ON THE CULTURAL AUTHORITY OF SCIENCE IN PANDEMIC TIMES AND THE CULTURAL POST-NORMALITY OF MEXICO

LA AUTORIDAD CULTURAL DE LA CIENCIA EN TIEMPOS PANDÉMICOS Y LA POSTNORMALIDAD CULTURAL EN MÉXICO

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RESUMEN: Las últimas encuestas nacionales en México han mostrado una confianza social creciente en creencias y prácticas pseudocientíficas, así como una percepción pública desfavorable sobre la visibilidad social de los científicos. La situación post-normal generada en la pandemia por COVID-19 se presenta como un escenario propicio para poner a prueba la importancia que los ciudadanos otorgan, de hecho, a la ciencia y sus profesionales en tiempos de crisis. Este artículo ofrece los resultados sobre comprensión pública de la COVID-19 y percepción social sobre el papel de la ciencia en la lucha contra la pandemia obtenidos de dos encuestas realizadas, en 2020, a dos grupos poblacionales de México: población rural, mayoritariamente indígena, y población urbana. Se comparan estos datos con los de otros estudios nacionales sobre comprensión pública de la ciencia (PUS en sus siglas en inglés) prepandémicos haciendo uso de los indicadores Progreso, Reticencias, Conocimiento y Compromiso (PREK en sus siglas en inglés), propuestos recientemente por Martin Bauer y colaboradores para valorar la llamada autoridad cultural de la ciencia. Nuestra investigación muestra la confianza y legitimidad sociales otorgadas, en general, a la ciencia en esta situación socio-sanitaria post-normal. Finalmente, a la luz de ciertos resultados, defendemos que las disparidades culturales propias de México se desvelan significativas a la hora de considerar el aprovechar tal prestigio social en el logro de un incremento de la apropiación social de cultura científica en México en general, es decir, más allá de contextos post-normales concretos.

PALABRAS CLAVE: Postnormalidad, comprensión pública de la ciencia, diversidad cultural, desigualdad pandémica.

ABSTRACT: Recent national surveys in Mexico show an increase in acceptance of pseudo-scientific beliefs and practices, as well as a negative public perception of the social visibility of scientists. The COVID-19 pandemic has created a post-normal context that allows us to analyse the relevance that Mexican citizens confer upon science and scientists in times of crisis. This paper presents the results of two 2020 studies on public perception of the COVID-19 pandemic, as well as the role of science in fighting it, done on two very different population groups in Mexico: the rural (mostly indigenous) population and the urban population. We compare the results from these studies with other national studies on public understanding of science conducted before the pandemic. In this comparison, we use the indicators Progress, Reserves, Knowledge and Engagement, as recently proposed by Bauer et al., as a way of analysing science's so-called cultural authority. Our study indicates that in this post-normal sociosanitary situation most citizens, as a general rule, show trust in science and recognize its social legitimacy. Finally, in light of some specific results, we argue that the cultural disparities prevalent in Mexico should be considered especially significant in trying to take advantage of science's current social prestige in order to improve the social appropriation of scientific culture in Mexico in general, that is, beyond specific post-normal contexts.

KEYWORDS: Post-normality, public understanding of science, cultural diversity, pandemic inequality.

1. INTRODUCTION

With the rapid spread of SARS-CoV-2, we have been confronted with a worldwide post-normal challenge (Funtowicz and Hidalgo, 2021), not just scientifically but also at a political level and in terms of social resilience. When the pandemic first broke out, urgent political decisions were needed with a high social risk attached to them, in part because many of the scientific facts on which these decisions were based were still far from sure. Since the situation was made public through the media and official communiqués and science was assumed to play an important role in stamping out the virus, the initial months of the pandemic are a useful context for assessing the role of science and the importance lent to it by the public at crisis points, i.e. in order to offer a more realistic insight into the issue than one that might be gained from national surveys on public understanding of science (PUS) in pre-pandemic periods.

The first, imported, case of COVID-19 was confirmed in Mexico on February 28, 2020. On March 23, on-site educational activities and all non-essential activities in the public and private sectors were suspended, among other mandatory social distancing measures. These precautionary and disease-containment measures were implemented or socially recommended (e.g. stay-at-home and some hygiene and protection measures) at national level as part of the so-called Phase 2 of the epidemic, which was the beginning of the *Jornada de Sana Distancia* (Safe Distance Phase) federal policy. The Consejo de Salubridad General (General Health Council) declared a national health emergency due to the pandemic on March 31. On April 21, the Phase 3 was announced, activating more socially restrictive policies given the rise in the number of infections and hospitalizations. The *Jornada de Sana Distancia* national policy ended on May 30, when the Government established that subsequent restrictions and measures to follow would be decided in each region, based on the number of cases detected locally (Secretaría de Salud de México, 2020; see also note 7). Vaccination campaign in Mexico did not start until December 24 of 2020. During its first phase, only considered essential workers acceded to it.

This paper starts by outlining the results of two surveys conducted in 2020 (since the enhancement of Phase 2 and before starting the vaccination) on perceptions and attitudes to science and the role of scientists in the fight to combat COVID-19. Several surveys have been conducted on the subject at an international level (e.g. WiD, 2020; Bucchi and Saracino, 2020; VA, 2020; Mora-Rodríguez and Melero-Lopez, 2021; Vieitez *et al.* 2020). The results for the (mainly indigenous) population living in rural communities are compared with those of urban areas of the country; the two target populations of the surveys. Next, all the data is compared with information from the latest PUS surveys conducted in Mexico prior to the pandemic (Conacyt 2017; Kindell *et al.*, 2018).

Our aim is to assess the cultural authority of science during a pandemic, i.e. to explore how the public regards science and people's confidence in scientists. For this purpose, tentative use is made of the indicators and Bungee Jump Model currently being developed by Bauer and colleges for this purpose (Bauer *et al.*, 2018; Liu *et al.*, 2019). Through regional data and a specific post-normal scenario, this paper contributes to international debate on PUS and to cultural debate in the field of science and technology studies, particularly for those interested in the inequalities that might determine the social appropriation of science.

2. MEXICO'S UNEQUAL SCENARIOS IN THE PANDEMIC

In October 2021, the Mexican government announced over four million confirmed cases of COVID-19 and over 300 thousand deaths (Gobierno de México, 2021). The pandemic continues to be an unprecedented management problem for Mexico ever since the emergence of the virus in 2020, when governments worldwide were forced to contend with it. Part of the challenge is the fact that it has put the national science and technology systems of different countries directly to the test, in several senses. One of the main ones –given that this is a health crisis which everyone must tackle on a day-to-day basis– is the scientific culture of the population as a whole and, in particular, the public's confidence in science.

Although differing policies and initiatives had been implemented by the Mexican government to foster new developments in science and technology, the 2002 Science and Technology Act was an important landmark at a general level and, more particularly, through its efforts to boost scientific literacy, for instance, by officially promoting the social dissemination of science (Sanz-Merino and Tarhuni-Navarro, 2019). Mexico came to form part

of the most dynamic group of countries in Latin America and the Caribbean in this regard (Polino and Cortassa, 2016). Instruments were also used to diagnose the success of these measures; more specifically, the Survey of Public Perceptions of Science and Technology, conducted biennially from 2005 to 2017. Nonetheless, federal investment into science has never surpassed 0.5% of the Gross Domestic Product (GDP) (Unesco, 2018) and, since 2018, the National Council for Science and Technology (Conacyt) has changed tack, bringing Mexican scientists into confrontation with regulators. Big differences of criteria with regard to the social importance of science in today's scenario of budgetary cutbacks and scientists' steady loss of control over the management of scientific affairs (DOF, 2020; Toche, 2021)[1] have become more acute and more publically obvious during the pandemic[2]. In fact, during the early months of the health crisis, the Mexican media gave broad coverage to the escalating tension between the new administration and the scientific community –upset by the recently announced austerity measures and reductions in public expenditure on science (Wade, 2019; FCCYT, 2019)–. In addition to the direct involvement of science in the fight against the disease, these events placed it at the core of the political agenda and public opinion, particularly during the implementation of our first survey.

The background context for the development of Mexico's national system of science and technology has always been a big challenge, particularly when the country's different populations and the big divides among them are taken into account. There are acute regional differences in the availability of basic infrastructure, such as health, education and telecommunication services, and access to them. According to recent studies, 63% of Mexico's population lives in municipalities with a medium vulnerability in access to these infrastructures, while about 30% live in municipalities with a high or very high vulnerability level. Almost 9 million Mexicans live in a critical situation (7%) (Suárez Lastra *et al.*, 2020). In addition to these sharp socioeconomic differences, similar to those of other Latin-American countries (Polino, 2019), Mexico's population is ethnically very broad ranging. Big cultural differences (e.g. language) can be found, making any general measures to boost the population's scientific literacy impractical.

Over 21% of the country's population consider themselves to be indigenous. Among the groups especially prone to economic, social and educational inequalities, rural communities stand out particularly, mainly with indigenous populations (Unesco, 2020). Not only have these communities suffered from a high incidence of COVID-19 during the pandemic, they also have a high risk of suffering from severe forms of the virus (Ortiz-Hernández and Pérez-Sastré, 2020). Additionally, the disparity in the local informal economies and social or political development have influenced the regional governors to implement sanitary and policy measures not always in line with federal recommendations or policies (Peci *et al.*, 2022)[3].

3. JUSTIFICATION, RESEARCH FRAME AND OBJECTIVES

The current pandemic is a post-normal situation in several different senses. A post-normal situation occurs when the framework for action and for finding a solution is outside the confines of *normal* scientific and technical knowledge and mechanisms, and yet decisions must be urgently taken, often accompanied by value clashes during the assessment of the problem (Funtowicz and Hidalgo, 2021). This is because the issues to be tackled involve a high degree of uncertainty, whether it is epistemic, technical, ethical or social. When these problems become public, their management or resolution sparks off public controversy. Over the last two years, pharmacological and epidemiological science and the medicine practised in health centres have both entered a

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1   Recently materialized in the proposal of a new Science Act that had not previously been consulted with the main scientific community's stakeholders (FCCYT, 2019).

2   For example, asking for the voluntary return of the economic stimulus received by researchers who belong to the National System of Researchers during three months to help with the most urgent needs of the health system in facing the pandemic (Conacyt, 2020).

3   For example, with respect to the closures of schools (*ibid*.). Besides, it is worth mentioning there has been internal incoherence within the federal policies and regulators' discourses during the management of the pandemic, in particular between some of President's official statements (and or his more informal declarations through his own social media) and the ones from the Secretary of Health from the very beginning of the health crisis. In this last sense, it was notorious that President López Obrador was not using masks publicly, and several times he explicitly discredited their need, even when, eventually, the official expert reports highly recommended their use. Apart from this, the President has also discredited several times the scientists' opinions on the severity of the pandemic. (More instances of these kinds of discrepancies in Esteinou Madrid, 2021).

state of post-normality, together with political management of the pandemic. In the fight to combat the disease and its spread, the general public has been the target of genuine social and political experiments and also at an individual psychological level.

Despite all this, in post-normal situations like the current health crisis, not only does science play a key –or even determining– role, but also the public's scientific culture. Socially, acceptance or rejection of governmental public health policies partly depends on comprehension of the available evidence and also on attitudes to the uncertainty that some scientific practices might involve (Broomell and Bodilly, 2017). However, in post-normal scenarios (and risk situations like the current one), when the population itself is forced to take urgent decisions, they tend to be based on reasoning from authority as opposed to a direct process based on the available evidence. The credentials of the chosen authorities by the population have largely been socially and culturally shaped over time (Kahan, 2017).

Given the above, it is important to analyse what is known as the «cultural authority of science»; that is, the social legitimacy of science as an institution and supplier of *truths* for use in decision-making (Bauer *et al.*, 2018, p. 7). In situations calling for science-based decisions (in our case, the acceptance of preventive restrictions and hygiene-related measures and the use of new vaccines), the status accorded to science by the general public[4] is an important source of information; for instance, in the formulation of risk-management intervention and communication strategies.

In this paper, we present the results of an evaluation of the cultural authority of science in Mexico during the pandemic, using the Bungee Jump Model. To measure the success of public policies for the promotion of science, Bauer and colleges recommend this model's use instead of the ones normally used to interpret general PUS data (Bauer *et al.*, 2018, pp. 8 and ss.). Whilst the latter equates social mistrust of certain scientific issues with a loss of scientific credibility in general, we start out from the assumption, like Bauer and colleges, that society can, on the whole, confide in science and yet also question certain social, ethical and environmental aspects.

The cultural authority of science depends on a combination of two circumstances: «on the level of general goodwill of society towards science and the type and intensity of the controversy» (Bauer *et al.,* 2018, p. 10). The first of these variables can be determined from general PUS surveys. We re-examine recent national and international studies of Mexico, comparing them with the results of our own two surveys in order to shed light on the second variable. From all the findings, we select and analyse the most relevant ones at a thematic level in accordance with the PREK indicators matrix developed by Liu *et al.* (2019), which we adapt to fit in with our scenario as follows:

- *Progress*. Perceptions of scientists' social role and the usefulness of science during the pandemic.

- *Reserves*. Social perceptions of the management of preventive measures in general and of vaccination in particular.

- *Engagement*. Public interest in COVID-19, information searches about the virus, and perceptions of the received information.

- *Knowledge*. Built-up knowledge of the origins and transmission of the virus.

Hence, the general aim of this research study is to evaluate the cultural authority of science during the most post-normal period of the SARS-CoV-2 pandemic in Mexico. At the same time, we add another assumption: that knowledge, attitudes and statements regarding the role of science in the fight to combat the virus might vary, depending on the specific cultural features of the population groups taken into account in our surveys. Conse-quently, our second aim is to empirically support the PUS discussion taking into account the cultural differences between Mexico's urban and rural population.

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4 It is important to add that the population is also making decisions in a scenario in which other phenomena with a negative effect on the image of science have worsened. They include the proliferation of information presented as being scientific, leading to confusion and giving rise to conspiracy theories involving scientific practices. (See the declaration by the World Health Organization (WHO): https://www.who.int/news/item/23-09-2020-managing-the-covid-19-infodemic-promoting-healthy-behaviours-and-mitigating-the-harm-from-misinformation-and-disinformation [last accessed October 19th 2020]).

4. SURVEYS

4.1. Data and methods

In order to identify possible differences in the country's rural and urban communities in terms of their knowledge, sources of information and perceptions of information about COVID-19, together with other considerations about the role of science in management of the pandemic, two surveys were conducted in the period comprised between Phase 2 and the vaccination's beginning.

The first, answered by people living in urban areas of Mexico, was conducted between April 5th and 14th 2020, when the total closure of activities and social distancing measures had recently been enforced. Due to the restrictions, the survey was conducted online, using Google Forms and it was sent out by e-mail and via social networks like Facebook and Twitter. Although the universe of respondents was determined by those with access to the Internet, there are 80 million Internet users in Mexico (70% of the population), mainly living in urban areas (INEGI, 2019). The survey was answered by 8001 people. The respondents had to be at least 16 years old, irrespective of their sex and educational and socioeconomic level.

The second survey was conducted in eight rural areas of the state of Yucatán, one of the states with the highest indigenous population in Mexico (over 65% of the population of Yucatán) (INEGI, 2015b). It was conducted between November 2nd and 12th 2020, when the surveys could be given in person. This was necessary because 40% of these communities are located in areas with no landline or mobile phone coverage and with no regular access to the Internet (Unesco, 2020). Staff were selected and trained to give the survey who spoke Mayan. This was fundamental, particularly in the case of older populations of Mayan people, who mainly just speak one language. In total 524 surveys were completed.

For both surveys, a non-probability sampling design was chosen in which a minimum representative number of questionnaires was obtained for different categories (see Table 1). Our urban and rural samples were similar in ratio to both sectors of the Mexican population as a whole[5].

Variables	Categories	Urban areas Frequency (%)	Rural areas Frequency (%)
Sex	Women	2988 (62.7)	266 (50.7)
	Men	5013 (37.4)	258 (49.2)
Age	Young	2433 (30.4)	130 (24.5)
	Adults	5568 (69.6)	394 (75.5)
Education level*	No education	-	68 (13.0)
	Basic education	-	368 (70.2)
	High school	970 (12.2)	78 (14.9)
	Higher education	4134 (51.6)	10 (1.9)
	Postgraduate studies	2897 (36.2)	-
Income**	Non remunerated	1249 (15.6)	-
	Up to 8 thousand pesos	2315 (28.9)	-
	8 to 25 thousand pesos	2974 (37.2)	-
	Over 25 thousand pesos	1463 (18.3)	-

Table 1. Total number and percentages of responses in urban and rural areas

* All of the respondents in urban areas had completed basic studies. ** In rural areas, no people with postgraduate studies were found and the respondent's average income is less than 8 thousand pesos.

Source: Own elaboration.

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5   According to the available data at the time of the surveys (INEGI, 2015a).

From among all the questions in both surveys (which differed somewhat in number, form and content, given the characteristics of their respective target populations)[6], in this paper, we focus on certain questions, most of which were aimed at both population groups. In the appendix, the full version of the analysed questions can be found and the percentage-based replies by survey (Tables 4.a and 4.b).

4.2. Results

In the urban population's opinion, scientists and healthcare workers were considered to be the most reliable sources of information about COVID-19 (98% and 94% respectively), at a far distance from politicians, journalists and influencers. In rural communities, the concept of a scientist or expert is closely associated with the healthcare authorities and with primary care (Vieitez *et al.*, 2020), particularly in the context of a pandemic, and so the respondents were asked about their level of confidence in the healthcare system's capacity to combat the COVID-19 pandemic. 65% of the respondents answered «Some confidence».

In urban communities, with higher education levels and access to more widely assorted communication channels, it was also possible to explore the role that the respondents thought scientists should play in this sense (Figure 1). «To support the healthcare sector» achieved the highest percentage of answers (83%), followed by «to contribute through their specialist field to an understanding of the pandemic» (78%). Half the respondents believed that it was also important for scientists to make an effort to help society to understand the pandemic.
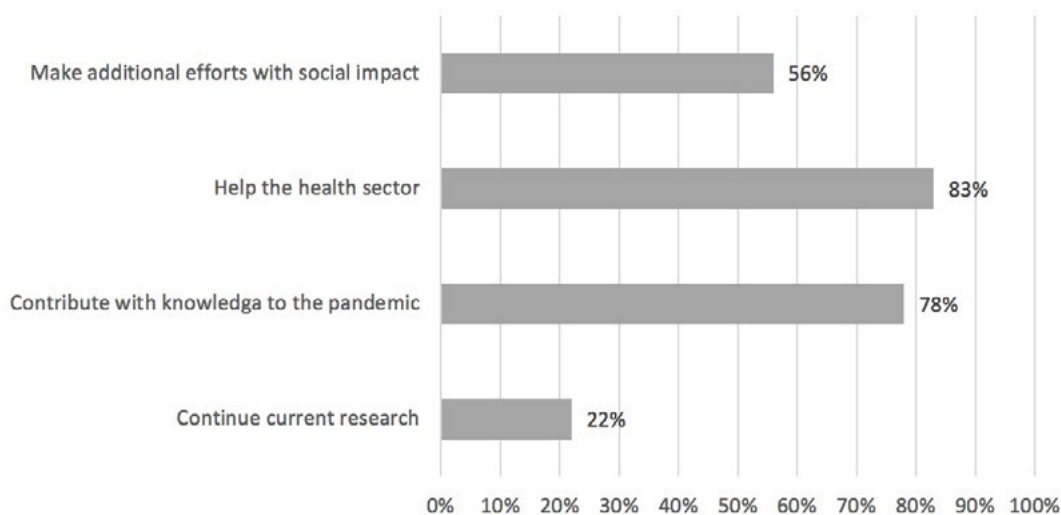

Figure 1. Perception of the duty of the scientific community (urban population). Source: Own elaboration.

This same group's prevailing opinion of the steps taken by the Government to prevent the spread of the virus during the pandemic[7] was that they had been very effective (71%), and they were even claimed to be indispensable or not remotely strong enough.

This opinion contrasts with perceptions in rural communities, where the measures were rated as being mediocre (64%), although almost 80% of the respondents said that the necessary measures were followed in their

6   For an outline of the methodology, questionnaires and total results of the surveys, see https://percepcioncovid19mexico.wordpress.com/
7   Social distancing measures and the closure of certain places were enforced through a national policy programme called the *Jornada Nacional de Sana Distancia* of March 21st 2020. On May 13th 2020, the official return to the «new normal» began. Since then, each State has regulated access to specific places and the possibility of certain activities, depending on the cumulative incidence. For this purpose, a four-colour epidemiological traffic light is used to indicate the level of the restrictions (See Gobierno de México, 2021).

community. Almost 70% thought that the community itself could develop effective measures to attend to the sick and avoid the spread of the virus.

As for the vaccination, in both urban and rural areas, the vaccine was seen as indispensable in controlling COVID-19. 95% of the urban respondents and 80% of the rural ones chose this option. In rural communities, continuing to take preventive steps and precautions (95%) was seen as more important, while less relevance was given to treatments of a specifically medical nature to combat the disease (58%).

To evaluate people's interest or engagement in scientific aspects, the information channels used by the population during the pandemic were analysed (Figure 2). The channels most commonly used as sources of information by both groups were very different. Whereas in urban areas, the Internet was consulted the most (77%), followed to a much lesser extent by conventional forms of the media (the press (30%), radio (22%) and television (27%)), the most widely used channels in rural areas were the television (94%) and radio (89%), although over half the respondents said that they had consulted the Internet (60%).

Almost eight out of every ten respondents from rural communities lent substantial importance to verbal communication and informal chats with family and close friends (as opposed to just 6% of the urban population). A lower percentage mentioned WhatsApp (42%) (compared with just 2% in urban areas) and other different organizational systems, such as community assemblies and other direct information channels (32% and 40% respectively).

In urban areas, the prevailing sources of online information were national and international official health websites (77%), followed by the daily press conference by the Federal Secretariat for Health (70%)[8] and the websites of universities and/or research centres (55%).
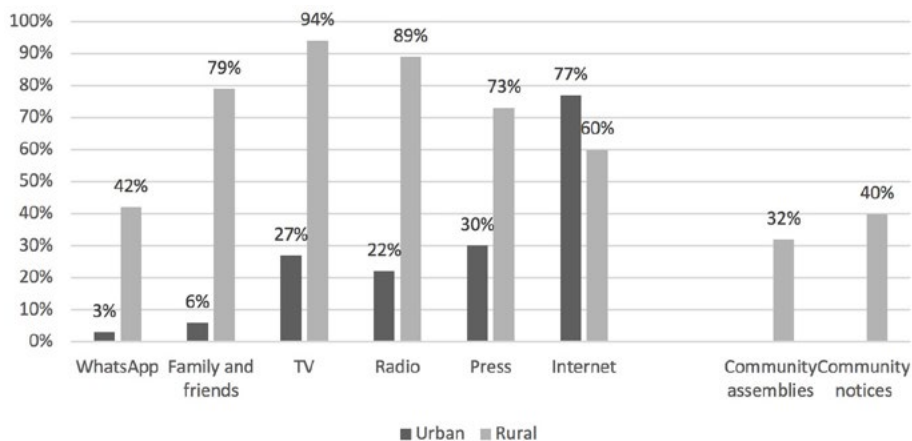

Figure 2. Consultation Channels. Source: Own elaboration.

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8   Between February 28th 2020 and June 11th 2021, both the federal government and the local authorities gave a daily press conference on the evolution of the disease. Before, a conference of the President of the Republic had already been broadcasted every morning since his arrival in government, with the objective of socially communicating the national agenda and the official position regarding important issues at hand. On January 22, 2020, first technical report related to COVID-19, by Dr Hugo López-Gatell (from the Secretary of Health) was held. His subsequent daily health conferences detailed the panorama of the pandemic (infected cases and fatality rates) in the world and, particularly, in whole America and in Europe. A map of Mexico were presented with the incidence rate by States, the distribution by age groups and the type of medical care they had received: outpatient/at home or hospitalized (patients were classified as stable, severe and critics). Data on recoveries and deaths were also presented, the latter in relation to co-morbidities, which in the case of Mexico are: hypertension, diabetes, obesity, smoking, kidney problems, chronic obstructive pulmonary disease (COPD), immunosuppression, asthma and HIV-AIDS. At the end of each technical report, the epidemic curve were also projected (For a more detailed analysis of the governmental press conferences' contents, see: Llano Guibarra, and Aguila Sánchez, 2020).

In the rural communities under study, eight out of every ten respondents said that they had obtained information about COVID-19 from popular campaigns like *Susana Distancia*[9] (68%). That is, the consulted sources were limited almost exclusively to the authorities, mainly the local ones (72%)[10].

Most of the respondents thought that it was important to be able to count on scientific information for informed decision-making relating to the pandemic, albeit to a greater extent in rural areas (78%) than in urban ones (69%). However, about 40% of the rural population chose the replies «I get fed up of it» and «I'm confused» for the information to which they have access. The general opinion of the urban population is very different (see Figure 3).
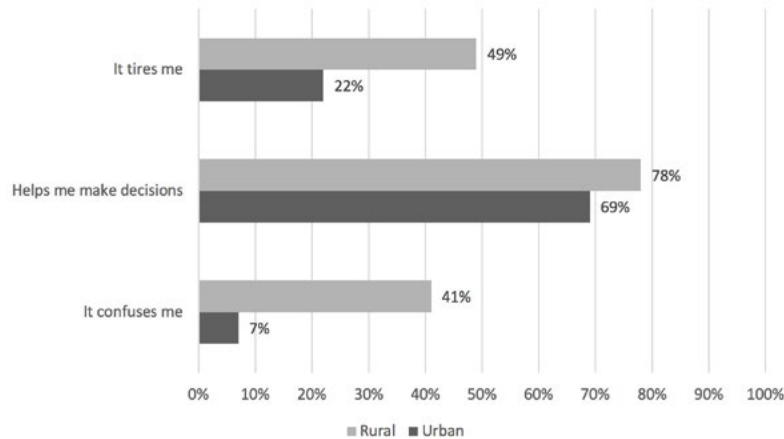

Figure 3. Perception on the received information. Source: Own elaboration.

As for the respondents' knowledge of COVID-19 (at least from what was scientifically available at the time), it can be confirmed that the mechanism for the transmission of SARS-CoV-2 from one person to another was well known to the public in both urban areas (100%) and rural ones (95%). The same is not true of the virus' origins, as shown in Figure 4.
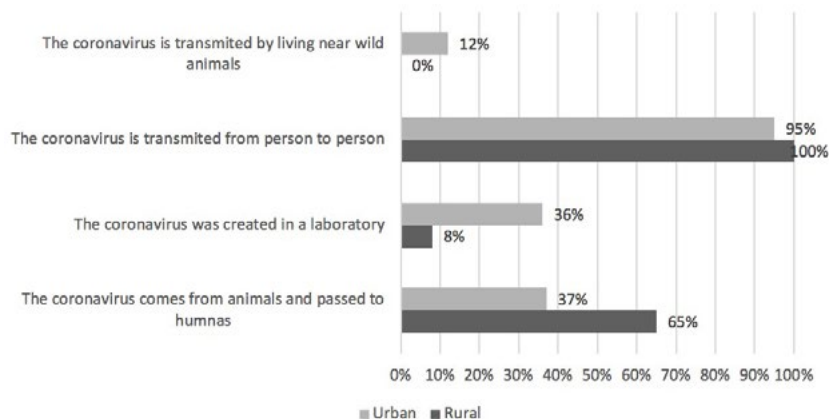

Figure 4. Knowledge about COVID-19. Fuente: Own elaboration.

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9   With the enforcement of the *Jornada Nacional de Sana Distancia*, an extensive official awareness-raising campaign began with a fictitious spokeswoman called *Susana Distancia* (a play on words in Spanish with a second meaning: «Yourhealthy Distance»).

10   It should be pointed out that the scientific community has not been explicitly involved in management of the pandemic in Mexico. Governmental dissemination of relevant scientific information was solely in the hands of the public authorities.

5. THE CULTURAL AUTHORITY OF SCIENCE IN MEXICO

Daniela H Tarhuni Navarro y Noemí Sanz Merino

When the results were grouped and analysed according to the PREK indicators, general conclusions could be drawn about considerations of science in urban and rural areas in the current pandemic. These are shown in Table 2.

	URBAN AREAS		RURAL AREAS	
	Attitudes	**Value**	**Attitudes**	**Value**
Progress	Trust in health personnel and scientists	High	Trust in the response of the health system	Medium
Reserves	Perception of control of the pandemic by authorities	High	Perception of control of the pandemic by authorities	Medium
	Attitude towards scientific recommendations	Medium-High	Trust in community achievements	High
	Positive posture to vaccination	High	Positive posture to vaccination	High
Engagement	Interest in scientific issues	High	Interest in local and family sources	Hight
	Scientific information for decision making	Medium	Information for decision making	High
	Perception of tiredness and confusion	Low	Perception of tiredness and confusion	Medium
Knowledge	Identification of the origin of the virus	Medium	Identification of the origin of the virus	Low
	Recognition of transmission mechanisms	High	Recognition of transmission mechanisms	High
	Assessment of pseudoscientific assumptions associated with COVID-19	Low	Assessment of pseudoscientific assumptions associated with COVID-19	Medium

Table 2. Social attitudes towards science against COVID-19 in Mexico. Urban vs Rural areas

Rating percentage range: High: 20-100%, Medium: 40-69%, Low: 0-39%.

Source: Own elaboration.

Outlined below is the most recent data for the same indicators prior to the COVID-19 pandemic. All the data will then be compared in order to evaluate the cultural authority of science in Mexico.

5.1. Progress

This dimension estimates positive attitudes to science and technology (Liu *et al.*, 2019). General pre-pandemic surveys mainly obtained positive replies in this regard. When the respondents' perceptions of basic and applied research were analysed, 73% of Mexicans thought that a country's economic growth is closely tied in with the amount and quality of its research activities. Furthermore, 67% thought that the benefits of scientific activities are greater than the harm that might be associated with them (Conacyt, 2017).

These findings are coherent with those of the Welcome Global Monitor of Trust (WGM) for Mexico prior to the pandemic. In its findings, 67% of Mexicans thought that the work of the scientific community benefits people and 80% believed that science and technology will improve the lives of the next generation. Moreover, 61% believed that there is a direct link between scientific and technological developments and local job creation (Kindell *et al.*, 2018).

Lastly, depending on the source that was consulted, some differences can be found in the Mexican population's perceptions of the scientific community prior to the pandemic. In the last national PUS survey, 84% of Mexicans regarded the scientific community as being reliable or very reliable (Conacyt, 2017). However, according to data gathered by the WGM, only almost half the respondents claimed to have some confidence in scientists (48%) and in science (46%) (Kindell *et al.*, 2018).

5.2 Reserves

Reserves are opinions that show an attitude of reticence, social rejection or concern about scientific and tech-nological developments, whether it is at a general or individual level.

Despite the aforementioned favourable attitudes, half the Mexicans stated stated, prior to the pandemic, that scientific and technological developments implied an artificial dehumanized way of life (Conacyt, 2017). Furthermore, according to the same survey, 37% considered that scientists are responsible for other people's misuse of their discoveries; 46% thought that, due to the knowledge they possessed, scientists had power that made them dangerous; 57% thought that priorities in national research in Mexico reflected scientists' personal spending more than social needs.

As for possible attitudes of rejection toward vaccines, there was widespread social acceptance prior to the pandemic. According to the WGM, 75% of Mexicans believed vaccinations to be safe and effective (Kindell *et al.*, 2018).

5.3 Engagement

This indicator explores social interest and engagement in scientific matters. Prior to the pandemic, 90% of Mexicans thought that the government should at least foster public debate among the population on the amount of the budget allocated to science (Conacyt, 2017). On the other hand, the same survey showed that 70% of Mexicans thought that scientists make very little effort to inform the public about their work. Only 36% showed an interest in scientific and technological developments and almost 50% in current affairs associated with science and technology.

The same survey also revealed very low attendance of centres or activities related to science and technology, e.g.: only about 20% of the respondents claimed to have visited a science or technology museum during the past year and only 7% had attended the National Science & Technology Week (an event organized in Mexico for over 20 years).

5.4 Knowledge

This indicator explores the typical items used to measure scientific literacy. The pre-pandemic Global Monitor has three findings worthy of note: almost 40% of Mexicans thought they knew something about science; just under half of them thought they understood the meaning of «science» and «scientists»; and 82% thought that studying a disease formed part of scientific activities (Kindell *et al.*, 2018). According to the national PUS survey, only 38% of the population regarded themselves as just having a fair understanding of the concept «scientific research».

In addition to this self-perceived lack of scientific literacy and low knowledge of scientific practices, objective data on the scientific literacy of the Mexican population is also very low (see Conacyt, 2017). Most answers re-lating to scientific concepts with a high visibility and high social use (such as «GMF», «software», «innovation» and the names of some degenerative diseases) were either «passable» or «poor». In parallel with this, Mexican perceptions of pseudo sciences must also be mentioned: 77% of Mexicans (a few percentage points above the aforementioned PUS survey) considered treatments like acupuncture, chiropractic medicine, homeopathy or *las limpias* (Andean cleansing procedures) to be valid (Conacyt, 2017).

Whatever the case, it is important to remember that, generally speaking, the Mexican population's level of education is not particularly high, in addition to the big differences between the urban and rural population. In accordance with the latest available official data when the surveys were conducted, 72% of the rural population either has no education or, at most, just a basic schooling, while 55% of the urban population has at least a secondary school education (INEGI, 2015a).

5.5. Discussion

As described above, in order to assess the cultural authority of science (Bauer *et al.*, 2018), we set out to gather two types of PUS data for comparison in accordance with the Bungee Jump Model. In addition to outlining the responses obtained in a specific post-normal situation, we also reported data on the Mexican population's knowledge, attitudes and perceptions of science at recent points prior to the pandemic. As a general rule, the results of our own surveys are coherent with the findings of surveys conducted in pre-pandemic periods.

Daniela H Tarhuni Navarro y Noemí Sanz Merino

Before the pandemic, most Mexicans considered science to be socially useful, believing that the benefits outweighed the possible negative consequences. During the COVID-19 pandemic, there are equally positive expectations and appraisals of the contributions of scientific knowledge and research, together with the capacity of healthcare staff to deal with the pandemic, in keeping with countries that are both socio-culturally similar and different (see, for instance, Mora-Rodriguez and Melero-Lopez, 2021; WiD 2020; Fetzer *et al.*, 2020). Nonetheless, despite the general positive notion that scientific knowledge is a key factor in tackling the pandemic, our surveys show that this is more the case in urban settings than rural ones.

When attention is turned to possible social reservations about science, during the pre-pandemic period, few reservations were expressed and/or they tended to be isolated. The most noteworthy instances were more closely associated with specific types of action by scientists (little social engagement, squandered finance, individual ethics, etc.) than with social rejection of the social or political authority of science in general.

By examining social perceptions of recommendations and preventive measures in Mexico during the pandemic and how they were observed, we could find out whether there was social reticence to science. The measures were obviously introduced by the Government although, as the population was told, in principle, they were established in accordance with internationally observed guidelines based on scientific agreement. On the whole, rural communities had a less favourable perception of the preventive measures: over half the respondents considered the effectiveness of the preventive measures, particularly federal ones, to be mediocre. However, there was no difference of opinion regarding vaccination: the respondents from indigenous communities and those of urban ones coincided in their belief that vaccination is a key factor in controlling the virus. The acceptance in our study was higher compared to other surveys made on the matter between August and November 2020 to Mexicans, in general. Even though, the lowest acceptance rate obtained about it (from Carnalla *et al.*, 2021) still showed its social importance: the 62% supported COVID-19 vaccination, while only the 28% did not[11].

Consequently, the Mexican respondents' widespread confidence in scientists and healthcare workers before and during the early stages of the pandemic coincides with the trend in post-industrial societies (i.e. whose policies, economies and social stratification are largely based on scientific and technological knowledge). As this hypothesis has gradually become firmly established in PUS studies for countries in this category, so it is that the more familiar the population is with science and its social impacts, the greater their awareness of its limitations and potential negative effects (Bauer *et al.*, 2012). In our case, in matters concerning adherence to recommendations by COVID-19 experts, no important «reserves» were found.

On the other hand, as for the Mexican population's engagement with science prior to the pandemic, even though the immense majority wished to be involved in certain associated political decisions and most people believed that scientists made insufficient efforts to disseminate information to society, what is most significant is that when the pandemic first broke out, there does not seem to have been a widespread interest in science and technology among Mexicans. However, during the pandemic, all the respondents coincided in the importance of having scientific information at their disposal in decision-making.

As for the information channels and sources of information that were used during the pandemic, there were clear differences between the population groups. In urban areas, information from official national or international health organizations was consulted to a greater extent. Half the respondents used universities and R&D centres as sources, mainly through the Internet (in accordance with the «just-in-time information acquisition» model in developed countries (Miller *et al.*, 2021)). In the indigenous communities that were consulted, 80% of the respondents highlighted the special attention paid to official informative campaigns. Nonetheless, conventional forms of the mass media were used by almost all the rural population, although this group also sought information from family members and friends and through different direct local assemblies or communication networks (which are practically non-existent in urban areas).

Lastly, with regard to the Mexican population's scientific literacy prior to the pandemic, it is important to note that it was particularly low in general, both when measured objectively and from the Mexicans' own standpoints, although

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11   The same study shows that Mexican refusal and hesitancy (9.5%) were higher in groups at a higher risk of COVID-19 mortality, in particular people over 60 years of age (Carnalla *et al.,* 2021).

the scientific information that was available during the pandemic seems to have been effectively appropriated –at least the most useful aspects–. Given the low levels prior to the pandemic, it is reasonable to believe that this difference could be due to the bombardment of information by the media and government and/or to fear of the virus. Whatever the case, the above results seem to indicate that practically the whole consulted population has a reasonably good idea of how SARS-CoV-2 is transmitted. In the case of the virus' origins, nonetheless, there were differences in the belief held by the urban population (who were inclined to believe in its animal origins) and that of the rural population (almost half of whom believe that it was artificially created). This is comprehensible since, during the first year of the pandemic, several controversial speculations were publicly aired as a result of initial uncertainties.

Consequently, as for the population's engagement and knowledge, from the data that was obtained during the pandemic, most of the respondents can be characterized as being potentially attentive to scientific issues (in relation to the members of their respective urban or rural communities at least) despite the fact that, from the PUS data prior to the pandemic, most Mexicans might reasonably have been described as being distant. «Distant public» can be described as regarding themselves as relatively uniformed scientifically, with little interest in science. They often think scientific information is hard to understand, and they do not normally seek out this kind of data. In contrast, «potential» public are generally more interested in science, even though they are not assiduous consumers of scientific information. In certain circumstances, this group can act in the same way as an «attentive» one (Polino, 2019). «Attentive» refers to a scientifically competent group that regularly consumes information in the field of science and technology and who are motivated to become socially and politically engaged in such matters (Miller, 1983).

In sum, in the case of Mexico, we can conclude that not only has the cultural authority of science not been counteracted by the pandemic, but it can reasonably be thought to have been reinforced. As interpreted in accordance with the Bungee Jump Model, some of the downsides to science revealed in the PUS studies do not necessarily have to be correlated with contempt for science.

This is based on indicators relating to the population's interest in science and scientific knowledge (which apparently rose during the pandemic in comparison with prior periods), but also if we take into consideration people's behaviour and their declared confidence in science. Despite the existence of some deep-rooted pseudo-scientific beliefs in Mexico, as well as a certain social mistrust of the amount of public money spent on science, reticence with regard to the *artificiality* of scientific products and the mentioned above science's recent loss of political authority and the political delegitimization in the media (before and during the pandemic), most of the respondents confided in science in decision-making in such post-normal times. By October 2021, 83% of the adult population had received their first jab (Santos, 2021).

Our data and this conclusion are aligned with other significant results found by studies on social susceptibility to misinformation about COVID-19 around the world (including the particular case of Mexico). Higher trust in scientists are significantly and consistently associated with lower susceptibility to misinformation about COVID-19, and higher trust in politicians[12] as effective managers of the COVID-19 crisis correlates with higher susceptibility to misinformation (particularly in Mexico, Spain and the USA) (Roozenbeek *et al.*, 2020), while, according to the same study and for the same three countries, susceptibility to misinformation was the variable that predicts lower compliance with public health policies and recommendations. So, even if Mexicans were witnesses of changing scientific information and recommendations, their higher trust in scientists than in politicians could explain why the cultural authority of science kept untouched during the most post-normal period of the pandemic and why the most of our respondents saw themselves as compliant with the main public health guidelines.

6. MEXICAN POST-NORMALITY

The second hypothesis put forward in our study was that there would be differences between the answers of the urban population and the largely indigenous rural one. Generally speaking, this hypothesis has been corroborated.

If science must necessarily be interlinked with each community's political and social processes for society to take advantage of its potential and be suitably prepared in post-normal situations (Funtowicz and Hidalgo, 2021),

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12 Apart from the above mentioned responses to our surveys, Fetzer *et al.,* (2020) show that, at the time of our study, Mexicans perceived that the government response to coronavirus has been insufficient and misleading.

what should we infer from the socio-economic differences in access to crucial infrastructure and from the cultural differences that are structural to these processes in Mexico? Our study sheds some light on debate about how to boost the scientific culture of the Mexican population as a whole (and not just in specific post-normal situations). Let us examine this issue before we conclude.

In urban areas, thanks to greater access to ICT and their more widespread use, the population could consult, compare and verify information (Tarhuni-Navarro and Sanz-Merino, 2021), indicating that this population group's social appropriation of science could be potentially higher and more critical, in comparison with the rural population at least. However, if we consider the low level of knowledge and engagement in Mexico prior to the pandemic, then possibly science's high authority in the current post-normal situation is more attributable to faith in science (based on decades of governmental and scientific propaganda and fear of the pandemic) than to real social appropriation of science.

Whatever the case, we know that Mexico's urban population expects scientists to be more actively involved in getting across technical issues related to the pandemic to society. In previous PUS surveys, Mexicans highlighted Mexican scientists' low presence in the media (Conacyt, 2017), which scientists themselves also acknowledge (Sanz-Merino and Tarhuni-Navarro, 2019). In a pandemic, the respondents expect to receive information that can assist in decision-making and, in fact, the urban population has sought out scientific sources of information in particular. From all this, it can be inferred that a more active role by scientists in communicating science to society could generally be an effective way of triggering a potential social interest in science and, in the final instance, of boosting the social appropriation of science in Mexico. That is, through science's raised social visibility and more social engagement by Mexican science and its scientists, the population could become more attentive to science and more scientifically prepared as members of a post-industrial or knowledge society. Someone who is scientifically cultured acknowledges science's social relevance and they take advantage of it in a reasonably critical or circumspect way (see, for instance, López-Cerezo and Cámara-Hurtado, 2009).

The need to foster such «public engagement with science» is not new to studies of scientific literacy and the social communication of science or to the authorities of advanced countries (see, for instance, EC, 2008). Salient PUS strategies in this field focus on boosting the population's scientific literacy and on the dissemination of science, combined with scientists' improved capacity to contribute directly to this and increased recognition of the importance of multiple perspectives and knowledge in scientific practice, on the part of both scientists and the public (see Sanz-Merino and Tarhuni-Navarro, 2019). The introduction of measures of this kind would help to boost the cultural authority of science among the urban population, depending on their profile, socio-economic characteristics and access to technology.

Nonetheless, rural populations do not benefit from the same circumstances and neither do they start out from the same level of scientific and technological awareness. Transposing the same engagement strategies to rural areas would probably not work. Remember that, in these communities, primary sources of information are those that are available in the immediate area, given the population's more restricted access (at best) to certain channels and the fact that 40% of the respondents said they felt overwhelmed or fed up of the information that was made public.

The fact that the rural population's confidence in governmental management of the pandemic in general and in the health system in particular was lower than in urban areas might induce us to believe that the theory of a cognitive deficit (that more classic PUS, according to which less familiarity with science breeds more mistrust and more social rejection) continues to apply in less developed societies (see e.g. in Bauer *et al.*, 2012). This, in turn, might lead us to propose popular enculturation strategies based on even more naive classic models for the social communication of science. However, it should also be noted that, despite the lower availability of information during the pandemic and the lower level of education of this population group in general, rural communities also demonstrated a potential to become an attentive scientific public in these post-normal times. Proof of this is their emphasis on the importance of science in decision-making and the fact that, in practice, they do not seem to have cast any doubt on the national enforcement of international health guidelines. Indeed, despite their socio-economic vulnerability, rural communities have also demonstrated a reasonably good knowledge of the virus. How can this population group be transformed into a public that is at least potentially attentive to science?

Mexico's socio-educational and economic differences are structural, as is the case of Latin-America as a whole (Polino, 2019). In order to boost people's scientific culture in general, the most obvious step is to eradicate the distorted «Mathew effect» so typical of Mexico's most socio-economically vulnerable communities; that is, to reverse the tendency for those who have less to continue to have less. When it comes to science and technology's possible contribution to this, science's recent loss of political authority in Mexico will very probably prevent it from assisting with this in the short or mid-term. Neither does this study aspire to contribute something new to what has already been said or is known about ways of boosting the general wellbeing of a country marked by socio-economic disparities.

However, at the same time, Mexico is also culturally diverse, in the most anthropological of senses; a circumstance that might also be regarded as post-normal. Mexico's multiculturality is a permanent characteristic, making it incompatible with mainstream social policies and customs.

In accordance with general models for interpreting PUS, the importance lent by rural communities to their own potential for self-organization in the fight to combat COVID-19 might be seen as contradicting social confidence in science. Alternatively, this *cultural mismatch* could be interpreted from the perspective of the Bungee Jump Model, in which case these results of our survey are *merely* opinions based on different behaviour patterns. Their consideration as such is equally important in reflections on PUS, not because these behaviours should be suppressed in order to boost the population's scientific enculturation but because these cultural factors should be taken into account in the way in which science is interlinked with different aspects of rural and indigenous communities in order to boost the social appropriation of science.

Logically, in places with a high indigenous population, community coordination in dealing with crises is seen as important. The specific features and relevance of the social customs and organizational systems of these communities in public and individual life have been widely studied and acknowledged (Instituto Nacional de Pueblos Indígenas, 2020). To continue with our post-normal hypothesis on the Mexican multiculturalism, given the peculiarities of this population group, particularly the indigenous population, it is not enough to merely focus on language barriers[13] or to *simply* disseminate science to these communities as a way of boosting the social appropriation, in particular, and the cultural authority, in general, of science. From what we have seen, science can be interlinked with social and political aspects of these communities by taking advantage of their existing communication and authority-related networks. This *situated* approach has been demonstrated to be more effective in mechanisms aimed at fostering the social appropriation of other public policies, such as policies in the field of medical care and the local economy (Instituto Nacional de Pueblos Indígenas, 2020).

In conclusion, the differences in the respondents' level of interest in science serve to highlight Mexico's situation of cultural post-normality (the urban population versus mainly indigenous communities) and the relevance of this factor in strategies to boost the population's scientific culture and, by extension, to further reinforce the cultural authority that science seems to possess in today's pandemic scenario. In the case of the urban population, who might be defined as potential consumers of science, we noted a desire for strategies to be fostered aimed at raising the visibility of scientists and at their increased involvement in the dissemination of scientific information. In the case of rural communities, however, we realize that, if science were to engage with society, this population group would not have access to the infrastructure or mechanisms that the urban population possesses. Neither is the sole implementation of communication strategies directed at overcoming the deficits in the population's scientific literacy advisable.

The new challenge we face in the dissemination and social appropriation of science is to interlink science with society in a way that takes into account the peculiarities of certain cultural groups' organizational systems and communication networks. This is not something that can be tackled by using standard social enculturation models for typical post-industrial countries, but are challenges not normal in seeking solutions in post-normal situations?

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13 In addition to the *Susana Distancia* campaign, conceived to overcome differences in the Mexican population's levels of education, the Commission for Latin America and the Caribbean made available audio-visual materials in different indigenous languages. However, they only reached limited audiences.

7. CONCLUSIONS

The general aim of this study was to find out the Mexican population's assessment of science and scientists and their confidence in them during the COVID-19 pandemic. For this purpose, PREK indicators (Progress, Reserves, Engagement, Knowledge) based on the Bungee Jump Model, both proposed by Bauer *et al.* (2018), were used to assess «the cultural authority of science».

Data was gathered from several PUS studies for Mexico conducted prior to the pandemic and from two surveys of our own, given in 2020, on public understanding and perceptions of science in the fight to combat COVID-19. In this way, we could compare the general level of goodwill toward science as an institution or privileged mouth-piece in establishing *the truth* prior to the pandemic and in the post-normal context of the health crisis in Mexico.

Although, as a general rule, the pre-pandemic results are less positive (e.g. a population with a low level of scientific literacy, growing confidence in pseudo-science, and some critical opinions of certain scientists' practices), the Mexican population confides quite well in science in situations that pose a high health risk. Indeed, the first conclusion was that, at the most post-normal point in the pandemic, not only was the cultural authority of science apparently not affected, but it even seems to have been reinforced.

Because one of our surveys was targeted at an urban population, while the other was directed at rural, mainly indigenous communities, the assumption could be made that there might be specific differences in the knowledge, attitudes and statements regarding the role of science in the fight to combat COVID-19 as a result of these cultural differences. This hypothesis was corroborated and, at the same time, specific differences came to light that could play an important role in strategies to boost the Mexican population's scientific culture in general.

Our second conclusion was that, in addition to big socioeconomic and educational differences in the Mexican population, Mexico can also be defined by its cultural post-normality; a factor that must be taken into account in efforts to boost the cultural authority of science, regardless of whether there is a pandemic or not. This is because multiculturality seems to call for different scientific communication and literacy strategies than the ones usually applied in post-industrial societies. As a result, any measures that are taken to boost the social appropriation of science must take into consideration the specific organizational systems and communication networks of different cultures in order to make them more socially effective; a factor that would no doubt also reinforce and foster a greater respect for Mexico's cultural diversity.

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Category	Question	Options	Urban Frequency (%)	Rural Frequency (%)
Trust in key actors and institutions	*Who do you trust most to be well informed about the pandemic?* **			
	Health Personnel	Trustworthy	7553 (94.40)	
		Not much	401 (5.01)	
		Untrustworthy	47 (0.59)	
	Scientist	Trustworthy	7853 (98.15)	
		Not much	122 (1.52)	
		Untrustworthy	26 (0.32)	
	Government	Trustworthy	3681 (46.01)	
		Not much	3007 (37.58)	
		Untrustworthy	1313 (16.41)	
	Politicians	Trustworthy	445 (5.56)	
		Not much	3479 (43.48)	
		Untrustworthy	4077 (50.96)	
	How much do you trust the Yucatán health system in fighting the virus? *	High		137 (26.15)
		Moderate		346 (66.03)
		None		41 (7.82)
Opinions on Governmental measures, scientific recommendations and community achievements	*In your opinion. Mexican scientist should:* **			
	Continue with everyday research	Yes	1744 (21.80)	
		No	6258 (78.20)	
	Provide elements from their scientific discipline to understand the pandemic	Yes	6219 (77.73)	
		No	1783 (22.27)	
	Help the national health sector to fight the pandemic	Yes	6632 (82.89)	
		No	1370 (17.11)	
	Help society understand better the pandemic as a phenomenon	Yes	4450 (55.62)	
		No	3552 (44.38)	
	You consider that the measures implemented by the federal and state Government to prevent from Covid-19 infections have been	Very effective	5683 (71.03)	162 (30.92)
		Somewhat	4544 (56.79)	335 (63.93)
		Poor	1089 (13.61)	27 (5.15)
	Do you believe that the measures required to prevent infection are respected in your community? *	Yes		409 (78.05)
		No		67 (12.79)
	Do you believe that your community would take action to avoid infections and take care of sick people? *	Yes		360 (68.70)
		No		105 (20.04)
	Will you get the Covid-19 vaccine?	Yes	7582 (94.70)	413 (78.82)
		No	420 (5.24)	111 (21.18)
	In your opinion, what will help to control Covid-19? **			
	Continuing with the prevention and care measures	Yes		497 (94.85)
		No		27 (5.15)
	The medicine that doctors give us	Yes		306 (58.40)
		No		218 (41.60)

Table 3.a Analyzed questions grouped by thematic categories and frequency of responses. Urban and Rural surveys (Trust)

* Exclusively implemented in rural communities .** Exclusively implemented in urban areas.
Source: Own data.

Category	Question	Options	URBAN Frequency (%)	RURAL Frequency (%)
Use and perception of information channels and sources	*What channels do you get informed thought about Covid-19*			
	Via television	Yes	2260 (27.57)	491 (93.70)
		No	5795 (72.43)	33 (6.30)
	Via radio	Yes	1787 (22.23)	465 (88.74)
		No	6214 (77.67)	59 (11.26)
	Via newspapers	Yes	2449 (30.61)	385 (73.47)
		No	5552 (69.39)	139 (26.53)
	Via Internet	Yes	6223 (77.78)	313 (59.73)
		No	1778 (22.22)	211 (40.27)
	WhatsApp messages	Yes	237 (2.96)	218 (41.60)
		No	7764 (97.04)	306 (58.40)
	By what friends and family talk about	Yes	500 (6.25)	415 (79.20)
		No	7501 (93.75)	109 (20.80)
	Have you consulted, known, or heard of…?			
	Official Web Sites (WHO, etc.)**	Yes	6223 (77.78)	
		No	1778 (22.22)	
	University sites and research centers**	Yes	4444 (55.54)	
		No	3557 (44.46)	
	Local conventions*	Yes		167 (31.87)
		No		357 (68.13)
	Signs about COVID-19 prevention*	Yes		207 (39.50)
		No		317 (60.50)
	Federal daily press Conference	Yes	5620 (70.24)	357 (68.13)
		No	2381 (29.76)	167 (31.87)
	State daily press conference*	Yes		377 (71.95)
		No		147 (28.05)
	National Social Distance Period*	Yes		423 (80.73)
		No		101 (19.27)
	"Susana Distancia" media campaign*	Yes		420 (80.15)
		No		104 (19.85)
	The information about COVID-19 available to you…?			
	Confuses you	Yes	1725 (21.56)	213 (40.65)
		No	6276 (78.42)	311 (59.35)
	Tires you	Yes	522 (6.52)	255 (48.66)
		No	7479 (93.48)	269 (51.34)
	Helps you to make decisions	Yes	2515 (31.43)	411 (78.44)
		No	5486 (68.57)	113 (21.56)

Category	Question	Options	URBAN Frequency (%)	RURAL Frequency (%)
Knowledge about the coronavirus	*Answer with Yes of No if you agree or disagree on each of the following statements:*			
	Coronavirus comes from animals, and from them it passed on to humans	Yes	5166 (64.57)	193 (36.83)
		No	2835 (35.43)	331 (63.17)
	Coronavirus was created in a lab	Yes	650 (8.12)	187 (35.69)
		No	7351 (91.88)	337 (64.31)
	Coronavirus spreads form person to person	Yes	7984 (99.79)	500 (95.42)
		No	17 (0.21)	24 (4.58)
	Coronavirus spread because of living near wild animals	Yes	38 (0.47)	62 (11.83)
		No	7963 (99.53)	462 (88.17)

Table 3.b. Analyzed questions grouped by thematic categories and frequency of responses. Urban and Rural surveys (Perception and Knowledge)

* Exclusively implemented in rural communities. ** Exclusively implemented in urban areas.
Source: Own data.