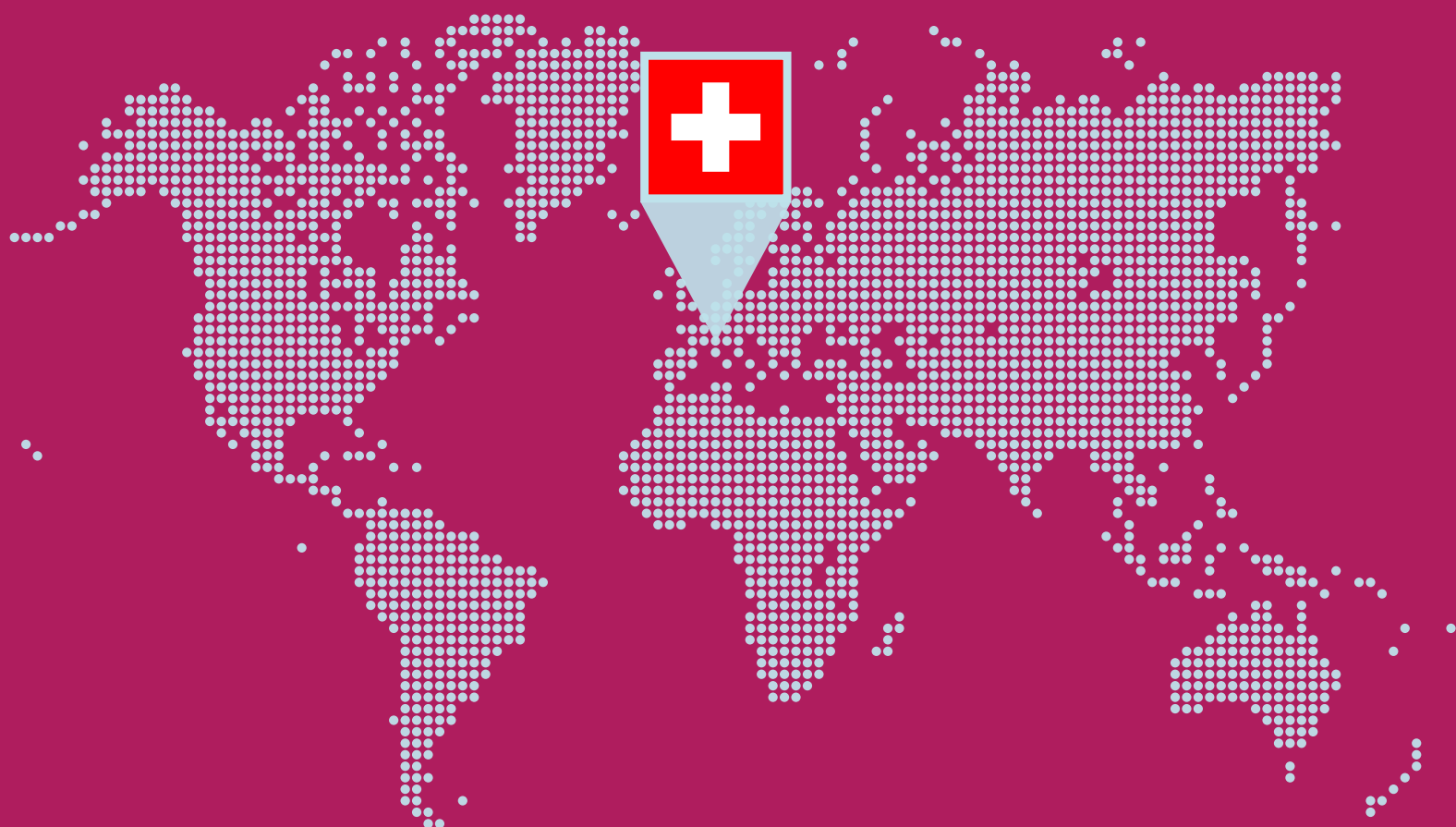


2022

Policy brief

CATALYSING ONE HEALTH WITH **SWISS** DIPLOMACY

Three recommendations for leveraging Switzerland's science and diplomacy to prevent, prepare, and respond to future pandemics



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FOREWORD



Marcel Tanner

*President, Swiss
Academies of Arts
and Sciences*

It is my great pleasure and privilege to endorse this important policy brief.

The SARS-CoV-2/COVID-19 pandemic has made it clear that the systemic and trans-disciplinary One Health approach is crucial. It ensures that people and animals are and remain healthy in any socio-ecological setting and contributes to the well-being of a society in the long term.

This policy brief builds on the recent experience of the pandemic and two decades of experience with scientific developments, validation and application of One Health in different social, cultural, and ecological settings in all parts of our world. Switzerland, with its scientists and their networks of international partners – particularly in low- and middle-income countries – played a key role in these impactful developments.

This policy brief presents three interrelated recommendations with 13 action points for Switzerland. Their implementation would promote the One Health approach and strengthen epidemic and pandemic surveillance, preparedness, and adequate public health responses within our path towards reaching the Sustainable Development Goals.

It becomes imperative that Switzerland coherently places and promotes One Health for more effective epidemic and pandemic prevention, preparedness and response. This development must happen both at the scientific and policy levels. The One Health approach should become a cross-cutting issue in Switzerland's international cooperation, diplomacy and policy, especially considering the growing risk of new pandemics. Building upon the Swiss tradition of science diplomacy and science-policy engagement, the International Geneva ecosystem will further grow as a centre of gravity for global health and well-being. Importantly, the third recommendation of this policy brief will surely stimulate basic research, research and development, as well as sound implementation science to accelerate evidence generation to forecast, mitigate, and control emerging and reemerging diseases and broader health problems.

With my strong and unconditional support, I wish this most timely policy brief the best reception and effective implementation at all levels.



BEYOND COVID-19: SCIENCE ADVICE TO CATALYSE ONE HEALTH

This policy brief was commissioned by the Swiss Federal Department of Foreign Affairs (FDFA). It articulates three recommendations to leverage Swiss scientific expertise and diplomatic instruments for strengthening international efforts to prevent, prepare for, and respond to future epidemics and pandemics¹ – with a focus on diseases of animal origin. The brief builds upon Switzerland's commitment to leveraging science and diplomacy to design evidence-based solutions to global challenges.²

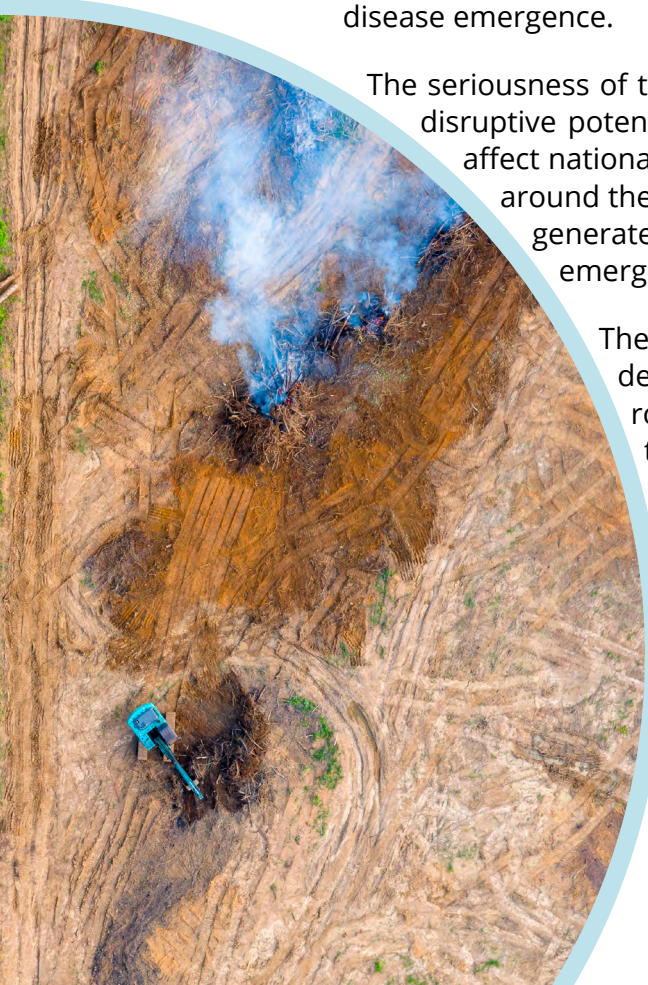
With over 6 million reported deaths and considerable impacts on social and economic systems worldwide³ (as of June 2022), COVID-19 has demonstrated the severe effect of a pandemic in our globalised and highly interconnected world. It is essential to learn from this pandemic to better prevent and prepare for future ones.

The number of new human infectious diseases – most of them of animal origin (zoonoses) – with the potential to cause large epidemics and pandemics has increased about four-fold globally over the past 50 years.⁴

Rapid environmental transformations (e.g., land-use changes related to agriculture intensification) exacerbate the risk for new outbreaks in vast tropical and subtropical regions, referred to as emerging infectious disease hotspots.⁵ In Southeast Asia, human–bat contact could lead to about 400,000 coronavirus spill-over events annually.⁶ Hence, national policy planning must anticipate and integrate this risk of disease emergence.

The seriousness of this risk lies in its high likelihood, significant deadliness, and disruptive potential for health and socio-economic systems, which can also affect national and international security (e.g., the rise of political violence around the world during the COVID-19 pandemic).⁷ Epidemics can both generate tensions and conflicts between populations and nations, or emerge as a result of conflicts.

The origins, spreading mechanisms, and consequences of epidemics and pandemics lie at the intersection between environmental, human, and animal systems. Therefore, effective governance requires an approach that accounts for the systemic nature of epidemics and pandemics. Traditional public health and medicine are not sufficient.⁸ Health is an outcome, not just a sector.



One Health addresses the risk of emerging diseases and accounts for the complex factors that amplify them. The COVID-19 pandemic led to the popularisation of One Health via the press and other channels and its growing recognition in national and international political spheres (e.g., G7 Summit).⁹

In November 2020, the Food and Agriculture Organization (FAO), the World Organization for Animal Health (WOAH), the United Nations Environment Programme (UNEP), and the World Health Organization (WHO), with the support of France and Germany, constituted the One Health High-Level Expert Panel (OHHLEP) – a multidisciplinary and international group of experts. The OHHLEP proposed a new and comprehensive definition of One Health to facilitate the communication, use, and application of the concept across disciplines, sectors, countries, and regions of the world:¹⁰



One Health is an integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals, and ecosystems.

It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.

The approach mobilises multiple sectors, disciplines, and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems while addressing the collective need for clean water, energy, and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.



However, there is no direct reference to One Health in any of the existing international pandemic-related treaties and regulations (e.g., Sendai Framework for Disaster Risk Reduction, Convention on Biological Diversity (CBD), Agreement on Sanitary and Phytosanitary (SPS) Measures).¹¹

Despite recent and growing efforts to strengthen International Health Regulations (IHR) using One Health,¹² integrating IHR and the WOAH's Performance of Veterinary Services (PVS) Pathway for improved collaborations between the human and animal sectors,¹³ and supporting countries in implementing integrated One Health approaches to address zoonotic endemic diseases,¹⁴ there is still significant progress to be made to harness the full potential of One Health.

The development of a new and historic international pandemic instrument, backed by the World Health Assembly (WHA) in December 2021,¹⁵ opens a window to strengthen existing and develop new policy instruments and perspectives to prevent, prepare, and/or respond to epidemics and pandemics using One Health.¹⁶

Switzerland has an essential role to play in strengthening the One Health approach to improve governance of international epidemics and pandemics:

SCIENCE

Switzerland is a global leader in One Health, transdisciplinary research, and education.¹⁷ Since the beginning of the COVID-19 pandemic in December 2019, Switzerland has produced the highest amount of relevant publications per capita and has built strong international scientific collaborations (Table 1 and Map 1).



DIPLOMACY

Switzerland hosts two-thirds of the United Nations in Geneva, including the headquarters of the WHO, among other key players in One Health, the permanent missions of >170 nations states and >400 Non-Governmental Organisations (NGOs). The Swiss Agency for Development and Cooperation (SDC) has an active role in strengthening the health systems of Low- and Middle-Income Countries (LMICs) with a multisectoral approach.

Signed by over **30 experts**, this policy brief supports Switzerland's role along these scientific and diplomatic axes with **3 key recommendations** and **13 actions** to catalyse One Health and improve epidemic and pandemic prevention, preparedness, and response. Quantitative and qualitative analyses of international and Swiss research on One Health support the following recommendations. The policy brief concludes with a description of the methodology.

Three recommendations for Switzerland to catalyse One Health and improve epidemic and pandemic prevention, preparedness, and response

1

Prioritise and increase Switzerland's commitment to ongoing **diplomatic efforts** related to epidemic and pandemic prevention, preparedness, and response using One Health

5 action points

2

Align Swiss **international cooperation** strategies with epidemic and pandemic risk, prevention and preparedness capacity and One Health needs

3 action points

3

Support policy-relevant One Health **research** in Switzerland and countries at risk of infectious disease emergence

5 action points

RECOMMENDATION

1

*Prioritise and increase Switzerland's commitment to ongoing **diplomatic efforts** related to epidemic and pandemic prevention, preparedness, and response using One Health*



Switzerland should increase its commitment to One Health and the application of this approach to diplomatic efforts to prevent and tackle epidemics and pandemics – an approach in line with Switzerland's facilitation role in multilateral settings.

National health systems and the global health security system primarily react to the threat of infectious diseases with epidemic and pandemic potential. They tend to concentrate on crisis response and management.

As seen with the Ebola epidemic in West Africa in 2014-2015 and the COVID-19 pandemic, the governance and coordination of the international response are challenging. The response is slow and insufficiently coordinated across fields of expertise, sectors and countries. The diversity of stakeholders involved, limited financial and human resource capacities within the WHO, and the political tensions which are often exacerbated during crises, are critical bottlenecks.¹⁸

More efforts are needed to tackle the root causes of the emergence of new zoonotic diseases (e.g., degradation and loss of animal habitats due to agricultural intensification and deforestation) and to prevent pathogens from spilling over from animals to humans in the first place.^{19,20}

While there is evidence for the financial and ethical benefits of prevention,²¹ implementing preventive policies prior to the manifestation of threats remains challenging. Predictive models of disease emergence and transmission often neglect the influence of social processes during the onset and evolution of epidemics.²² Civil society, and communities at the frontline of new infectious disease emergence and affected by endemic zoonoses are often relegated to observer status, rather than active participants in science and the implementation of actions (e.g., surveillance).²³ Political attention is scarce and tends to increase when problems – such as epidemics and pandemics – become salient enough through media coverage, for instance.²⁴

To make progress, we need to improve communication, collaboration, coordination, and capacity across and between human, animal and environmental sectors and disciplines, and with the civil society.

One Health is the most suitable approach to addressing many of the recurring systemic problems in epidemic and pandemic prevention, preparedness, and response.

One Health will presumably be at the core of the negotiations around the international pandemic instrument²⁵ coordinated by the World Health Organization. Diplomats can play a critical role in these negotiations by facilitating communication both between countries and across sectors using the One Health approach. Diplomats should have a good understanding of what One Health is, the main challenges that hamper One Health operationalisation from the international to national and local levels and who the relevant stakeholders across the sectors are. Diplomats should be aware of their national One Health strategy and strengths (e.g., national expertise and capacities) and how their country can play a role in the development and implementation of the pandemic instrument. Specific One Health training activities (e.g., information sessions, courses, workshops) may be required to engage and empower diplomats and other government representatives.²⁶

Switzerland can build on its “One Health” Sub-Body²⁷ and the lessons learned from developing and implementing its national Strategy for Antibiotic Resistance (StAR).²⁸ This strategy follows the cross-sectoral One Health approach and brings together the Federal Offices for Health (FOPH), Food Safety and Veterinary Affairs (FSVO), Agriculture (FOAG) and the Environment (FOEN).

It is essential that Switzerland contributes, by profiting of FDFA’s large external network, to these diplomatic efforts in a way that builds upon and further enhances One Health. As one of the hubs for One Health research (Table 1), Switzerland can provide expertise and strengthen international collaboration to prevent and tackle epidemics, pandemics and other global health threats. Moreover, One Health is in line with Switzerland’s position as a promoter of multilateralism; One Health requires a strong focus on coordination, facilitation of dialogue, and collaboration, which are recognised areas of Swiss expertise. Additionally, promoting One Health will also promote sustainable development and strengthen national health security in line with the strategic objectives of Swiss Health Foreign Policy.²⁹

Absolute number of publications		Number of publications per 100 mio inhabitants			
1	USA	552	1 Switzerland	1289	
2	UK	369	2 Norway	780	
3	Italy	186	3 Denmark	780	
4	France	174	4 Portugal	731	
5	Australia	168	5 Australia	651	
6	Brazil	162	6 Belgium	628	
7	Germany	141	7 UK	554	
8	China	139	8 Sweden	526	
9	Spain	132	9 Netherlands	485	
10	India	121	10 Singapore	477	
11	Switzerland	109	12 Italy	298	
14	Netherlands	84	13 Spain	279	
15	Portugal	75	15 France	256	
16	Belgium	74	18 Germany	176	
17	Sweden	54	19 USA	165	
22	Denmark	46	27 Brazil	76	
23	Norway	43	41 China	10	
33	Singapore	28	42 India	9	
Average		80	Average		248

Table 1: Switzerland is the country that has published the highest number of publications on One Health per capita during the COVID-19 pandemic. One Health publications in 2020 and 2021 in the 10 most productive countries (mio: million). Limited to countries that have published more than 20 papers. Publications were retrieved from the bibliographic database Web of Sciences. Publications from England, Scotland, Wales and Northern Ireland were grouped into the United Kingdom (UK).

ACTION POINTS

to prioritise and increase Switzerland's commitment to ongoing diplomatic efforts related to epidemic and pandemic prevention, preparedness, and response using One Health

1

Support and facilitate an inclusive multilateral and cross-sectoral dialogue in Geneva for the development of the international pandemic instrument that builds on One Health and recognises existing international agreements and treaties and all relevant stakeholders in the human, animal, and environment sectors.

2

Provide One Health training to diplomats and other relevant government representatives involved in international and cross-sectoral negotiations.

3

Support the Quadripartite Alliance (FAO, WOA, UNEP, and WHO) in the implementation of the One Health Joint Plan of Action.

4

Promote Swiss representation in international expert groups and contribute Swiss expertise to scientific and policy-oriented initiatives (e.g., Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)). Support the needs assessment and potential development of an intergovernmental panel on pandemic risk.

5

Establish a permanent interdisciplinary and cross-sectoral Swiss One Health roster of experts or advisory council – also involving civil society representation – to provide agile technical support to the Swiss government, its partner countries, and other stakeholders based in Switzerland (e.g., NGOs and international organisations).

RECOMMENDATION 2

Align Swiss **international cooperation** strategies with epidemic and pandemic risk, prevention and preparedness capacity and One Health needs



Switzerland should prioritise its development and cooperation strategies considering research and capacity needs in emerging infectious disease hotspot countries.

Building local One Health capacity and epidemic preparedness in emerging infectious disease hotspot countries is ultimately a way to improve protection against epidemics and pandemics for the Swiss and global populations – which is at the centre of the Swiss Health Foreign Policy.³⁰

If we project the Swiss One Health research activity and associated networks during the COVID-19 pandemic onto a map, we observe that Switzerland is highly productive and globally connected. Swiss One Health research includes collaborations with multiple countries located in territories identified as hotspots for emerging zoonotic diseases, which could be geographic origins of epidemics or pandemics (Map 1).

These hotspots include countries in West, Central, and East Africa, South East Asia, and large countries like the People’s Republic of China and India, among others.³¹ These countries and regions are either geographic priorities of the current Swiss foreign policy strategy or of the international cooperation strategy. However, epidemic prevention, preparedness, and response and One Health are not explicitly recognised in the Swiss International Cooperation strategy.



Map 1: Network of international collaborations in Swiss One Health research based on publications indexed in Web of Science in 2020 and 2021, for which the expression “One Health”, referring to the approach, appeared in the title, abstract, or keywords and co-authored by at least one author affiliated with an institution in Switzerland (109 papers). The size of nodes represents the number of joint publications.

Epidemics exacerbate poverty, as well as socio-cultural and political tensions in and between countries and can result in humanitarian crises (e.g., Ebola crisis in West Africa in 2014-2015, cholera epidemic in Yemen in 2016).³² At the same time, humanitarian crises can favour the emergence and/or spread of infectious disease outbreaks and epidemics (e.g., crowded populations with poor hygiene conditions, close interaction with domestic and wild animals). Many of the countries on Map 1, particularly those in sub-Saharan Africa, are low-income and politically unstable and/or affected by ongoing humanitarian crises (e.g., Burkina Faso, Chad, Democratic Republic of the Congo, Ethiopia, Kenya, Mali).

Considering the Swiss tradition and expertise in humanitarian action, with Geneva and Switzerland hosting the United Nations High Commissariat for Refugees (UNHCR), the International Committee of the Red Cross (ICRC), Doctors Without Borders (MSF), Vétérinaires Sans Frontières (VSF), among other major humanitarian players, Switzerland should integrate One Health and epidemic prevention, preparedness, and response as part of its humanitarian and development cooperation strategies. This choice aligns with the current strategy of the SDC on health, which, among other objectives, aims to strengthen health systems in LMICs and use the One Health approach to address determinants of health effectively.³³

Switzerland should leverage and reinforce the SDC's digitalisation strategy to facilitate data access and sharing, and help other countries develop their information technology systems to support effective health and other information management and international reporting obligations. Additionally, Switzerland has developed robust systems at local and national levels, such as for animal husbandry and biosecurity, wildlife health management, and natural resources (e.g. water) management, which can serve as a model for other countries or help provide technical assistance.

Hotspot countries are producing a lot of high-quality research, but there are often barriers to knowing what new research is emerging (e.g., due to lack of communication across sectors, research is unpublished or appears in grey literature, or robust systems for sharing information electronically are lacking). Supporting the compilation, dissemination, and amplification of priority country research would be a unique and timely contribution to supporting country-led One Health efforts.

At the same time, Switzerland can facilitate One Health education and capacity-building in emerging infectious disease hotspot countries and countries where zoonoses (e.g., rabies) are endemic. The University of Geneva (UNIGE) and the University of Basel developed the first Massive Open Online Courses (MOOC) on One Health. For example, the MOOC from UNIGE has over 11,000 registered students from across the world.³⁴ These online courses have given learners based in LMICs like Kenya or Nepal the opportunity to take part in more advanced training activities on One Health in Geneva and Basel.³⁵ Switzerland has also provided world-class (post-)graduate opportunities to scientists and practitioners involved in One Health initiatives in several low-income countries in Africa – an approach that could be further scaled and disseminated.



ACTION POINTS

to align Swiss international cooperation strategies with epidemic and pandemic risk, prevention and preparedness capacity, and One Health needs

6

Integrate infectious disease emergence risk and level of national epidemic and pandemic prevention and preparedness as criteria to prioritise which countries Switzerland cooperates internationally with.

7

Establish a dialogue between countries, the Swiss Agency for Development and Cooperation (SDC), and the Swiss One Health scientific community, that helps identify the most relevant problems and research needs to foster solution-oriented research for development, and connect relevant actors in the field with each other, including early career researchers. The Swiss development and cooperation strategy should not duplicate existing efforts at the country level but align and build on ongoing initiatives and national priorities that promote local ownership and sustainability.

8

Reinforce and develop academic, scientific and political relationships with countries threatened by emerging and endemic zoonoses, providing Swiss technical expertise and supporting education and capacity building in One Health to produce high-quality, basic and applied solution-oriented local research.

RECOMMENDATION **3**

*Support policy-relevant One Health **research** in Switzerland and countries at risk of infectious disease emergence*



Switzerland should reinforce and further develop its scientific expertise on One Health via basic, applied and operational research and increase collaboration between the science and policy communities, both in Switzerland and in countries at risk of infectious disease emergence.

Based on an analysis of projects focused on diseases of pandemic potential funded by the Swiss National Science Foundation (SNSF) in 2020 and 2021 (until Sept. 27) as well as a global scoping literature review, we found a strong bias in both Swiss and international research. Indeed, most projects funded by SNSF in 2020 and 2021 responded to a rapid call for COVID-19 research, focused on human health, and were in the fields of biological and medical sciences (Figure 1). Social sciences, which are central to transdisciplinary approaches to health such as One Health,³⁶ were poorly represented, being cited as a field of study in only 23 out of 125 projects analysed.

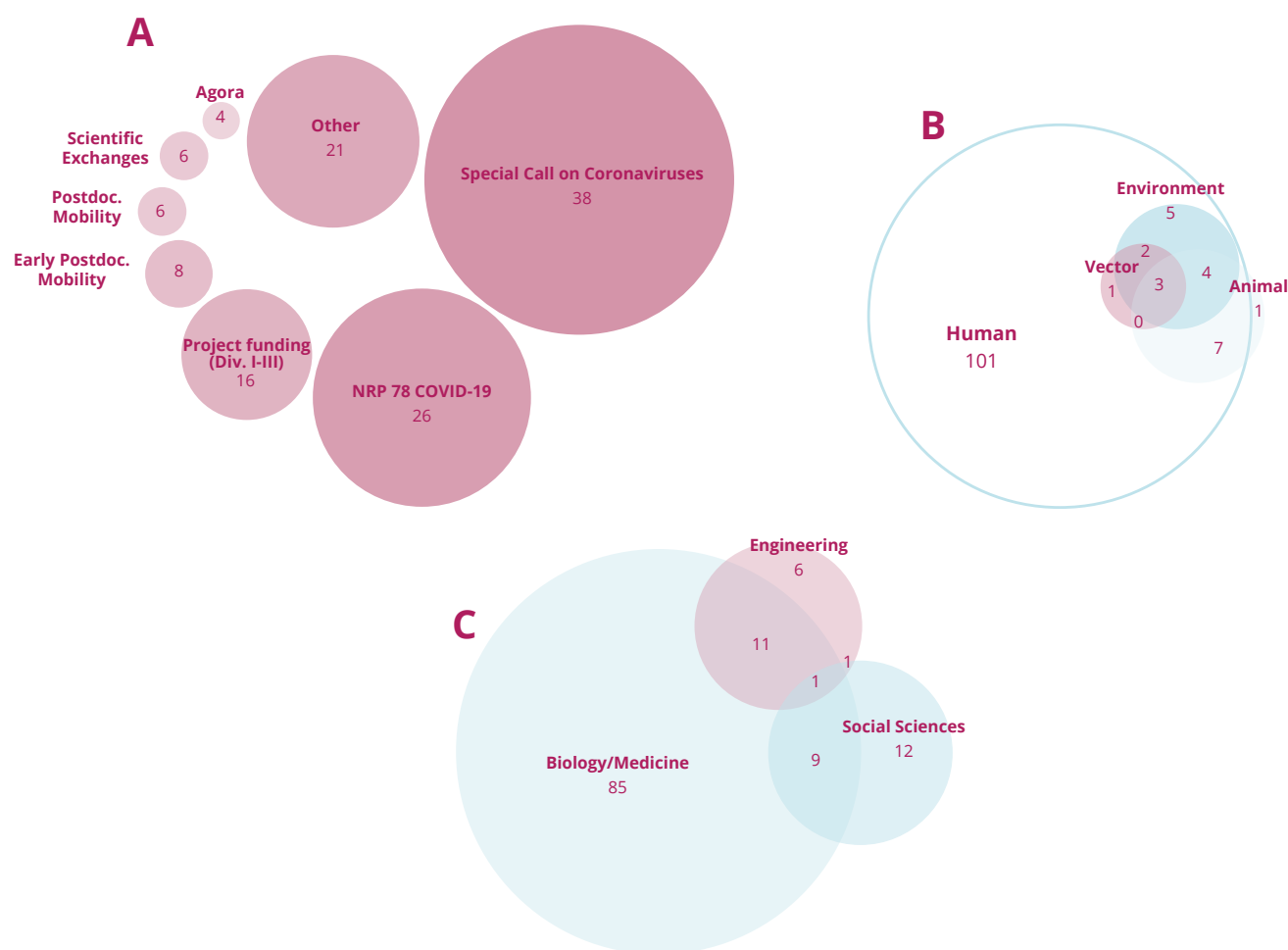


Figure 1. Distribution of SNSF projects on diseases of pandemic potential by (A) funding instrument, (B) health sector (i.e. human, animal, and environmental health), and (C) scientific disciplines.

From a geographical perspective, 41 out of 125 projects involved collaborations between Swiss researchers and institutions and international partners. Regarding the geographic area of the study site, 28 out of 125 projects were international, with only 6 focusing on LMICs, highlighting a severe geographic bias of the research on diseases of pandemic potential funded by SNSF (Figure 2).

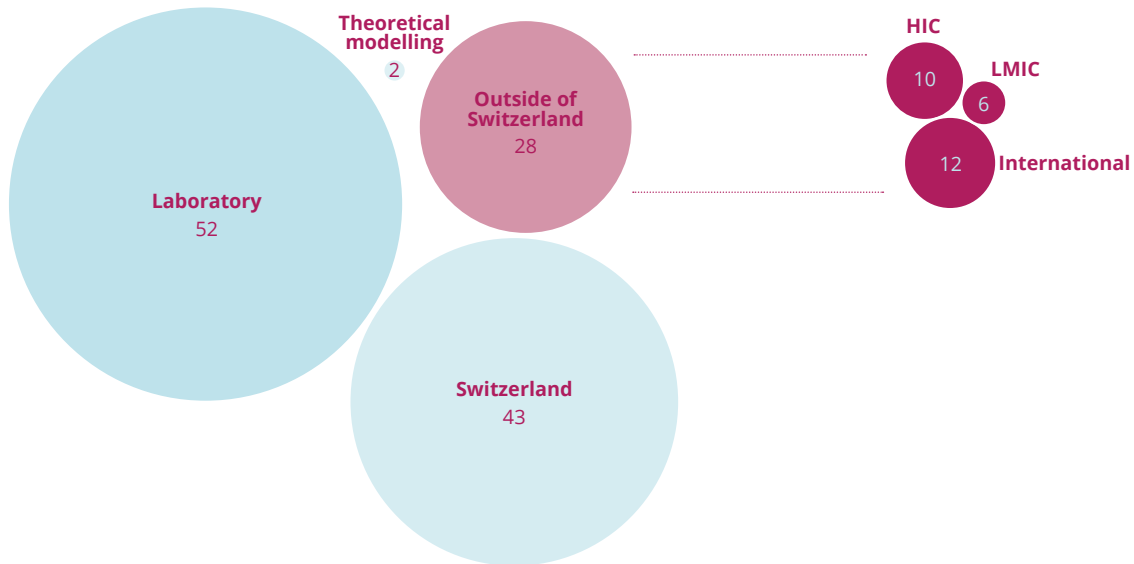


Figure 2. Distribution of SNSF projects on diseases of pandemic potential by geographic area of the study site

With such a partial funding and research landscape in Switzerland, and considering the complexity of preventing and tackling emerging zoonoses, a broader transdisciplinary funding framework is needed to support Swiss researchers and international partners, particularly those in emerging infectious disease hotspots (as suggested in Recommendation 2).

In January 2022, the SNSF and SDC launched a new research programme called “Solution Oriented Research for Development” (SOR4D) with a budget of ~19 million Swiss Francs to fund approximately 28 projects running from 2022 to 2026³⁷. This call could offer a timely opportunity to fund large transdisciplinary and international projects, including collaborations between academia, development actors in the field and governments in LMICs, to improve epidemic prevention, preparedness and response using One Health.

Yet, the call is not focused specifically on zoonoses, epidemic prevention and response with emerging infectious disease hotspot countries. More specific calls on these issues, as seen in the Horizon Europe Framework Programme (e.g., calls “Pandemic preparedness”, “Ecology of infectious animal diseases”, and “One Health approach for Food Nutrition Security and Sustainable Agriculture”), are needed to improve the Swiss emerging infectious disease and One Health scientific landscape in the coming years.

Swiss research and innovation have always been very international. Two-thirds of Swiss scientific publications result from international collaboration.³⁸ Swiss universities and federal institutes of technology are regularly ranked as some of the top institutions in the world for research and innovation.

The goal of Switzerland's International Strategy on Education, Research and Innovation³⁹ is to preserve this Swiss leadership position. International research cooperation is a cornerstone of Switzerland's policy to promote research and innovation. International cooperation is essential for problems such as pandemic prevention and response that have to be tackled on a global scale and where an exchange of knowledge and data with foreign actors is needed.

The increasing number of emerging and re-emerging epidemics of animal origin will trigger research interest and effort on pandemic prevention, preparedness, and response using One Health. Research projects and programmes in this field will probably explode globally. Strong cooperation with countries at risk of infectious disease emergence will give Switzerland an advantage when it comes to international funding opportunities for collaborative research and participation in international programmes and ultimately help Switzerland keep its position as a global leader in One Health research.





ACTION POINTS

to support policy-relevant One Health research in Switzerland and countries at risk of infectious disease emergence

9

Map One Health research actors (e.g., researchers, institutions, bodies) in a set of priority countries and regions that constitute emerging infectious disease hotspot countries and support the compilation, national and international dissemination, and amplification of locally produced quality research.

10

Promote the use and operationalisation of existing research and evidence, leverage successful applications of One Health, and support the implementation of sustainable actions and processes in Switzerland and emerging infectious disease hotspot countries.

11

Promote policy-relevant research and innovative science-policy interfaces, mechanisms and tools that facilitate and accelerate the uptake of scientific results and their translation into recommendations for policies and actions, particularly during epidemic and pandemic crises. Strengthen the evaluation of One Health interventions and policies, homing in on the benchmarks for One Health systems and measurements (e.g., Network for Evaluation of One Health (NEOH)).

12

Promote and support transdisciplinary research that engages local communities and that can be translated into practical and scalable applications of One Health with measurable impact on human-animal-environmental health at local, national and regional levels. This will also help promote a better understanding of the nature and effectiveness of the governance of One Health at national, regional and international levels.

13

Promote research on epidemic and pandemic prevention and early detection of infectious diseases in animals and humans, as well as on the origins and determinants of emerging zoonoses (e.g., ecological, environmental, socio-economic, cultural, gender, equity and human rights), and connect relevant actors in the field with each other, including early career researchers.

BEYOND EMERGING EPIDEMICS AND PANDEMICS

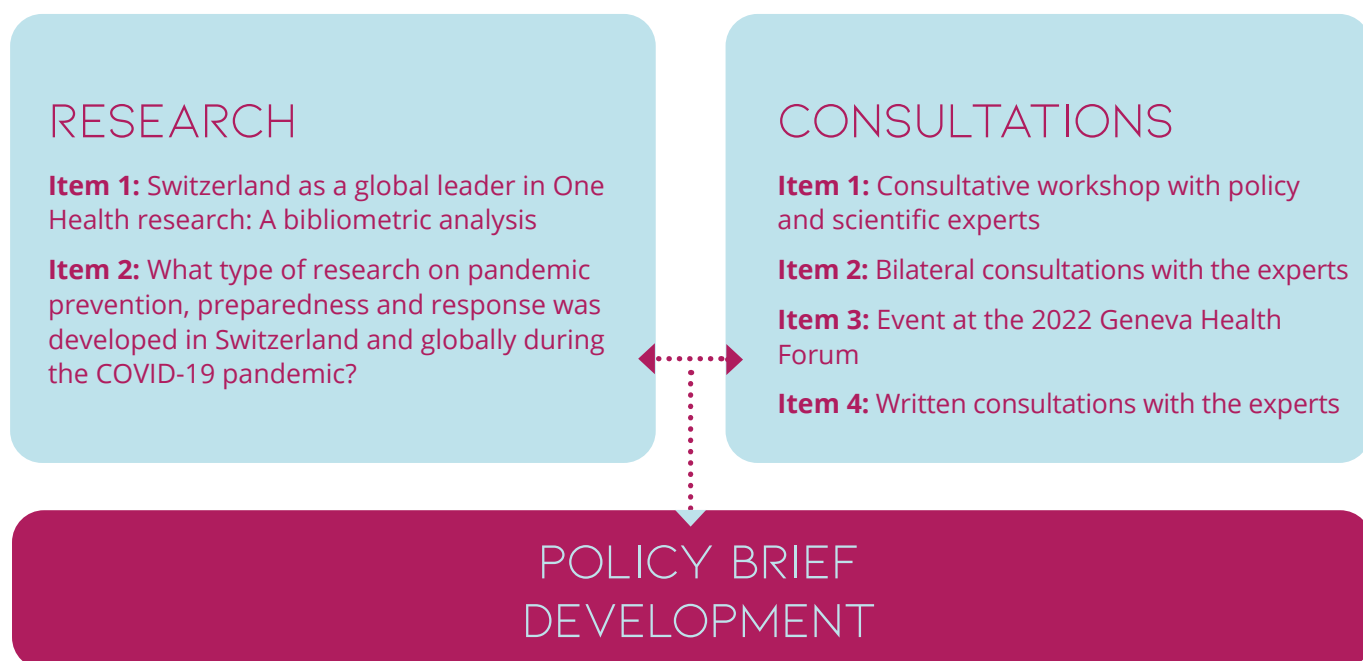
This policy brief and the research associated with it were developed in the context of the COVID-19 pandemic and focus primarily on the prevention, preparedness and response to emerging zoonoses and potential epidemics and pandemics. This work responds to a specific interest of the FDFA.

However, One Health and some of the recommendations and actions of this policy brief also apply to other endemic and emerging public and global health issues at the interface of humans, animals and their environment. These issues include other infectious diseases, such as neglected zoonotic tropical diseases (e.g. rabies) or diseases caused by drug-resistant pathogens (e.g. antimicrobial resistance), but also non-infectious issues like human-wildlife conflicts (e.g. snakebite envenoming), nutrition and health, and food security – among many others.

This policy brief promotes the systemic perspective inherent to One Health and should evolve with the environmental crisis and the rapidly changing global health landscape. New recommendations and actions, or even specific companion documents covering other issues not explicitly mentioned in this version of the policy brief, could certainly complement this work in the future.



METHODS



Switzerland as a global leader in One Health research: A bibliometric analysis

A bibliometric analysis is a quantitative analysis of academic literature in a certain domain based on quantitative indicators such as its evolution over time, most prolific institutions, countries, or authors. On June 5, 2022, we searched Web of Science, one of the largest multidisciplinary bibliographic databases, for articles on One Health published in 2020 and 2021. We used the VosViewer software to construct and visualise the collaboration networks among authors, institutions, and countries.

What type of research on pandemic prevention, preparedness and response was developed in Switzerland and globally during the COVID-19 pandemic?

We used a dual methodological approach combining an analysis of the SNSF projects and a scoping review of the scientific literature to identify international and Swiss research on pandemic prevention, preparedness, and response. We searched the SNSF open access data portal, P3, using keywords related to pandemics, spill-over, and infectious diseases and selected and analysed 125 SNSF funded projects which started between January 2020 and September 2021. For the scoping review, we searched three databases (Web of Science, Google Scholar and PubMed) and identified 90 relevant articles published from December 2019 to August 2021.

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ABBREVIATIONS

CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species
ETH Zurich	Swiss Federal Institute of Technology
FAO	Food and Agriculture Organization of the United Nations
FDFA	Swiss Federal Department of Foreign Affairs
FDHA	Federal Department of Home Affairs
FOAG	Federal Office for Agriculture
FOEN	Federal Office for the Environment
FOPH	Federal Office of Public Health
FSVO	Federal Food Safety and Veterinary Office
HUG	University Hospitals of Geneva
ICRC	International Committee of the Red Cross
IHR	International Health Regulations
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
LMICs	Low- and Middle-Income Countries
MOOC	Massive Open Online Course
MSF	Médecins Sans Frontières
NEOH	Network for Evaluation of One Health
NGO	Non-Governmental Organization
OHHLEP	One Health High-Level Expert Panel
OIE	World Organization for Animal Health
PVS	Performance of Veterinary Services
R4D-Program	Swiss Programme for Research on Global Issues for Development
SDC	Swiss Agency for Development and Cooperation
SNSF	Swiss National Science Foundation
SOR4D programme	Solution-oriented Research for Development Programme
SPS	Sanitary and Phytosanitary Measures Agreement
StAR	Swiss Strategy on Antibiotic Resistance
Swiss TPH	Swiss Tropical and Public Health Institute
td-net	Network for Transdisciplinary Research
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
UNIGE	University of Geneva
Vetsuisse Faculty	Faculty of Veterinary Medicine at the University of Zurich and Bern
VSF	Vétérinaires Sans Frontières
WHA	World Health Assembly
WHO	World Health Organization

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