

# Climate Change and Micro, Small and Medium Enterprises

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The effects of climate change are becoming increasingly pronounced and powerful, taking on an alarming scale and imposing enormous economic and human costs on humanity. However, the burden of these costs is unevenly distributed with the poorest and most vulnerable bearing the heaviest toll. Such a situation requires specific and targeted measures, if the humanity seriously intends to meet the goals of International Sustainable Development Strategy. This is an unprecedented challenge to humanity not only because of the size of financial resources needed to be mobilized, but also because of the tension between socio-economic and political short, mid and long-term goals and aims, tension between the needs to ensure a rapid and quantitative economic growth and the needs to reduce mass poverty and social inequality. The article attempts to review policies and measures undertaken by governments and civil society groups to resolve the above tensions by developing integrative adaptation policies and measures, which allow to simultaneously address the problems of environment degradation, natural disaster risks and socio-economic development. It focuses on most vulnerable segments of population: self-employed and employees of micro, small and medium enterprises, both formal and informal. The article highlights prevailing world-wide trends in disaster risk management and risk reduction efforts and tries to identify most innovative and effective programs, which could be adjusted to specific conditions of Russia.

**Keywords:** disaster risk management (DRM), disaster risk reduction (DRR), natural perils, natural disaster insurance, index-based insurance, adaptation, resilience, mitigation, MSMEs (micro, small and medium enterprises), insurance premium, developing countries, International organizations, FAO, UNDP.

The increasing frequency and destructive power of natural disasters around the world challenge capabilities and capacities of micro, small and medium enterprises (MSMEs) to withstand and cope with the consequences of global climate change. The MSME function as an employer and as a “safety net” for millions of people throughout the world. In the OECD countries, MSMEs account, on the average,

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for about 60% of jobs in the manufacturing sector and 75% in the service sector. In emerging economies, MSMEs contribute up to 45% of total employment and 33% of GDP. In low-income and lower middle-income countries, the share of MSMEs in total employment is much larger than in other country groupings (upper middle income and/or high-income countries), and it ranges between 67-97 % (Small Matters... 2019). Therefore, the ability of MSMEs to survive is of great importance for the preservation of the livelihood of the poorest and most vulnerable segments of the global population. This applies primarily to human settlements in geographical areas that are at the highest risk of natural disasters: small islands, coastal, heavy rain, semi-desert and desert locations, and seismically unstable areas.

The twin goal of this article is to assess the MSMEs capacities and capabilities to adapt to and cope with the consequences of natural disasters and to review policies and policy measures undertaken by different states and international organizations in order to strengthen their ability to meet the challenges of climatic changes.

In recent years Russia has faced serious consequences of natural disasters, the economic damage from which amounted to billions of rubles over the year 2019 alone. Past experience has clearly shown that the population of the country at large has a very rough idea of the possible consequences of climate change caused, among other things, by anthropogenic factors, such as uncontrolled deforestation, burning of dry grass in homesteads, clogging of rivers and ponds, etc. Lack of understanding, multiplied by unpreparedness for possible natural disasters (forest fires, floods, sudden temperature spikes, storms and prolonged rains, etc.), both among the population and among local authorities, leads to severe consequences and material losses. According to preliminary estimates, the economic damage of the 2019 flood in the Irkutsk region amounted to 29 billion rubles<sup>1</sup>. Damage from forest fires in 2019 in Russia, according to preliminary data, is estimated by the The Ministry of Natural Resources and Environment of the Russian Federation at 15 billion rubles<sup>2</sup>. The problems discussed in this article are relevant not only for Russia, but also for many other countries, including, as shown by the recent experience with the wildfire in Australia, and developed countries.

Changes in the global climate are increasingly making themselves felt and the losses, material and non-material of the world's population have been growing. According to "Statista", for example, the global economic losses for weather only events accounted for USD 438 billion in 2017 and USD 215 billion in 2018<sup>3</sup>.

The Center for Research on the Epidemiology of Disasters (CRED) of the University Catholique de Louvain in Belgium in collaboration with the World Health Organization estimated the world total economic losses per each type of natural disasters over

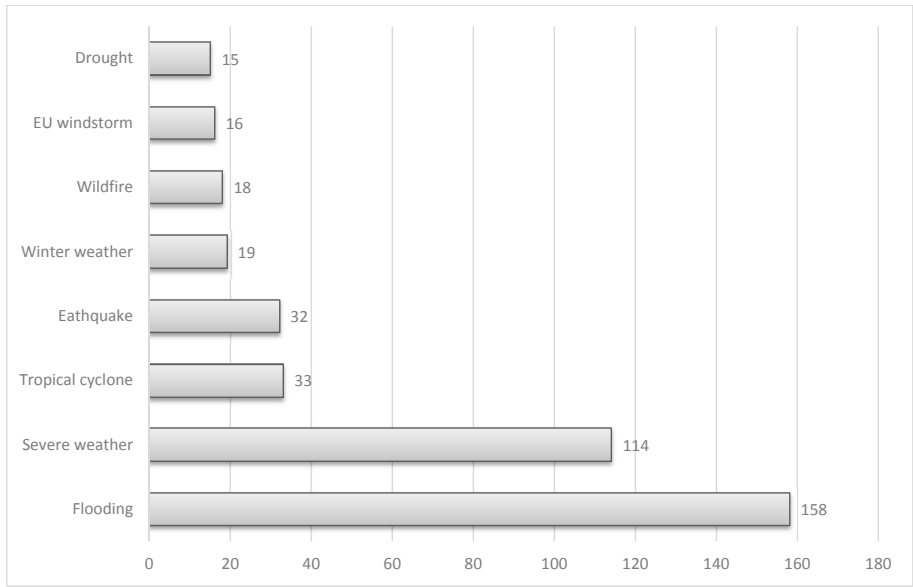
<sup>1</sup> Названа сумма ущерба от наводнения в Иркутской области (The Amount of Flood Damage in the Irkutsk Region). *Lenta.ru*. 3 июля 2019. URL: <https://lenta.ru/news/2019/07/03/rub/> (дата обращения: 01.02.2020)

<sup>2</sup> Минприроды оценило ущерб от лесных пожаров в 2019 году в 15 млрд рублей (The Ministry of Natural Resources Estimated the Damage from Forest Fires in 2019 at 15 Billion Rubles). ТАСС. 17 декабря 2019 г. URL: <https://tass.ru/vstrane/7362573> (дата обращения: 01.02.2020)

<sup>3</sup> Statista - Global No.1 Business Data Platform. URL: [statista.com](https://www.statista.com) (accessed: 01.02.2020)

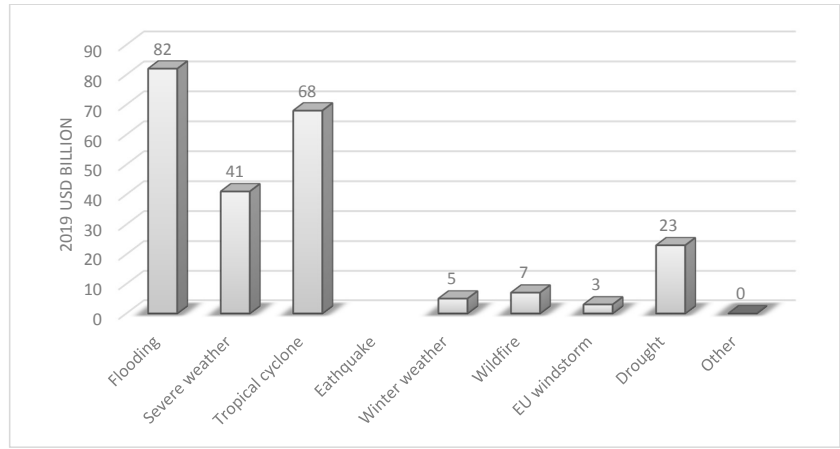
the period 1998-2017: flood - USD 650 billion, storm - USD 1330 billion, volcanic activity - USD 661 billion, extreme temperature - USD 68 billion, drought - USD 124 billion<sup>4</sup>.

One of the leading global professional services firms “Aon plc” estimated that the world economic losses and damage resulted from natural disasters in 2019 amounted to USD 232 billion, of which USD 229 billion resulted solely from weather disasters. The inland flood peril was the costliest of 2019, and its highest year since 2013 (Fig. 1 and Fig. 2) (Weather... 2020).



**Fig. 1. Total natural disaster events by peril in 2019**

Source: (Weather... 2020)



**Fig. 2. 2019 global economic losses by peril**

Source: (Weather... 2020)

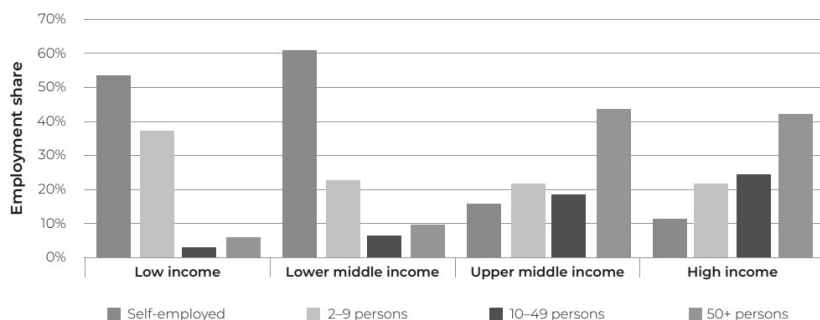
<sup>4</sup> Natural Disasters 2018. An Opportunity to Prepare. Brussel: CRED, 2019. URL: <https://emdat.be/> (accessed: 01.02.2020)

The awareness among small businesses of forthcoming climatic changes, as well as of the risks of asset and life losses, has significantly improved thanks to efforts of governmental and numerous non-governmental organizations to disseminate relevant information among as many people as possible. According to the “Zurich Insurance Group fourth annual global SME survey”, almost 78% of the small businesses (MSMEs) surveyed in 13 countries in Europe, the Americas and Asia Pacific expect significant losses associated with climatic changes, in particular, as a result of downpours, floods, heavy rains (22% of the businesses), droughts and severe heat (20%). More than one-third (36%) of the surveyed businesses anticipate material losses and business interruption<sup>5</sup>.

Apart from a possible asset damage, which could be caused by a direct strike of climatic event, many MSMEs are also concerned with supply chain interruptions, higher costs for energy and water and the impact of climate extremes on the health of employees<sup>6</sup>.

### Surviving natural disasters

Some studies of the past severe natural events, undertaken by research organizations, found, that the burden of damage from natural disasters born by self-employed, micro and small businesses in most low- and medium-income countries disproportionately high due to their inherent weaknesses. Self-employed and micro-businesses (in both rural and urban areas) suffer most due to their extremely limited capacity (financial and/or physical) and insufficient cognitive capabilities (specific knowledge and skills) to prepare themselves for an approaching destructive weather event on time. In low-income countries, the situation is further aggravated by mass poverty, absence of social protection arrangements, high degree of informality of economic activity and employment. As it is seen from Fig. 3, the prevailing forms of businesses are self-employed and micro-enterprises, teetering on the brink of absolute poverty.



**Fig. 3. Employment share of micro, small and medium enterprises by country income group, 2019, %**

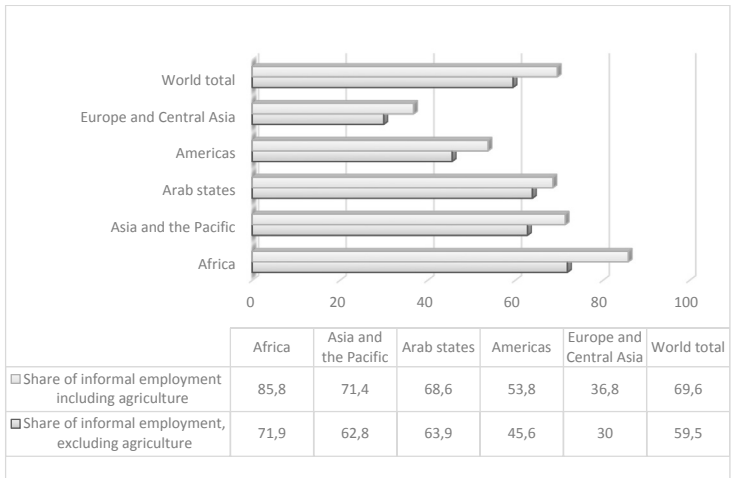
Source: (Small Matters... 2019: 1)

<sup>5</sup> Survey Report on Key Climate Risks for SMEs in 2016. Zurich, Zurich Insurance Group, 2019.

<sup>6</sup> Ibid.

Another evidence of high vulnerability of MSME in low-income countries is that a significant proportion of self-employed and micro-businesses operate informally, including informal hiring, thus, complicating ex-ante appraisal of vulnerability of different segments of population and ex-post delivery public and private relief to disaster (Fig. 4).

Furthermore, the ability of MSMEs in many developing and emerging market economies (as well as in some regions in developed countries) to respond speedily to an approaching severe weather event and, consequently, to recover after the disaster strike, significantly undermined by the underdevelopment of local physical infrastructure (transportation, drainage system, water and electricity supply), absence of public early warning system, shelters, medical and emergency services and the shortage of relief funding.



**Fig. 4. The size of the informal sector by region in 2018, %**

Source: (Women and Men... 2018: 14)

Finally, insufficient socio-economic infrastructure and mass poverty in many developing countries, manifested in low quality housing and other constructions, limited access to radio, phone and other communication and information technologies, shortage of food and medical drugs reserves at local food-stores and pharmacies, further aggravate the vulnerability of population. It should be also noted that the poor in many countries tend (or pushed out) to settle down in risk-prone urban and/or rural areas (close to the shore, on the banks of rivers, on the slopes of volcanoes and etc) due to a deficit of affordable housing and/or high market prices of land. All these weaknesses and fragility of the poor explain, at least partly, higher toll of disaster victims in low-income countries in comparison with industrial ones. Thus, in 2019 more than 10 000 of people lost their lives to natural disaster. 59% of fatalities occurred in the countries of the Asia-Pacific region and 36% in Middle East, Africa and Europe. Cyclone Idai alone in East Africa claimed about 1303 lives, prolonged monsoonal flooding in India cost the lives of 1750 people (Weather... 2020: 10). According to a joint World Bank &

Global Facility for Disaster Reduction and Recovery (GFDRR) study, each natural disaster pushes almost 26 million people into poverty every year (Halegatte et al. 2017).

It should be also taken into consideration that economic activities of self-employed, local micro and small enterprises in many poor developing countries heavily rely on natural resource (e.g., fishing, hunting, timber harvesting, mining, gathering mushrooms, nuts, medicinal herbs, berries, and gardening, horticulture, and/or truck farming). In most cases, such activities constitute the only source of income available to local communities. The UN Food and Agriculture Organization estimates that fisheries and aquaculture, for example, support the livelihood of nearly half a billion people in the world, while almost 1.6 billion people rely on income derived from forestry (the delivery of wood and non-wood goods and environmental services) (Meybeck et al. 2019: VII).

Fishing settlements are usually very small and closely intertwined, forming local value-added chains (fishing, supply of fresh sea food to local markets, shops, small restaurants, eateries, inns and street vendors) or cooperatives. Most of these people are unable to acquire high quality fishing equipment and boats. Loss of equipment or a break-down of value-added chains in consequence of tsunami or typhoon will mean total ruin and misery of fishermen and their families.

MSMEs in most countries are not able to rapidly adjust their operational activities or quickly recover from losses without an external help. According to the US Federal Emergency Management Agency (FEMA), more than 40% of small businesses hit by natural disasters never re-open<sup>7</sup>. Almost 60% of the US small businesses did not have insurance and/or disaster plan<sup>8</sup>. Therefore, national policy makers have to bear in mind these weaknesses and vulnerabilities of MSMEs in the process of development of adaptation policies and preventive measures to reduce their potential losses.

### Transformative adaptation

It is of paramount importance to improve the understanding of the systemic nature of environment by the population at large. It is also extremely important to equip people with relevant knowledge and appropriate tools and technologies, as well as other necessary resources, which could significantly improve their resilience. It is not an easy task, especially for poor countries. Nonetheless, this is the only possible way to reduce economic and human losses as climate change accelerates.

Today, the international community embarks on the path of sustainable development. Three policies have been launched simultaneously: *adaptation* (improving or building up the capacity and ability to adapt to climate change), *mitigation* (reducing threats associated with climate change) and *transformation* (implantation of a sustain-

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<sup>7</sup> When Disaster Strikes: How Can Small Businesses Survive. *Small Business Daily*, October 26, 2016. URL: <https://www.smallbizdaily.com/when-disaster-strikes-how-small-businesses-can-survive/> (accessed: 01.02.2020)

<sup>8</sup> Ibid.

able development mode), which complement and reinforce each other. Most countries are in the process of developing strategies, policies and appropriate instruments. The problems they encounter varies, depending on the level of development and, consequently, on the availability of funding, administrative capacity and human resources in terms of scientific and technical expertise. To some extent international organizations and donor-countries, as well as private non-profit and profit-oriented organizations, compensate for the lack of finance and expertise by providing economic and technical assistance.

Another problem, slowing down the implementation of adaptation and mitigation policies, is the complexity and diversity of climatic conditions and topography (landscape) throughout the world regions. Each eco-zone is unique and requires a careful approach, which will not aggravate, but on the contrary, improve its state. This brave endeavor of the international community to withstand climate change is not only highly risky, but also tremendously expensive. According to the United Nations Conference on Trade and Development, achieving the Sustainable Development Goals (SDGs) will take between 5 to 7 trillion USD<sup>9</sup>.

The break-down of data, presented in Table 1, shows priorities, timing and the volume of financial resources needed for implementation of adaptation, mitigation and transformation policies on the global scale. The most expensive measures are those, which aim to reduce CO<sup>2</sup> emission, on the one hand, and to secure energy supply, on the other.

It is expected that necessary resources will come from two sources: public (government budget and official development assistance) and private (businesses, non-profit organizations and individuals).

**Table 1. Investment requirements for transition to a sustainable development model**

*Source:* UNTT Working Group on Sustainable Development Financing. Financing for Sustainable Development: Review of Global Investment Requirement Estimates. *Sustainable Development Goals Platform*. URL: <https://sustainabledevelopment.un.org/>

Goals	Targets	By	Pathway characteristics	Investments
Improve energy access	Universal access to electricity and modern cooling fuels	2030	- Diffusion of clean and efficient cooking appliances. - Extension of high voltage electricity grids and decentralized micro-grids. - Increase financial assistance from industrialized countries to support clean energy infrastructure.	Estimated investment to connect 1.6 billion people with lowest income: US\$ 55-130 billion per year to 2030. Estimated investment to provide rural grid connections: <US\$ 11 billion per year to 2030.

<sup>9</sup> Mara Niculescu. UNDP Europe and Central Asia. Impact Investment to Close the SDG Funding Gap. UNDP. 17 July, 2017. URL: <https://www.undp.org/content/undp/en/home/blog/2017/7/13/What-kind-of-blender-do-we-need-to-finance-the-SDGs-.html> (accessed: 01.02.2020)

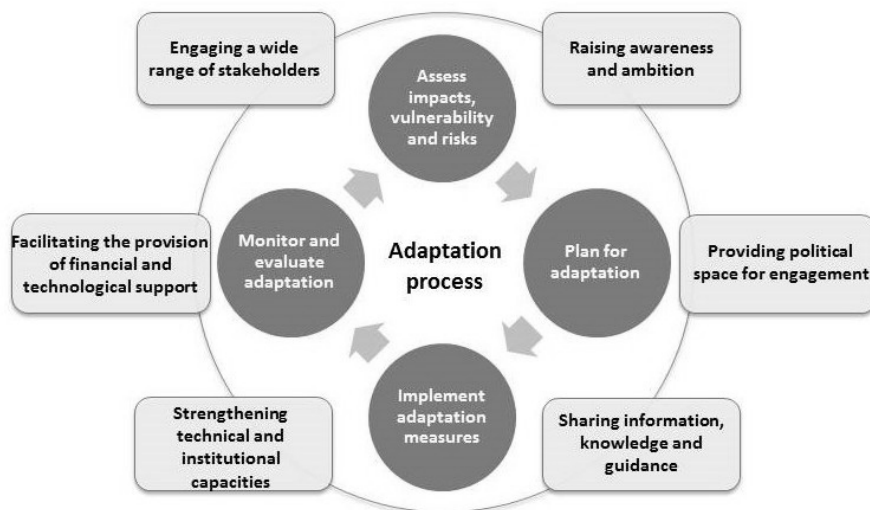


Goals	Targets	By	Pathway characteristics	Investments
Improve energy security	Limit energy trade, increase diversity and resilience of energy supply	2050	- Increase in local energy supply options (e.g. renewable to provide 40-70% of primary energy by 2050). - Increase in diversity of imported fuels and reduce dependency (e.g. reduce share of oil in imports in primary energy by 30-80% by 2050 compared to 2000). - Infrastructure expansion and upgrades to support interconnection and back-up, including increased capacity reserves and stockpiles.	Estimated investment in infrastructure upgrades for electricity grid: >300 billion per year by 2050. Co-benefits of stringent climate mitigation policies reduce overall security costs (import dependency & diversity by about 75%.
Reduce air pollution and improve human health	Reduce premature deaths due to air pollution by 50%	2030	- Tightening technology standards across transportation and industrial sectors (e.g. vehicles, shipping, power generation, industrial processes). - Combined emissions pricing and quantity caps (with trading). - Fuel switching from traditional biomass to modern energy forms for cooking in developing countries.	Estimated investment to meet air pollution targets: US\$ 200 billion per year to 2030 (-12% of energy costs). Co-benefits of stringent climate mitigation policies to reduce overall pollution control costs by about 75%.
Avoid dangerous climate change	Limit global average temperature change to 2°C above pre-industrial levels with likelihood of >50%	2050, 2100	- Widespread diffusion of zero and low-carbon energy supply technologies, with substantial reduction of energy intensity. - Global CO <sub>2</sub> emissions peak by 2020 and are reduced to 35-75% by 2050 on 2000 levels. - Globally comprehensive mitigation efforts covering all major emitters. - Financial transfers from industrial countries to support de-carbonization.	Up-scaling of investment into low-carbon technologies and efficiency measures > US\$ 465 billion per year to 2050. Additional financial transfers to developing countries of about 2-5% of total energy system costs to 2050, depending on the domestic commitments of industrialized countries.

In most cases adaptation policies envisage a mixture of measures aiming to mitigate climate change threats and to transform the prevailing *modes of operandi and vivendi* (life-organization patterns). Such mixed policies and processes they induce may be qualified as a *transformative adaptation* (see Fig. 5 and Table 1).

The above measures complement macro- and meta level actions to ensure that transformative adaptation advances smoothly. They include: mobilization and prioritization of public investment in sustainable development; targeting and reforming economic sectors and institutions; strengthening research capacity and setting-up an early warning system; inspection and evaluation of vulnerability of constructions, transportation, and public utilities; promotion of innovation and alternative technologies application; encouraging diversification of livelihoods, modernization of production and facilitation of development of financial and insurance markets; upgrading of housing and physical infrastructure; setting-up emergency services and relief programs, and other measures.





**Fig. 5. Adaptation cycle**

Source: The United Nations Framework Convention on Climate Change. URL: <https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean>

### **Strengthening the resiliency of MSMEs and self-employed: a brief review of national and international efforts**

All the measures, instruments and actions aiming to strengthen the resiliency of MSMEs and the population at large at national, regional and international levels may be analyzed within two frameworks: disaster risk management and *disaster risk reduction*.

Disaster risk management (DRM) refers to legal, institutional and policy frameworks and administrative mechanisms and procedures related to the management of both risk (ex ante) and disasters (ex post), therefore including also the emergency management elements. The DRM elements may include, but not limited to:

1. *Risk assessment* – diagnostic process to identify the risks for a community;
2. *Prevention* – activities to avoid the adverse impact of hazards;
3. *Mitigation* – structural/non-structural measures undertaken to limit the adverse impact;
4. *Preparedness* – activities and measures taken in advance to ensure effective response;
5. *Early warning* – provision of timely and effective information to avoid or reduce risk;
6. *Protection of people and livelihoods during emergency* (immediate assistance, evacuation – temporary mass departure of people and property from threatened locations, provision of assistance during or immediately after disaster);

7. *Assessing damage and loss* – information about impact on assets and loss to production.

Disaster risk reduction (DRR) is a crucial component of DRM and refers to those programs and practices, which are specifically targeted at avoiding (prevention) or limiting (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development. In effort to improve disaster resilience and mitigate natural disaster risks many countries encourage their population and businesses to apply for weather- and commodity-based insurance. However, households and businesses in low-income countries cannot easily afford commercial insurance schemes without support from extended family or the government. Nonetheless, some poor countries succeeded in widening risk insurance coverage by employing various incentives like, for example, government subsidization of insurance premium or by enforcing obligatory nation-wide insurance schemes.

With regards to MSMEs, many poor countries (with support of international governmental and non-governmental organizations) have developed and utilized different models of disaster-based insurance (Table 2). However, according to Swiss Re estimates, *the global all-catastrophe protection gap*<sup>10</sup> in 2017-2018 combined was impressively large at US \$280 billion, and more than half of that resulted from independent secondary and secondary-effect peril events (see Fig. 6).

**Table 2. Types of disaster risk insurance in developing countries**

*Source:* Mechler R., Linnerooth-Bayer J., Peppiatt D. Disaster Insurance for the Poor? A review of micro-insurance for natural disaster risks in developing countries. A ProVen-tion IIASA Study, July 2006. URL: <https://reliefweb.int/>

Category	Description
1. Disaster micro-insurance	Schemes that facilitate access to disaster insurance products to protect the livelihoods of the poor against extreme events, Examples; Proshika (Bangladesh), Swayamkrushi (India), Network Leasing Corporation (NLC – Pakistan), and the National Smallholder Farmers' Association of Malawi (NASFAM), VimoSEWA (India), Nepal Centre for Self-Help Development (CSD)
2. Agricultural insurance	Schemes aim at developing programs for farmers, herds, rural entrepreneurs and agricultural financial institutions (e.g. rural banks, microfinance institutions) to increase their financial resilience to adverse natural hazards. These schemes can be sub-classified as "index-based" or "indemnity-based", according to the type of insurance instrument used. Examples: WINCROP (Windward Islands Crop Insurance) program was established by the banana marketing organizations of Dominica, Grenada, St. Vincent, and St. Lucia; Mozambique Index-based Agricultural Insurance (IAM), Rwandan and Zambian Index-based Agricultural Insurance, Drought Index-Insurance Pilot for Groundnuts Farmers of Senegal.
3. Property catastrophe risk insurance	Schemes aimed at developing catastrophe insurance markets and increasing catastrophe insurance penetration among homeowners, small and medium enterprises, and public entities. Examples: Hurricane-Resistant Home Improvement Program in St. Lucia (HRHIP), Turkish Catastrophe Insurance Pool, Peril-based HOIs (HOI - home-owner insurance) in Canada, USA, France, UK and other industrial countries.
4. Sovereign disaster risk transfer	Strategies that aim to increase the financial response capacity of governments in the aftermath of natural disasters, while protecting their long-term fiscal balance, through the use of risk transfer instruments including insurance and insurance-like securities (e.g. catastrophe bonds, catastrophe swaps, and weather hedges). Examples: African Risk Capacity, Caribbean Catastrophe Risk Insurance Facility, Pacific Catastrophe Risk Assessment and Financing Initiative, Southeast Europe and Caucasus Catastrophe Risk Insurance Facility

<sup>10</sup> Protection gap is the difference between insured losses and economic losses, or uninsured losses.



**Fig. 6. Natural catastrophe protection gap by region and peril, 2009-2018, in USD billion (in 2018 prices)**

Source: SIGMA. *Natural Catastrophes and Man-made Disasters in 2018: “secondary” perils on the frontline*. Swiss Re Institute, No2/2019, Zurich (Figures 5 and 13), Pp. 6, 21.

There is a number of reasons why the penetration of natural disaster-based insurance has been so slow. Many studies underscore the following reasons keeping people and small businesses away from commercial insurance schemes:

1. In many countries, regardless of the level of development, high insurance premium rates were cited as one of the key barriers;

2. Complicated documentation, rules, requirements, losses specification and the lack of understanding when and how the insurance payments will be delivered to disaster victims were among other constraints mentioned by people;

3. Psychological factors were also highlighted, particularly, a widely shared belief, that helping natural disaster victims is sheer Government responsibility (Linnerooth-Bayer et al. 2008)<sup>11</sup>.

To remedy the situation and expand insurance coverage of population, especially, in poor countries, both governments and civil society groups came out with various innovative initiatives, including the creation of:

1. Public nation-wide disaster insurance programs with compulsory participation;
2. Government insurance premiums subsidization programs;
3. Risk-pooling (solidarity) community-centered arrangements (so-called «mutuals»);
4. Insurance schemes covering indirect losses or costs as a result of cascading effects of natural disasters in the list of covered risks;
5. Pro-poor “work-for-insurance” in exchange for some assets improvement (e.g. land, repairing of buildings, roads or irrigation system, vaccination of animals, new crops), “saving-for-change” (e.g. schemes, which may included some incentives to attract the poorest by offering debt waivers and a guaranteed access to credit) or «social protection safety net» programs, specifically designed for the poorest and most vulnerable population groups.

**Table 3. Community-centered model of mitigation of natural disaster risks: some examples**

Program	Description
“The Goat Trust” (India)	<p><i>The Goat Trust</i> is registered as charitable trust to promote small livestock (Goat/sheep/Backyard birds rearing) based livelihood. It is mandated to grow as a resource organization to work on development of pro-poor small livestock farming systems, technologies and market development through collaboration and networking with various stakeholders.</p> <p>The Goat Trust and its partners have currently offering a <i>community insurance</i> to those households engaged in goat rearing and goat farming in poverty pockets and semi-arid regions of Madhya Pradesh and Uttar Pradesh, Rajasthan &amp; Jharkhand. The goal of this community insurance initiative is mitigate goat loss risk through integration of goat farmers, building institutions of goat farmers (group and larger federation), and making provisions of financial services (insurance). It also provides training and handholding support to Grass root partners &amp; Goat farming communities – Certified Livestock Managers and Livestock Nurses (Pashu Sakhi), participatory training and monitoring tools development for small livestock based livelihoods; micro financing (Micro leasing, Community based Insurance, Livestock Credit card) for livestock; standardisation of pro-poor live body weight based marketing system and Information exchanges; teach and promote the use of Information Technology in Livestock; ethno veterinary practices and promotion of Herbal cure for sustainable livestock management.</p> <p>Source: “The Goat Trust”. URL: <a href="http://thegoattrust.org/">http://thegoattrust.org/</a></p>

<sup>11</sup> See: Mechler R., Linnerooth-Bayer J., Peppiatt D. Disaster Insurance for the Poor? A Review of Micro-insurance for Natural Disaster Risks in Developing Countries. A ProVenton / IIASA Study, July 2006; Final Report: Understanding the Role of Publicly Funded Premium Subsidies in Disaster Risk Insurance in Developing Countries. Vivid Economics. Surminski Consulting, Callund Consulting and UK Department for International Development, November 2016. URL: <https://www.gov.uk/dfid-research-outputs/final-report-understanding-the-role-of-publicly-funded-premium-subsidies-in-disaster-risk-insurance-in-developing-countries> (accessed: 01.02.2020)

Program	Description
Fondos (Mexico)	<p>The first agricultural insurance program in Mexico began in 1942 and was based on arrangements between mutual unions and private insurance companies. It was not until 1961 that the first specialized public company for crop insurance was created, the National Crop and Livestock Insurance Company (ANAGSA).</p> <p>Insurance through ANAGSA was a condition for receiving agricultural credit; policies covered multiple-perils and premiums were almost entirely subsidized. <i>Fondos</i>, or farmer mutual insurance funds, developed in response to rising prices and shrinking availability of agricultural insurance.</p> <p>The first Fondo was established in 1978 in order to reduce insurance costs, offer technical support for members, develop financial options, as well as to reinvest any profits back into the community.</p> <p><i>Fondos are mutual insurance funds</i> that are formed by local growers, and only provide insurance to their members. Their advantage lies in their close connection to farmers and their knowledge of local agricultural conditions. As Fondos are civil associations, they are not intended to generate profits either for the Fondos themselves or the members. Under the law they may only provide agriculture related damage insurance, agriculture related property insurance, farmers' life insurance, and accident/illness related insurance. The Government provides support to the Fondos system through a program of operational assistance and financing to both Fondos and Integrating Agencies (OIs), which are associations formed by Fondos members that oversee the activities of Fondos. The operations of Fondos are regulated by the Agriculture and Rural Insurance Fund Law (2005), and overseen by OIs and a National Integrating Agency. OIs supervise the organization of Fondos' admission, separation, suspension, and expulsion of members; risk retention limits; contracts of reinsurance; functions and operations; constitution and investment of technical reserves and the social fund; and accounting. Any irregularities are reported immediately to the finance ministry (SHCP).</p> <p>Source: The World Bank documents. URL: <a href="http://documents.worldbank.org/curated/pt/197661468281079879/pdf/880990BRI0P1300urance04Pager0Fondos.pdf">http://documents.worldbank.org/curated/pt/197661468281079879/pdf/880990BRI0P1300urance04Pager0Fondos.pdf</a></p>
Takaful	<p><i>Takaful</i> is a co-operative system of reimbursement or repayment in case of loss, organized as an Islamic alternative to conventional insurance. Under <i>takaful</i>, people and companies concerned about hazards make regular contributions ("donations") to be reimbursed or repaid to members in the event of loss and managed on their behalf by a <i>takaful</i> operator. There are several models (and several variations) of how <i>takaful</i> can be implemented:</p> <ol style="list-style-type: none"> <li>1) <i>Mudharabah</i> model (profit-sharing): the managers (shareholders) are sharing profit and losses with the policyholders; used initially in Far East;</li> <li>2) <i>Tabarru'</i>-based: "donations" (<i>Tabarru'</i>), i.e. premiums, are accumulated into a fund to meet members' losses. Members are not allowed to take back any contributions or profits from investments, a combination of <i>Tabarru'</i> and <i>Mudharabah</i>: Bahrain, UAE and Middle East countries,</li> <li>3) <i>Wakala</i> model: agency fee, received up front from the contributors and transferred to shareholders fund.</li> </ol> <p>Source: Ahmed Salem Mulhim, Ahmed Mohammed Sabbagh. The Islamic Insurance Theory and Practice. URL: <a href="https://www.albaraka.com/media/pdf/Research-Studies/Book-Islamic-Insurance.pdf">https://www.albaraka.com/media/pdf/Research-Studies/Book-Islamic-Insurance.pdf</a></p>

The distinct characteristics of the bottom-up disaster risk insurance arrangements (mutuals and/or cooperatives) are as follows:

1. "Mutuals" can operate on every level (communal, regional, national and international);
2. They are able to provide services that meet the need of poor and vulnerable;
3. Their proximity to members and shared ownership facilitate claims settlement and self-regulation (Facing Risk... 2018).
4. Such programs can be designed within the framework of sustainable development strategy by combining elements of risk reduction, risk mitigation and transformation of livelihood, production and consumption;
5. They are country specific.

It is obvious that many countries still lack the capacity and capabilities to meet all the requirements of effective DRM, including some developed countries. It is also beyond any doubts that concerns with natural disasters intensify. Increasing toll of

losses caused by natural catastrophes has been on rise revealing weaknesses and/or unpreparedness of human physical and socio-economic infrastructure to keep a direct hit of mother nature. Results of efforts to strengthen the endurance and resilience of humanity in the face of raging nature and climatic change have not yet been impressive, as the political elites in many countries have been more often preoccupied with next election campaign or personal political career, rather than with true voters' needs. Business community, as well, has been rather reluctant to rush to join the efforts to mitigate climate change risks. Nonetheless, the International Governance has been pressing countries to accelerate the implementation climate change adaptation and mitigation policies to reduce potential damage of natural disasters to human communities throughout the world.

Specific problems of most vulnerable segments of the world population (formal and informal self-employed, owners and employees of micro and medium enterprises) in risk-management programs and adaptation policies have been muted. In developing countries programs a strongest emphasis has been on farmers and rural population, which is understandable due to frequent outbreaks of hunger. In developed countries programs MSMEs are mainly considered from the perspective of productivity and competitiveness, therefore, the emphasis is on transformation, employment and social protection issues.

Review of some instruments applied to promote adaptation to climate change reveal that many experts, policy makers and community leaders have been trying to design effective risk reduction programs, which are suited to the needs of specific social groups. The most popular have been insurance against natural disaster. While there is no definitive conclusion on which of the numerous natural disaster insurance schemes is most effective, some of them are worth to try in Russia. These are primarily mutual insurance funds at the communal (local) level.

Such programs allow to combine risk reduction with diversification of livelihood. Candidates for such programs could be fishermen settlements in Far East, on Caspian Sea and Siberian rivers shores, as well as some close-nit indigenous peoples of the Extreme North. Orenburg region, on the other hand, may be suitable for a program similar to the Indian Goat Trust. Another option could be an all-nation natural risk insurance program with compulsory participation of the population of disaster-prone regions. They should be adjusted and targeted (based on the principle of fairness) and include both primary and secondary losses.

An interesting approach, which also could be tried in Russia, is a diversification of activities of Fund of Small Business Credit Assistance of Moscow by adding disaster insurance component to its activities.

Finally, there is a need to develop an integrative approach to the issues of climate change. This will require a joint effort of scientists and practitioners from different areas.

With regards to climate change preparedness of the population, local governments must:



- develop a disaster preparedness plan and risk-mapping,
- set-up an effective early-warning system,
- educate and inform people by organizing training for business owners and public servants,
- distribute handbooks, booklets and leaflets,
- open a local disaster preparation platform on Internet with access to emergency service and public and private assistance.

This article is far from being exhaustive. There is a need to further study other nations' experience in order to avoid common mistakes.

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## **Климатические изменения и микро-, малые и средние предприятия**

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Последствия изменения климата становятся всё более явными, принимая угрожающие масштабы и накладывая огромные экономические и человеческие издержки на человечество. Бремя этих расходов, однако, распределяется неравномерно, причём самые бедные и уязвимые слои населения несут самые тяжёлые потери. Такая ситуация требует конкретных и целенаправленных мер, если человечество всерьёз намерено достичь целей международной стратегии устойчивого развития. Это беспрецедентный вызов человечеству не только из-за объёма финансовых ресурсов, которые необходимо мобилизовать, но и из-за напряжённости между социально-экономическими и политическими краткосрочными, среднесрочными и долгосрочными целями и задачами, напряжённости между задачей быстрого и количественного экономического роста и потребностями сокращения массовой бедности и социального неравенства. В статье предпринята попытка анализа политики и мер, предпринимаемых государствами и структурами гражданского общества для разрешения вышеуказанных противоречий путём разработки интегративных адаптационных стратегий и мер, позволяющих



одновременно решать проблемы деградации окружающей среды, риска стихийных бедствий и социально-экономического развития. Она ориентирована на наиболее уязвимые слои населения: самозанятых и работников микро-, малых и средних предприятий, как формальных, так и неформальных. В статье освещаются общемировые тенденции в области управления рисками стихийных бедствий и их снижения, а также делается попытка выявить наиболее инновационные и эффективные программы, которые можно было бы адаптировать к конкретным условиям России.

**Ключевые слова:** управление рисками стихийных бедствий (DRM), снижение риска стихийных бедствий (DRR), природные опасности, страхование от стихийных бедствий, индексное страхование, адаптация, устойчивость, смягчение последствий, ММСП (микро-, малые и средние предприятия), страховые взносы, развивающиеся страны, международные организации

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