; quality standards for water supply and sanitation; watershed management and conservation; groundwater utilisation and conservation.
The Government of the Republic of Moldova adopted Decision No. 934 from 15. 08. 2007 on the establishment of the automatic information system called “The State Register of natural mineral waters, drinking waters and non-alcoholic bottled drinks" by which were approved “The sanitary standards concerning use and marketing of natural mineral waters" (annex 1), “The definition and recognition of natural mineral waters”.

National research institutions undertake studies and estimation of reserves of underground water from sources both in terms of volume and quality for the subsequent argumentation of the rural localities drinking water supply policy.

Available capacity building and enabling institutional environment that manages the use of available water resources. Ministry of Environment (Direction of water management) ,Agency “Aplele Moldovei” , Geological Agency of Moldova, Agency “Apa Canal” operate the water supply services, set tariff, manage funds, have the responsibility for integrated management of water resources.

Government supportive to local private business an international investments. Existing international partnership (Swiss Development Agency, USAID, other) proved the possibility of successful implementation of water project in rural communities of Moldova.
Local government (municipalities) and beneficiaries are willing to make contribution to the extent possible, assist in planning.
In Moldova there are trained specialists comprising water and sanitation specialists, economists and financial analysts able to plan, install and maintain water pipe system in rural communities.
Main entities responsible for water resources exploration and monitoring are:

Ministry of Environment is the State body responsible for environmental management, including all natural resources: ground waters, underground waters etc. www.mediu.gov.md

Environmental Quality Monitoring Department in the frame of the ***State Hydrometeorological Service*** performs systematic ecological monitoring of the environmental objects quality (surface water, air, soil, γ-radiation etc.) on a basis of the monitoring network throughout the entire territory of the Republic of Moldova. http://www.meteo.md

The Agency for Geology and Mineral Resources of the Republic of Moldova is subordinate to the Ministry of environment and is responsible for regulatory and coordinating the study, protection and rational use of the subsoil and the development of mineral raw material base of Moldova, including water resources. No Web site.

"Apele Moldovei" Agency is the administrative authority responsible for the implementation of the State policy in the field of water resources management, hidroamelioration, water supply and sanitation, which operates under the Ministry of the environment. Web: http://www.apelemoldovei. gov. md

Institute of Ecology and Geography of the Academy of Sciences of Moldova is in double subordination: Ministry of Environment and Moldova Academy of Sciences. It is responsible for the scientific ensuring in environmental branch. There are some laboratories in Institute: The quality of the environment; Ecobio-indicators and Radio-ecology; Standards and regulatory environment; The ecology of Human Settlements; Biogeo-oceanology with the geo-information group; Dynamic geomorphology; Climatology; Geography and Evolution of Soils; etc. Web: http://www.ieg.asm.md

Ministry of Health ***State Public Health Surveillance Service*** is responsible for establishing the quality and safety parameters of drinking water, monitoring and supervision of safety of all sources of drinking water in the country. Web: http://www.cnsp.md

2.3.4. Barriers identified to technology diffusion.

Economic and financial

- Inadequate access to financial resources.
- Red tape (bureaucracy).
- Uncertain macro- economic environment.
- Lack of entrepreneurial skills to reach the findings.

Policy, legal and regulatory

- Insufficient legal and regulatory framework in estimation of drinking water scarcity impact on population health
- Inappropriate financial incentives and disincentives
- Lack of decision concerning designing of the centralized water supply system

Institutional and organizational capacity

- Lack of interest or limited capacity of responsible institutions.

Network failures

- Lack of involvement of stakeholders in decision making.

Human skills

- Lack of skilled personnel in building of local water supply systems and their maintenance.
- Lack of skilled personnel in estimation of drinking water scarcity impact on population health
- Lack of service and maintenance specialists.
- Lack of entrepreneurs in territories.
- Lack of service and maintenance specialists.

Information and awareness

- Poor dissemination of information to technology users.
- Poor infrastructure for communication of small-scale project support.

Social, cultural and behavioural

- Unknown product, inadequate information, lack of local participation.
- Resistance to change, due to cultural reasons. Rural peoples' resistance to new technologies.
- High discount rates on consumers.
- Lack of confidence in new climate technologies.

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Table 2.3.1 Technology *Rural population supply with drinking water of guaranteed quality. Building of local water supply system* technology.

S. No	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost, how can it be funded (domestic or international funding)	Indicators of success, risks
1.	Enforce the legal and regulatory framework support in order to assure proper functioning of health care measures.	Slackness may frustrate programs and may be crucial for water supply system projects, baffling them. Decision-makers, stakeholders, private business have to be co-partners in these activities.	Government, stakeholders, decision makers of all levels.	By strengthening the legal and regulatory framework and by proper activities management.	0-5 years	Estimated cost of 5-8, 000 mdl is approving a legislative initiative in the Parliament of Moldova. Amount is determined by the Department of National Statistics.	✓ Prompt and opportune decision implementation ✓ Active involvement of stakeholders.
2.	Promote financing of water supply projects in rural areas.	It is crucial for water supply system building.	State Agencies or private sector.	Allocating grants	0-5 years	Popularize this event through roundtables, media, etc. (mdl 50,000 annually). The amount originates form the expenses the state institutions responsible for implementation of these projects will incur and allocated budgetary resources are sufficient to carry out this measure.	✓ Project documentation approved in the established manner. ✓ The risk – unskilled specialists in designing water supply system.
3.	Development of institutional framework for provision of	Because of the lack of legal and regulatory framework in assuring of durable and proper	Republic of Moldova Government	By governmental decision.	0-5 years	Estimated cost of 5-8, 000 mdl is approving a legislative initiative in the Parliament of Moldova.	✓ The set of legal and regulatory framework in assuring of durable and proper functioning

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S. No	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost, how can it be funded (domestic or international funding)	Indicators of success, risks
	centralized distribution of rural population with guaranteed quality of drinking water sources.	functioning of local water supply.				Amount is determined by the Department of National Statistics.	of local water supply. ✓ The risk – slackness of central and local authorities.
4.	Building the water supply systems.	To ensure secure access to drinking water of rural population under all circumstances and all time it is necessary to build up of water supply system.	Local authorities, private sector, Government, international water supply funds.	Implementing water supply projects in rural areas.	5-10 years	426, 000 € for the first year and 46,900 € every year as a depreciation of equipment. The value of this measure depends on the value of the whole project.	✓ Number of localities was water supply systems will be built. ✓ Water supply systems functioning. ✓ The risk slackness of central and local authorities.
5.	Undertake a national investigation of underground water sources as base for policy enforcement in the area.	There are no in depth investigation about underground water resources in Moldova, the policy developers lack of information for developing appropriate policies in the area.	Research institutions, Agency "Aplele Moldovei", Agency for Geology and Mineral Resources of RM, Institute of Ecology and Geography.	Implementing national and international research projects.	0-5 years	Depending on Project funds.	✓ Publications on underground reservoirs of Republic of Moldova. ✓ Developed water map/guides of underground water resources on Moldova's territory.

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S. No	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost, how can it be funded (domestic or international funding)	Indicators of success, risks
6.	Intensifying the inter-sectorial collaboration between local authorities, investors, public services and entrepreneurs.	The lack of inter-sectorial collaboration presents an essential barrier in building of local water system.	Republic of Moldova Government , local authorities, investors, public services providers, entrepreneurs	By strengthening the legal and regulatory framework and by proper activities management.	All time	Do not need funding.	✓ Prompt and opportune of decision implementation.
7.	Strengthen human capital base in the Human Health sector.	Because of the insufficient number of skilled specialists in rural area in technologies of drinking water supply.	Government, Universities, Colleges.	By appropriate planning and motivation of young people. By strengthening the university and college training process in technologies of drinking water supply.	0-10 years	Budget and private financing.	✓ Number of final-year students. ✓ The risk – low salary of employees.
8.	Better informing of rural population about health problems related to water quality.	Most of the rural population is not aware of the negative parts of the climate change and of future drinking water scarcity on human health.	Central and local authorities, NGOs	By promoting the relevant information through mass-media.	0-5 years	10,000 mdl annually for each locality involved in the project. This can be supported by the State Ecologic Fund.	✓ The number of people being aware of the negative parts of the climate change and of future drinking water scarcity on their health.

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S. No	Measure	Why the measure/action is needed	Who (government, agency, private sector etc.)	Mode of implementing (how should they do it?)	When (0-5 years, 5-10 years, or 10-20 years)	How much the measure/action will cost, how can it be funded (domestic or international funding)	Indicators of success, risks
9.	Rising population information and awareness about climate change impact on human health.	The social effectiveness of the building of local water systems is one of the main scopes of this program.	Government, central and local authorities, NGOs	By testing public opinion.	0-5 years	Making household surveys in towns involved in the project – 50,000 mdl for a supply project. The amount can be achieved within the projects annually announced by Academy of Sciences of Moldova.	✓ Number of population indicating. ✓ Improvement of life conditions. ✓ The risk – slackness of central and local authorities and NGO's

Chapter 3. Cross-cutting Issues

A common enabling policy applied to all technologies of both prioritised sectors Agriculture and Human Health is Moldova 2020: National Development Strategy. According to targets set by the Strategy, the main concern is to promote the people's welfare in a healthy environment. The prioritised technologies of both sector Agriculture and Human Health would have a significant contribution toward improvement of population life standards, also toward sustainable development of communities and of the whole country.

A cross cutting identified barrier is administrative and ambiguities - there is a great deal of uncertainty about the involvement of stakeholders from sectors. Responsibilities are not clearly assigned to different levels of administration, particularly at the ground level; therefore, proposed measures that imply coordination among participating actors encourage collaboration and are oriented toward addressing cross— sectoral cutting issues.

Access to affordable finance and in amounts needed for start investments or larger capital expenditures remain a constraint across both Agriculture and Human Health sectors. This issue is difficult to solve applying measures based on internal budgetary resources and in conditions where private sector is weak in addressing country's sustainable development needs. In response to poor access to finances and investment capital as a measure was proposed to seek investments form regional and global funding organisations. Governmental commitment toward implementation of international programmes on climate change is of great support for all sectors of Moldova's economy. By another hand, some of sector's level problems (managerial) could be solved locally, with national or even community supports, as these opportunities are not well explored.

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Annexes I - II

Annex IV

Country Full Name

Annex I. List of stakeholders involved and their contacts

1) Ministry of Environment: (Maria Nagornii, Chief of Department for Analysis, Monitoring and Evaluation of politics, tel 373-22-204520).
2) Ministry of Agriculture and Food Industry (Iurie Senic, Chief of Department Ecological Agriculture, Renewable resources and irrigation, tel 373-22-233427)
3) Institute of Ecology and Geography of the Academy of Sciences of Moldova (Maria Sandu, Deputy Director, tel 373-22-211-134)
4) Ministry of Health (Ion Salaru, Deputy Director, National Center for Public Health. Tel 373-22-574-666)
5) State Hydrometeorological Service (Elina Plesca, Deputy Director, tel 373-22-773-511)
6) State University of Medicine and Pharmaceuticals of Moldova "Nicolae Testimiteanu" (Grigore Friptuleac, Chief of the Department Preventive Medicine tel 373-22-205-464
7) NGO "Ecospectr" (Alexandru Teleuta, Director, tel 373-22-523-898)

Annex II. List of experts (national consultants) contracted under the adaptation component of TNA Project.

National consultant	Title, position, institution	Background & Area of expertise
Druta Ala	Leader of Adaptation Team in the TNA Project, Dr. of biology, Chief of Plant Biology Department, State Agrarian University of Moldova	Vulnerability and adaptation to climate change; plant ecophysiology, crop production.
Boincean Boris	Prof., Dr. habilitate in agriculture, Research Institute for Filed Crops "Selectia", Coordinating researcher	Agronomy, selection and seed production; organic agriculture, soil management - integrated soil nutrient management
Cerbari Valerian	Prof., Dr. habilitate in agriculture, Institute of Pedology, Agrochemistry and Soil Protection 'N. Dimo', Head of the Pedology Laboratory	Pedology, agrochemistry and soil management, conservation tillage; sustainable farming systems - agro-forestry
Opopol Nicolae	Acad., Prof., Dr. habilitate in medicine, Head of the Hygiene and Epidemiology Chair of 'N. Testemitianu' University of Medicine and Pharmacy	Medicine; human health adaptation to climate change: thermal stress – reduce heat island effect, air conditioning; vector borne – vaccination programs, sustainable surveillance; water borne - improved water treatment; genetic screening of pathogens, etc.
Baltag Grigore	Chief of Economics, Statistics and Analysis Department, Associate Professor, UASM	Financial analysis of agriculture enterprises Economic European integration, Agriculture policy of European Union.