

PREVENTIVE HEALTHCARE: TOPICAL ISSUES OF HEALTH RISK ANALYSIS

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Research article

UNDERSTANDING THE PERCEPTION AND HIERARCHY OF RISKS: AN ENVIRONMENTAL MEDICO-SCIENTIFIC PERSPECTIVE WITH COVID-19 IN MIND

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The purpose of this article is to examine risk perception among some specific stakeholders, including international intergovernmental bodies, private western-based corporates, and among European public opinion surveys. We also address concerns of the Russian Federation and the impact of China's Belt and Road Initiative. Perception of risks is key to policy decision-making and probably more important than risk assessment. We offer a medico-scientific perspective based on factual evidence drawn mostly from official websites and publications. Our first goal is to understand if sufficient attention is given to human health, disease prevention and control relative to economic and financial considerations. Our second goal is to promote a translational and interprofessional approach to global risk prioritization by cooperation between the medico-scientific community and the financial-economic world. To this end, we examine the benefits for the practice of economic risk assessment of engaging biomedical expertise focused on global environmental health. Maintenance, expansion and sustainability of the human enterprise require health and wellness.

Key words: Environmental health, decision-making, World Bank Group, Organisation for Economic Co-operation and Development, World Economic Forum, World Health Organization, World Trade Organization, Asian Infrastructure Investment Bank, Belt and Road Initiative.

Global Environmental Health identifies many risks to which humans are exposed. Among the major environmental threats that endanger the ever-expanding human population are: pandemics, climate change, pollution, malnutrition, war, poverty, water scarcity, and reduced biodiversity. The hierarchy of existential threats, their importance, urgency, and probability of occurrence, as well as their causes, are debated. However, a consensus ex-

ists in the medico-scientific community about the nature of the major threats to human and planetary health. Strangely, the expertise and commitment of hygienists and environmental scientists concerned with planetary health are often bypassed in political and economic decision-making. How and why this occurs are discussed here.

This cogitation started in 2005 following a visit (JR) to The Center for Health and the

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Global Environment, at Harvard Medical School, Boston USA. Since this visit, several disasters, shocks, viral epidemics and even a global pandemic have occurred. The COVID-19 pandemic demonstrates that global public health must occupy a preeminent role in risk assessment and decision-making. Public health is not something just to be called into action when disease strikes or disaster occurs; it has constant, ongoing pretensions and responsibilities that are directed to the *prevention* as well as the *control* of diseases. In the case of communicable disease prevention, the public health community has for decades warned of the risk of emerging viruses for which humans would have no defense, and the growing risk of rapid disease spread through the expansion of air travel and trade that greatly increase international people-to-people interactions. In 2017 in Xi'an, one (P.S.) of us called for heavy investment in public health to accompany China's gargantuan plans – the Belt and Road Initiative – for increased trade among 70+ countries. We suggest that both the control and prevention of disease should be guided by the Precautionary Principle, as applied to Global Environmental Health. «*While maintaining their objectivity and focus on understanding the world, environmental scientists should be aware of the policy uses of their work and of their social responsibility to do science that protects human health and the environment. The precautionary principle highlights this tight, challenging linkage between science and policy*» [1, 2].

Decision-makers, especially those in governmental organizations, are influenced not only by prevailing conditions but also by parties seeking to influence their decisions, including experts, lobbyists, activists and numerous stakeholders [3]. Public opinion, voiced through the media, communications and social networks, can also be influential. An analysis of the roles of all these influences in the decision-making process would need a sociological and political rather than

the purely scientific approach taken here. Our interest lies in understanding the perception of risk and its hierarchy of leading stakeholders and bodies. We hypothesize that *perception of risk* is the key to decision-making and thus the outcome thereof. We have selected some bodies that operate at an international level, some Western corporate sectors, and two (European) public opinion surveys. We also examine Russian concerns and China's Belt and Road Initiative. Information is drawn mostly from official websites and publications.

Data and methods. We selected organizations, bodies and companies that operate internationally and have a variety of risk perceptions, analyses and management. Each entity was required to have an official publicly available website. Other selection criteria included: global reach, generally accepted expertise, and overall positive reputation. Selected institutions included: the World Bank Group (WBG) and International Finance Corporation (IFC), the Asian Infrastructure Investment Bank (AIIB), the Organisation for Economic Co-operation and Development (OECD), the World Economic Forum (WEF), the World Trade Organization (WTO) and the World Health Organization (WHO). Private companies in the business of insurance, reinsurance and credit-rating assessment were also selected based on their prominence and global reach. Public opinions of risks were drawn from French and European sources. The data for the Federation of Russia concerns for Environmental health and Medicine, as well as hygiene, come from the experience of one of us (N.Z.). Due to the lack of an official web site, we chose to address the impacts of the Belt and Road Initiative via unofficial publicly available data.

International institutions.

Organisation for Economic Co-operation and Development (OECD). Created in 1948 as the Organisation for European Economic Cooperation, the body became the OECD in September 1961. The OECD is an

intergovernmental economic organization based on an international convention, with nowadays 36 member countries. Its purpose is to deal with economic issues and world trade. Thus, its web site states: «*Our goal is to shape policies that foster prosperity, equality, opportunity and well-being for all*» [4]. In 1999, the OECD started to «*analyse the policy implications of emerging and systemic risks*» [5]. In the 10 years that followed, the world faced major threats, terrorist attacks, natural disasters (e.g., hurricanes, tsunami, volcanic eruptions), epidemics related to common germs (e.g., dengue fever, cholera), SARS-CoV in 2002–2004, the first declared pandemic due to the H1N1 virus in 2009, and the financial crisis in 2008. All these «*extremely disruptive events*» which «*destabilize critical systems of supply, producing economic spillovers that reach far beyond their geographical point of origin*» led to the concept of *global shocks*. The 2011 OECD report gives a precise definition of a global shock: «*a rapid onset event with severely disruptive consequences covering at least two continents*» [5]. This shock has specific characteristics: «*future global shocks may arise from previously unknown hazards for which there are no data and no model for likelihood and impacts (...), exhibit the potential for wide-ranging, destructive consequences that transcend national boundaries*», and will challenge our world «*due to its speed of onset*». Obviously, a global shock differs from slow-onset and/or chronic risks «*which provide time for society to adjust, react, and mitigate risk before, during and after onset*».

The OECD has recognized five future global shocks: pandemics, financial crises, cyber risks, geomagnetic storms and social unrests. A detailed study of their impact on several complex key systems has been undertaken. A complete disorganization of several interdependent systems is predicted, for example: production, delivery and transportation, and supplies of energy, goods, drugs

and food. The OECD analysis reveals that different shocks can cause comparable societal disorganization. «*The growing interconnectedness in the global economy could create the conditions and vectors for rapid and widespread disruptions*». Massive urbanization and concentration of populations and assets, as well as the herd behavior and «*groupthink*» of corporations and regulators will drive and amplify the negative consequences of future global shocks [5].

World Bank Group and International Finance Corporation (WBG). Conceived in 1944 at the Bretton Woods United Nations Monetary and Financial Conference to regulate the international monetary and financial order after the conclusion of Second World War, the missions of the World Bank Group (WBG) have evolved in hand with ongoing global economic and financial challenges. Today, the WBG has several commitments, most notably provision of funding for the promotion of sustainable development. Its sister organization, the International Finance Corporation (IFC), was established in 1956 as the private-sector arm of the WBG, focusing on the role of the private sector in addressing poverty and development in low-income countries. In 2007, the IFC issued guidelines for Environmental, Health, and Safety (EHS) to achieve performance in line with Good International Industry Practices. These guidelines emphasize all known environmental and health hazards and risks. The first step for effective management is clearly stated thus: «*Identifying EHS project hazards and associated risks as early as possible in the facility development or project cycle*». Sustainable banking also deals with these issues, with a constant public health interest; this is the case for air quality: «*Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts*» [6].

Asian Infrastructure and Investment Bank (AIIB). The Asian Infrastructure In-

vestment Bank (AIIB) headquartered in Beijing is a new (2016) multilateral development bank of 102 members with a stated mission to improve social and economic outcomes in Asia and beyond. In May 2020, the AIIB announced a «water sector strategy» based on the recognition that «*water availability and management are crucial for economic growth, food security, public health and trade*» [7]. The document recognizes that population growth, rapid urbanization, and industrial and economic growth make Asia's water challenges more urgent than ever. «*Water is indispensable for agriculture and fisheries, industry, energy production, navigation and the provision of critical environmental services*». Climate change, environmental degradation, poor sanitation and the water needs of agriculture are addressed. Plans for AIIB investment invoke its Environment and Social Framework to address social and human health risks relating to the quality and quantity of available water, equality of access to and affordability of water, as well as environmental factors including biodiversity and aquatic ecosystems. In sum, this significant document recognizes the interdependency of human and environmental health and economic growth and development.

World Trade Organization (WTO). Created 60 years ago under its original moniker, the General Agreement on Tariffs and Trade (GATT), the World Trade Organization (WTO) with 164 members «*provides a forum for negotiating agreements aimed at reducing obstacles to international trade and ensuring a level playing field for all, thus contributing to economic growth and development*». The WTO has joined with the WHO «*to bring attention to the need for policy coherence between trade and health matters at global, regional and domestic levels*» [8]. Further, the Standards and Trade Development Facilities a joint initiative of the WTO, WBG, WHO, Food and Agriculture Organization (FAO) and the World Organi-

zation for Animal Health that «*aims to assist low-income countries establish and implement sanitary and phytosanitary standards (food safety and plant health) to ensure health protection and facilitate trade expansion*». Health services is one of the least-committed sectors, such that fewer than 50 WTO members have undertaken commitments in one of the four health services sub-sectors; most of the commitments concern hospital services. «*Health and social services have attracted very limited attention in the services negotiations, which began in January 2000*» [9].

World Health Organization (WHO). The World Health Organization (WHO), which results from a constitution coming into force on 7 April 1948, is an avatar of the United Nations created in 1945. WHO's mission is «*to promote health, keep the world safe and serve the vulnerable, with measurable impact for people at country level*». The organization adheres to the principle that «*Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*» and it envisions «*a world in which all peoples attain the highest possible level of health*». On January 13, 2020, the WHO issued a report titled: «*Urgent health challenges for the next decade*» [10]. The hierarchized list starts with «*health in the climate debate, health in conflict and crisis*», places in the fifth and sixth position respectively «*infectious diseases*» and «*preparing for epidemics*», and ends with «*earning public trust*». Already for 2019, the WHO had issued an alarming report «*Ten threats to global health in 2019*» which placed air pollution and its links with climate change as the greatest environmental risk to human health [11]. National initiatives to promote environmental research and regulation began 50 years ago in the USA and 20 years later in Europe. Nowadays ambient air pollution remains a priority issue for many countries all over the world, Russia included. As per the WHO report Health

2020 European policy framework, the European region has the greatest load of non-communicable diseases in the world. Seventy-five per cent of deaths are caused by cardiovascular and oncologic diseases [12]. To successfully decrease the burden of non-communicable diseases, it is necessary to combine different approaches that take into account leading principles of environmental hygiene.

Western-based private bodies and institutions.

World Economic Forum (WEF). The European Management Forum was created in 1971 by Klaus Martin Schwab, Professor of Economics at the University of Geneva, as a not-for-profit foundation. Renamed in 1987 as the World Economic Forum (WEF) – better known as the Davos forum – the WEF is an international Organization for Public-Private Cooperation [13]. Its web site states: *«The Forum engages the foremost political, business, cultural and other leaders of society to shape global, regional and industry agendas»*. Prominent invited contributors have included Mrs. Gro H. Brundtland, three-term Prime Minister of Norway and the Club of Rome.

In 2020, the WEF issued several reports and notes, which seek to address the major risks faced by the world, including the COVID-19 pandemic. On the WEF website, the reports' introduction states: *«The global economy is facing an increased risk of stagnation, climate change is striking harder and more rapidly than expected»* [14]. Top five risks include biodiversity, which *«underpins global nutrition and food security»* and is *«critically important to human health, economies and livelihoods is declining globally, faster than at any other time in human history»* [15]. Additionally, Sheikh Hasina, prime minister of Bangladesh writes: *«poverty and inequality within and among societies will increase rapidly as a result of COVID-19»* [16].

WEF's Global Risk Report 2020 notes the *«slowing of health progress»*, the *«pressures*

on health systems» and the *«ubiquitous risks of a weak health system»*. It points to the fact that *«no country is fully prepared to handle an epidemic or pandemic. Meanwhile, our collective vulnerability to the societal and economic impacts of infectious disease crises appears to be increasing»*. Highlighting an obvious neglected truth: *«Good health is the foundation for societal well-being and a dynamic and prosperous economy»* [17].

Insurance and reinsurance companies. Insurance companies are private organisations that deal with all kind of risks, with notable operations in human life, health and property casualty. The insurance company policyholder allows the insured entity to transfer risk to the company in exchange for periodic premium payments. Corporate reinsurers provide financial protection for insurance companies by handling very large risks. The reinsurance company writes business in direct collaboration with primary insurers and via brokers, such that reinsurance risk is spread across various participants. Since reinsurance companies handle various risks across the world, their business model allows diversification of risk and, therefore, its reduction [18]. Rating means prevision and anticipation, whatever the nature of the risks, whether emergent, chronic or long-term in nature.

Based on their 2018 net premiums, Swiss Re and Munich Re are the largest reinsurance companies worldwide. In 1978, Munich Re launched a series of publications dedicated to complex risks from natural hazards: The World Map of Natural Hazards [19]. More recently, Munich Re stated: *«Climate change...one of humanity's greatest challenges»* is *«predominantly the result of human activity, is real and has a major influence on weather-related natural disasters»*. In their 2017 report, Munich Re also underlines: *«the enormous economic challenges that people, companies and public institutions face in tackling the consequences of disasters»* concluding *«The threat to people*

and the need for increased resilience was highly evident in 2017» [20].

Acting in the same field, Swiss Re has similar interests and notes the same facts, sharing the same approach: «*Sustainable business is good business*» and «*Protecting the environment coupled with respect for human rights help underpin our social and regulatory license to operate*» [21]. In one of its many publications, Swiss Re proposes to address 15 emerging risks with their time frame and score of possible business impacts [22]. Among the short-term environmental factors are «*vaccination*», which is judged to have a medium potential impact risk and «*pervasive and toxic – chemicals in our bodies*», which is rated as low. «*Climate change and life & health*» is scored as a high potential impact risk in the next years (over 3 years).

Allianz, a global leader in the insurance and asset management business, provides property and casualty insurance. The first Allianz Risk Barometer was published in 2012. In 2020, its goal was «*Identifying the major business risks for 2020*» based on «*The most important corporate perils for the next 12 months and beyond, based on the insight of more than 2,700 risk management experts from 102 countries and territories*». Risk ranking for the 5 major risks include: First cyber incidents followed by business interruption, changes in legislation and regulation, natural catastrophes (e.g. storm, flood, earthquake), and market developments. Climate change/increasing volatility of weather is assigned position № 7 and health issues (e.g. pandemic outbreak) appears in position № 17! [23].

Credit rating agencies (CRAs). A credit rating reflects the financial strength of companies and governmental entities, especially their ability to meet principal and interest payments on their debts. Three major companies assign credit ratings across the world: Standard & Poor's (S&P), Moody's, and Fitch Group. All provide retail and institutional in-

vestors with financial information and corresponding insights. These clues facilitate their ability to examine and understand the risks and opportunities associated with various investment environments. The interest of these agencies in non-financial issues has grown recently. For example, S&P states: «*For more than a decade, S&P Global Ratings has factored environmental, social and governance (ESG) risks into its ratings*» [24]. When considering the Fitch Group's rating methodology, applicable in particular to transportation infrastructure and power generation and transmission, criteria related to «*events risks*» appear under the denomination «*macro risks*» [25]. The report states: «*the potential event risks (...) may adversely affect the issuer's ability to repay the debt. Event risks arising from natural hazards (floods, earthquakes, hurricanes, tornadoes) as well as human error or mechanical malfunctions are identified and the presence of adequate mitigation such as reserves and insurance coverage (...). In some instances, events will be determined to be «uninsurable», meaning insurance of the related risk is unavailable, unavailable in sufficient amounts, or completely uneconomic (...). In some cases, risk mitigation will not be sufficient and the rating may be capped below an investment-grade threshold depending on vulnerability to the uninsured risk*». According to the Fitch Rating Credit Outlook 2020, the most important risks for the coming year were only economic (fiscal policy and global trade) and political (for central banks) [26].

Public opinion surveys. The use of surveys to measure public opinion is an important factor for policy decision-makers. In France, the *Institut de Radioprotection et de Sûreté Nucléaire* (IRSN) has, since 1973, surveyed French citizenry perception of nuclear energy [27]. This mission was later extended to the psychological and sociological aspects of all kinds of risks. A barometer of public opinion on risks and security, which was started in 1988, allows the evolution of

opinions and attitudes towards risk issues to be tracked in real time. Among themes that have been examined are the perception of various hazardous situations in terms of personal risk, risk for the society, need for security, trust in authorities for public protection from risks, as well as prevailing social and environmental preoccupations. Public concern for environmental health risks has been constantly ranked low: only an average of 8–10 % of interviewed people declared a preoccupying interest in the subject! The major perceived issues have been dominated by socio-economic problems (e.g., unemployment, exclusion and poverty, lack of security) [28]. The quality of medical care has not been an issue.

Since 1973, European institutions have commissioned regular public opinion surveys to evaluate the views of the citizenry of member states [29, 30].

In 2007, the European Parliament launched its own specific Eurobarometer series. As for France, a change in favor of environmental and environmental health issues has been confirmed. The concern in 2010–2015 was constantly low, ranking 4 to 6 %, with important differences among countries [31, 32]. In 2018, environmental and climate concerns grew to 10 %. These concerns peaked in the Scandinavian area (peaking at 37 % in Sweden) and in Malta [33]. When questioned about the priorities for the European Union, the unified European opinion has cited «*protecting the environment*» (34 %) and «*fighting global warming*» (26 %) [32]. The last poll in October 2019 confirmed the trend: for the first-time, environmental concerns ranked first with a 32 % score! [33].

Russian concerns. Although the Russian Federation (RF) is not an official member of the Organisation for Economic Co-operation and Development, Russia participates notably in OCDE bodies, subcommissions and expert activities [34]. Russia shares OCDE goals and most of its positions and, since 2007, has actively participated and sometimes directly ini-

tiated many subject processes. Russia adheres to the World Bank Group's guiding principles in the sphere of health and environmental protection. The issue is urgent not only in terms of environmental improvement but also preservation of human capital possessed by Russia. Thus, the WBG, using The Changing Wealth of Nations (2018) database, gives a characteristic of aggregated wealth that belongs to Russia and highlights that human capital accounts for fully 46 %. The figure is relatively high for a country that is mostly a source of raw materials but it is substantially lower than that of high-income countries (70 %) [35].

There is a notably growth of awareness for environmental health issues (population health losses, additional mortality and morbidity cases) in Russia. The reasons are numerous, notably related to a rather slow decrease of in the cost (up to 6 % of country GDP) of damage caused environmental pollution. Besides the evolution of ecological legislation (which needs a legal approach), the positions of some stakeholders are very informative. Some large Russian companies (Gazprom, Gazprom Neft, Transneft) insure such risks voluntarily but these practices are not widespread (cited per N. Galushkin, the President of the Russian national reinsurance company) [36].

The role of the All-Russian Insurers Society (ARIS) is increasing as the ARIS is promoting legal mechanisms in its 2019–2021 strategic plan. These should substantially raise ecological safety and reduce the number of ecologically dependent mortality and morbidity cases among the country population [37].

In Russia, great attention is paid to examining public opinion on issues related to environmental pollution. In 2019, the Expert analytical center at the HSE Ecology Institute performed a public opinion poll; it revealed that the majority of the RF population (94 %) is preoccupied with environmental issues, and only 1 % think there is no such

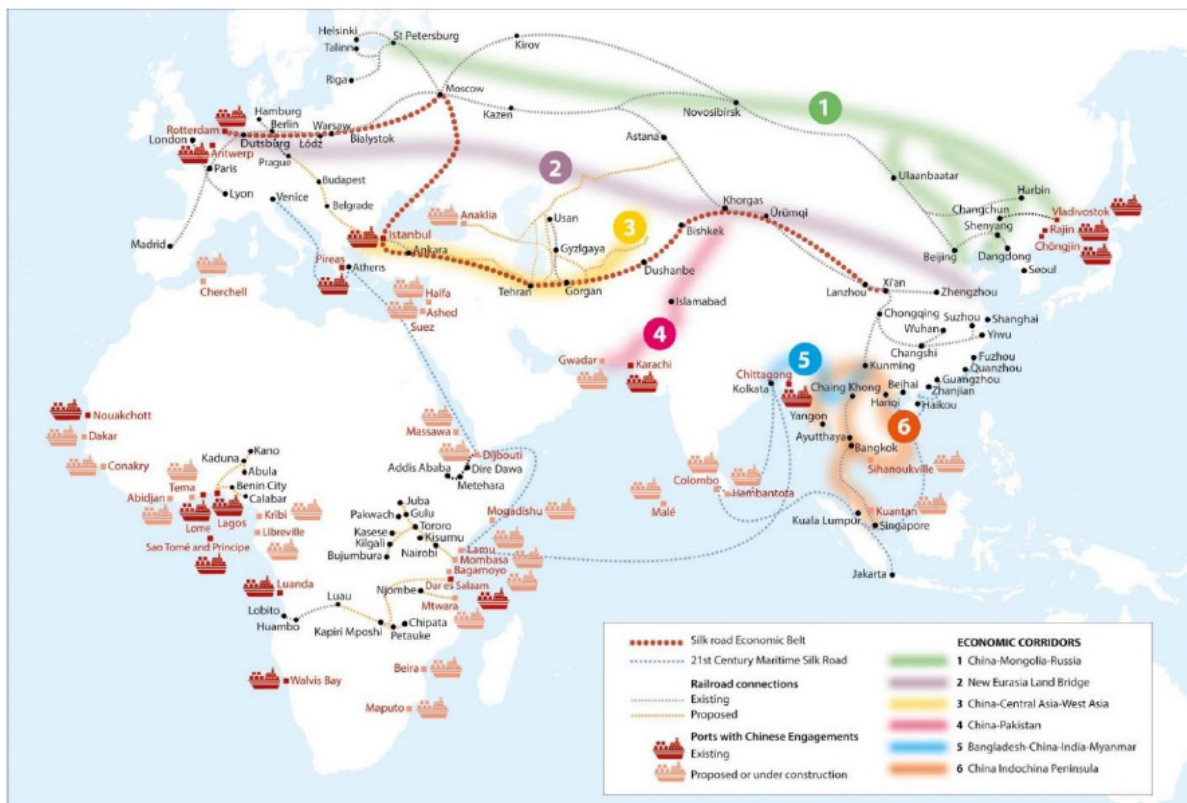
problem; 5 % state that the problem exists but is rather insignificant. According to opinions expressed by Russian respondents, their health is to the maximum extent influenced by polluted air and drinking water [38].

The latest poll performed by the Russian Public Opinion Research Center (RPORC) revealed that 23 % Russians believed ecological situation had improved; 31 % stated otherwise. At present, there are significant discrepancies in results obtained via public opinion polls on environmental issues performed by RPORC, «Public Opinion» fund, and Levada-center; this might result from questions being formulated in different ways, varying research techniques, and different respondents’ samplings [39].

The Belt and Road Initiative (BRI). China’s Belt and Road Initiative (BRI) is one of the most ambitious infrastructure projects ever conceived, originally covering more than

70 countries in Asia, Europe, Africa, Latin America and Oceania, including 65 % of the world's population and 40 % of the global gross domestic product as of 2017. Today, the BRI involves 4.3 billion people in 138 partner nations (Fig.) [40, 41].

The BRI project is two-pronged: the overland Silk Road Economic Belt (six inland trade corridors) and the Maritime Silk Road that together connect China with much of the world [42]. The global development strategy was incorporated into the constitution of the People's Republic of China in 2017. The BRI objective is «to construct a unified large market and make full use of both international and domestic markets, through cultural exchange and integration, to enhance mutual understanding and trust of member nations, ending up in an innovative pattern with capital inflows, talent pool, and technology database» [43]. The initial focus has been infrastructure



Source: OECD research from multiple sources, including: HKTDC, MERICS, Belt and Road Center, Foreign Policy, The Diplomat, Silk Routes, State Council Information Office of the People’s Republic of China, WWF Hong Kong (China).

Figure. China's Belt and Road Initiative in the Global Trade, Investment and Finance Landscape

investment, education, construction materials, railway and highway, automobile, real estate, power grid, and iron and steel [44]. China's colossal infrastructure investments may usher in a new era of trade and growth for economies in Asia, Africa, South America and beyond. According to the BRI initiative, Russia, being a transport and energy base, cooperates with China and other countries in Central Asia as well as with European and African countries.

In May 2018, a BRI-related agreement on trade and economic cooperation was signed between China and countries of the Eurasian Economic Union (EEU), which consists of Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia [45]. In October 2019, Russia and China agreed on more intense BRI cooperation [46].

The colossal BRI initiative is supported in research, engineering and academic exchange by the University Alliance of the Silk Road centered at Xi'an Jiaotong University, which in 2017 held a Global Health International Conference with the Chinese Preventive Medicine Association and the Chinese Society of Global Health. Among the topics discussed was the need for parallel investment in global public health because of the increased people-to-people exchange that would result from the massive increase in international trade planned for the BRI. Others have expanded on the need to strengthen BRI-related global health cooperation, disease control, data sharing for pandemic threats, and disease control and elimination [47]. However, BRI implications for health were absent from a high-level analysis of BRI views from Beijing, Moscow and Washington DC [48]. Obviously, COVID-19 pandemic will have its influence on priorities in cooperation with the BRI, with the major shift in attention focus to reducing population health risks.

Results and discussion. This review of some stakeholders' positions and concerns for environmental risks and Environmental Health issues offers several important insights on the

perception and management of global risks, by selected economic actors, health and trade organizations, and by public opinion. While the subject matter of draws heavily from Europe, we seek to avoid a purely Western-centered approach.

Obviously, global, national and personal economic concerns are the leading issues for the economic and trade actors, as well as for European public opinion which is largely but not exclusively based on their background knowledge and short-term interests. However, European and Russian public opinion have begun to shift greater interest toward environmental concerns, a trend that seems likely to continue as a result of the COVID-19 pandemic.

The distinction between acute global shocks and chronic problems is the major point for the economic world, as underlined by the OECD. The fear is always the same, namely sudden dangers that might compromise economic structure and business activity (which is the core of the Allianz barometer). This awareness of the possibility of economic and financial disasters arising from shutdowns and/or lockdowns has resulted in advice to anticipate, to prepare (OECD, IFC, CRAs) and to mitigate their predictable consequences. Use of financial leverage via credit ratings to mitigate (via insurance) and/or to refuse projects associated with high environmental risks (e.g. an extreme climatic change), reveals increasing awareness of financial risks associated with such «events» in the economic world (CRAs). Predictably, the differences and consequences of acute and chronic risks (long-term) should be questioned in risk assessments. WEF's last report perfectly anticipated the dramatic condition and unpreparedness of many nations that have had to fight the COVID-19 pandemic.

Lessons learned from the COVID-19 pandemic will probably underline the need to place public and environmental health issues high – perhaps number one – on the risk agenda. Predictably, such considerations will

also permeate thinking in regard to health and safety in international trade and people-to-people exchange, a core principle of the Belt and Road Initiative.

The long-term challenges posed by climate change, a preoccupation of many environmental activists, is also a concern addressed by some in the economic world. Private reinsurance companies as well as the WEF have ranked these issues number one. In a 2012 special report, the U.N. Intergovernmental Panel on Climate Change states in the summary for policymakers: *«Economic, including insured, disaster losses associated with weather, climate, and geophysical events are higher in developed countries. Fatality rates and economic losses expressed as a proportion of gross domestic product (GDP) are higher in developing countries (high confidence) (...). Increasing exposure of people and economic assets has been the major cause of long-term increases in economic losses from weather – and climate-related disasters (high confidence). Long-term trends in economic disaster losses adjusted for wealth and population increases have not been attributed to climate change, but a role for climate change has not been excluded (high agreement, medium evidence)»* [49]. With the present COVID-19 pandemic, which has also increased and pointed to global, national and ethnic population inequities, this observation can be extended to all manner of planetary threats.

WHO's hierarchy of concerns, albeit expressed prior to the present pandemic, seems to be based mainly on the mortality rate and attributable mortality of diseases related to air pollution, climate change and infectious and non-communicable diseases other than COVID-19. Presently, the mortality rate associated with diseases linked to or exacerbated by ambient air pollution is higher than the mortality rate associated with climate change. The WHO, which greatly impacts public health policies, has pointed to the importance of chronic diseases versus communicable dis-

eases, the colossal impact of which is evidenced by the COVID-19 pandemic, may be dramatic not only on health and mortality but also on the global economy. This tremendous gap in the perceived risk of chronic versus acute viral and other health conditions should be questioned. Managing pandemics, chronic or acute, needs to embrace economic and political cooperation. Food safety, plant health and biodiversity are addressed by several cooperating agencies, but WTO planning for health, hospital and social services appears to have stalled.

If we adopt a holistic overview, we must note that stakeholders with global reach and impact have never considered Environmental Health as the key issue for worldwide development and economic security. Although most of the stakeholders are aware of some health-impacting environmental factors, including the prospect and now the reality of a pandemic, they have not considered the possibility and benefit of engaging with and learning from Environmental Health and Medicine. Given that taxpayers underwrite research advances in the form of vast numbers of projects relevant to planetary health, the world of biomedical and ecological science often seems far removed from the risk perceptions of government bodies, private enterprises specializing in risk assessment, and the public. Global cooperation across these sectors can bring a more realistic, science-based understanding of environmental risks for the human condition and its enterprise. Investments in health, as well as physical infrastructure, are critical components for BRI and other countries because the prevention and control of disease will lift all boats, including personal and population well-being, whether measured in health or economic terms.

This article was never designed to be an exhaustive review and therefore has several limitations. The selection of stakeholders is arbitrary and did not consider different types of governance. We have ignored several UN

dedicated agencies (e.g. the United Nations Environment Programme, UNEP, the Food and Agriculture Organization) as well as the European Union, the BRICS and SCO summits and the Association of Southeast Asian Nations (ASEAN). We have not addressed the role of numerous lobby groups, notably those from agricultural and industrial areas. The views expressed here are those of environmental scientists who function outside financial and economic sectors. Our goals were neither to examine legal and political issues nor to compare these aspects between countries. Our hope is that this approach will favor cooperative, multidisciplinary research and action that traverses biomedicine and economics.

Conclusions. The major concern of the environmental health community is maintenance human health and wellness with heavy dependence on the Precautionary Principle as defined above. Anticipation, prevention and preparedness are mandatory as growing risks and threats in increasingly urbanized countries with greatly centralized life support systems. The collective vulnerability of societies to social and economic consequences is also typical for conditions associated with exposure to environmental risk factors that create long-term and frequently low-level impacts.

Global risks can no longer be addressed with the usual «in-the-box» compartmentalized approach. Inter-professional and interdisciplinary cooperation are mandatory, as practiced in Environmental Health and Medicine. A long-term perspective is of great impor-

tance, with critical risk assessments applied to chronic health issues as well sudden, acute threats. Fifteen years ago, we were warned: «*Time is running out to prepare for the next pandemic. We must act now with decisiveness and purpose. Someday, after the next pandemic has come and gone, a commission... will be charged with determining how well government, business, and public health leaders prepared the world for the catastrophe when they had clear warnings. What will be the verdict?*» [50, 51]. Hopefully, lessons learned during the COVID-19 pandemic provoke salutary changes. Let's imagine a brighter future in which Environmental Health is a priority concern among stakeholders worldwide. Perhaps a positive trend can be seen in OECD's latest report where the body calls for global cooperation to develop and distribute a SARS-CoV-2 vaccine, strengthening of health care systems and public health and prevention strategies to contain viral spread [52].

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