Implications of COVID-19 for Climate Governance in China: The Rise of an Eco-Surveillance State?

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Abstract

China's success in pursuing zero-COVID through unprecedented levels of population monitoring and control may result in the expansion of the surveillance state. This paper examines the development of COVID surveillance strategies and explores how the strategies may be applied in the country's commitment to carbon neutrality, constituting what can be called an eco-surveillance state. The probable introduction of a series of carbon rationing schemes, covering local governments, enterprises, and the public, and enforcement of these schemes with advanced surveillance technologies by the government are presented. The potential challenges and debates regarding the rise of an eco-surveillance state are discussed.

Keywords: surveillance; eco-surveillance; climate governance; carbon rationing; COVID-19; China

1. Introduction

China's commitment to zero-COVID is founded on an unprecedented level of invasive mass surveillance to monitor and control the population [1,2]. Scholars have discussed the likelihood that surveillance could be accepted as the norm after the pandemic has passed [3–5]. The rapid development of health surveillance, including the extensive collection of personal and private information, such as medical and travel history, that is widely perceived in China as a successful strategy in fighting against COVID, may provide the state with a measure of confidence in the use of the same strategy in other policy domains. Others also believe that China's model of illiberal pandemic response could diffuse worldwide, given the country's leadership roles in the global political economy and international governance [6]. Several reasons have been offered for this prediction. First, the success in using surveillance to control the pandemic creates what can be called the emergence of the surveillant imaginary, that is, the imagination of the possibility of capturing human and non-human activities as comprehensively as possible [7]. Second, the pandemic has driven governments and companies to focus resources on the development of new surveillance technologies, such as big data analytics and sensors. This not only enhances the technology capacity in surveillance but may also create a certain path dependency such that alternatives (e.g., solutions that are not based on surveillance) are dismissed [8]. Invested enterprises and individuals are likely to become advocates of surveillance and call for the expansion

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of their technologies for other uses. Likewise, the creation of new institutions in charge of COVID surveillance may undergo "mission creep," expanding their power beyond the original organizational purpose [9]. Third, and perhaps most fundamental, COVID-19 may have changed the public view of surveillance, perhaps creating a so-called surveillance culture [10]. Several studies on the attitudes of Chinese citizens towards contact-tracing apps and surveillance show a high level of acceptance, despite problems of transparency and privacy violations [11, 12]. The public seems to consider violations of privacy and liberty justifiable in the context of public health.

Following this line of thought, this exploratory study discusses the future of China's climate governance by referencing the rise of an eco-surveillance state, defined as a state that imposes extensive surveillance to achieve environmental goals. China is the leading carbon emitter in the world, accounting for 33% of the global total in 2021. At the same time, the recently announced Goal3060 (carbon peaking by 2030 and carbon neutral by 2060) signifies a serious intention to control carbon emissions [13]. Therefore, if China is to apply its health surveillance experience to achieve climate objectives, knowing what key paths it would take and what challenges would likely be faced is important. This paper is organized as follows. First, I discuss the techno-politics of surveillance as a theoretical backdrop of the discussion. I then discuss the state of Chinese COVID surveillance. Next, I present China's climate governance, highlighting how information politics have been a constraint on the state achieving its objectives. I argue that the government may introduce a series of carbon budgeting schemes, covering local governments, enterprises, and the public, and enforce these schemes with advanced surveillance technologies. Finally, I conclude by discussing some of the implications of such a policy.

2. Techno-politics of surveillance

Surveillance, defined as the ability to swiftly collect, analyze, interpret, and disseminate information, is crucial to the formulation and implementation of many high-profile policy domains of national and international significance [14]. Although crime-fighting is often the focal point, surveillance has been used widely in different domains such as public health [15], transportation [16], environmental protection [17], and national security [18]. Surveillance is not new; it has been a consistent feature for hundreds, if not thousands, of years. Archaeologists have found structures similar to the Panopticon prison—considered by many as the beginning of surveillance power—in the Early Bronze Age (3000–2400 BC) [19]. Moreover, technological advances have radically changed the mechanism of surveillance, and disciplinary power has undoubtedly expanded. In particular, digital technologies reduce the need for labor-intensive, proximate observation, allowing efficient monitoring of tremendous physical space and events [20]. The closed-circuit television (CCTV) has become ubiquitous in modern society, making it a valuable tool for fighting crimes [21]. More recently, the development of real-time sensor technologies such as drones, remote sensing, GPS tracking, and digital meters has provided unprecedented surveillance power [18, 22, 23]. Furthermore, machine learning and artificial intelligence technologies, particularly big data analysis and applications such as face and voice recognition, have substantially promoted surveillance capacity by automating the surveillance process [24]. Simultaneously, non-technological aspects of surveillance remain important. The mobilization of societal resources has long been used as an important means of surveillance. For example, community surveillance—reliance on people to report offending or suspicious activities—is often used by the state to collect information from the public either passively or actively by groups of volunteers [17].

Foucault was a pioneer in studying the techno-politics of surveillance [25]. He famously interpreted that surveillance, as a form of disciplinary power, has saturated modern society. Surveillance involves the subjectification of the public, who are more likely to obey imposed

rules in a non-deliberative manner through self-discipline if they are under constant surveillance [26]. However, the state does not just monitor the public, but also a wide range of different subjects, including businesses, the environment, and even the government apparatus themselves; therefore, it is too narrow to equate disciplinary power with biopower. Considering environmental surveillance as an example, the monitoring of ambient air quality is an important policy tool in both formulating and enforcing policies [27], whereas remote sensing surveillance has been used to detect companies violating forest conservation policies [28]. Furthermore, surveillance is not only a tool of the powerful but has also been used by communities and non-governmental organizations. For instance, real-time surveillance of water quality and aerial footage taken by drones has been used by environmental groups to challenge eco-destructive decisions made by corporations and government agencies [29, 30]. Therefore, we can speak of the politics of surveillance as a techno-politics of contestation, as surveillance is a political tool used by different societal actors to struggle for control and advance their goals.

Another way of thinking about the politics of surveillance involves examining how it is embedded within certain political regimes. Although in some ways surveillance is thought of as an essential feature of authoritarianism, perhaps best embodied by Orwell's 1984, the fact is that liberal democracies also use surveillance to achieve state objectives [6]. Simultaneously, it seems that democratic and authoritarian countries exhibit something different when it comes to surveillance. First, for democracies, there is usually a strong awareness of the risks of surveillance, especially mass surveillance, to privacy and liberty. Hence, publicly elected policymakers tend to use the tool with caution and adhere to key principles, such as restricting surveillance to a predefined period of time, transparency in data collection and use, limiting access to data as much as possible, and establishing high-level supervision [31]. In authoritarian regimes, the lack of accountability and oppression of public voices allows states to impose mass surveillance relatively easily and less cautiously, which means that surveillance is likely to be the first choice rather than a last resort for policymakers. Second, it has been suggested that authoritarian governments have a stronger need for surveillance because of the lack of alternative mechanisms for the government to receive genuine information, such as a free media and an independent judiciary [32]. Third, surveillance is not simply a means to achieve a particular policy objective but an enabling mechanism that reinforces the political dominance of the state that defines authoritarianism. Surveillance and authoritarianism have a synergistic relationship. Authoritarianism provides the authority to introduce a surveillance state, and in turn, surveillance strengthens the authoritarian state's control over the population. For these three reasons, authoritarian regimes are more likely to deploy invasive surveillance as a policy tool, and few countries have the ability to introduce surveillance systems as does China.

3. COVID-19 surveillance in China

The use of surveillance against the spread of COVID-19 is not unique to China but is a global phenomenon. This is because the key to stopping the transmission of the virus is the rapid identification and isolation of cases [33]. COVID surveillance is not a singular system, but has developed into a complex entity. Ibrahim [34] identified 20 different types of commonly used surveillance, including sentinel, clinical surveillance, and virological surveillance. Perhaps the most controversial form of COVID surveillance is the monitoring of population movement because it directly targets the public and therefore has significant privacy issues. Many countries have deployed location or movement tracking of citizens, mainly for two purposes: (1) contact tracing of people infected with the virus, and (2) enforcing social isolation/distancing rules. Different countries have different surveillance levels. At the invasive end of the spectrum, the compulsory

collection of mobile phone location data allows the accurate identification of close contacts, who could then be placed into mandatory quarantine to stop further contagion [31]. At the other end of the spectrum, some countries or regions have instead chosen to introduce voluntary contact-tracing systems and do not provide the government access to such data [35].

As the first country to be affected by COVID-19, China's response to the virus has received considerable scholarly attention. In the early stage of the pandemic, some scholars have argued that China's approach to COVID-19 in Wuhan shows that information can be a barrier to effective pandemic control in authoritarian regimes [36,37]. Specifically, they claim that, as authoritarian governments do not tolerate free media and political freedom, they struggle to receive accurate and timely information about the pandemic and disseminate information to the public, resulting in delayed and ineffective implementation of measures to control the pandemic [36,37]. This is a valid concern that mirrors previous criticisms of the 2003 SARS outbreak [38,39]. However, two years have passed since the beginning of the pandemic, and the Chinese experience shows that worries over institutionalized deception, denial, inaction, and chaos are unfounded. Rather, the Chinese government has been able to catch a potential COVID-19 outbreak very quickly by imposing effective measures to contain its local transmission, making China one of the few countries that still successfully pursues a zero-COVID policy [40].

Surveillance, including both technological and nontechnological components, is the cornerstone of China's COVID-19 strategy. Technologically, the development of advanced digital surveillance technologies to track population movements and health status plays an important role. The mandatory use of "Health Code" (*jiankang ma*), a contact-tracing app fully embedded in popular mobile platforms WeChat and Alipay, allows the government to track the location of individuals and identify people who are at risk by cross-referencing retrospective travel data [41,42]. Although the use of mobile apps for COVID-19 is not uncommon globally, China's contact-tracing app achieves an unprecedented level of tracking accuracy by automatically collecting a wide array of personal information. The Health Code also controls people's movements by assigning users a green, yellow, or red code, which dictates whether a person is allowed to travel or access public spaces [43]. A green code means that the person is healthy and can travel freely, but a yellow or red code indicates that the person has medium or high exposure risk and thus is not allowed to enter any public venue and needs to test or self-quarantine immediately [5].

In addition to digital technology, China's health surveillance is also built on a thick network of grassroots governmental and quasi-government institutions, such as resident committees and homeowner associations, who not only help to trace and report those who test positive for COVID-19 to local authorities but also serve as information propagators, ensuring people understand and observe the government's orders [44]. These surveillance practices allow local authorities to detect and control an outbreak in a timely manner through intensive contact tracing, monitoring, isolation, quarantine, and lockdown [45].

China's experience also contradicts concerns that authoritarian political systems may incentivize local officials to avoid sharing bad news with their superiors. Again, this is a valid concern, given China's fragmented nature of governance [46,47]. However, the Chinese government was able to quickly roll out institutional restructuring to overcome fragmentation by establishing a top-down command-and-control chain and surveillance networks for epidemic prevention. At the central government level, a leading group, headed by Premier Li Keqiang, was established as the authoritative body for epidemic control. Similar leading groups/headquarters were formed at the provincial level and below, establishing a chain of command [48]. Furthermore, the central government routinely sends inspection teams to investigate local outbreaks, particularly regarding the governance of COVID-19 control. Sun Chunlan, the vice premier in charge of public health, has personally led inspection teams to outbreak centers, where she is known to make tough requests

for the rapid elimination of the virus. Furthermore, punishment for being deemed inadequate in handling an outbreak is very high, as many officials have been disciplined for mishandling the crisis. As such, the political incentives for local governments to implement stringent measures to eliminate local transmission, as quickly as possible are quite high.

In short, the slow response and information problems in Wuhan were largely related to uncertainty and underestimation of the seriousness of the situation [49]. When the central government—in this case, President Xi Jinping himself—realized the dire situation and elevated the issue to a national crisis, the entire authoritarian machine jolted into motion, quickly establishing channels of communication, surveillance systems, and population control. However, the concern lies in the unconstrained use of surveillance by the government, resulting in excessive and oppressive violations of privacy rights and individual liberty. Furthermore, surveillance, especially regarding how and what information is collected, analyzed, and used, is not transparent and fails to respect privacy and consent [7]. It is suspected that these apps access the GPS system on the mobile phone and location data, and that the data are regularly shared with the police [43]. Furthermore, incidents of privacy breaches have been reported where the identity of the infected and their close contacts are released by the government [50].

The surveillance for COVID-19 is not the only well-known surveillance scheme in China. Examining other surveillance schemes could also shed light on the possibility of the emergence of eco-surveillance. One such example is the use of facial recognition surveillance. This is not unique to China, but the scale of deployment is unprecedented, and it is estimated that more than 170 million cameras were in use in 2018, with an additional 400 million to be installed by 2020 [51]. Another well-known digital surveillance system is the social credit system (*shehui xinyong tixi*), a big data surveillance system that monitors the trustworthiness of citizens and firms [52]. The system involves the collection of private information concerning citizens' social, financial, and political activities and controls behaviors by restricting access to a variety of services and benefits for individuals with low social scores. Recently, the party launched the Learning for Strong Nation (*xuexi qiangguo*) app, which monitors the political knowledge and loyalty of people by tracking how many news articles people read and how many correct answers they provide in quizzes [5]. Furthermore, emerging evidence suggests that the technology developed during COVID-19 will persist and expand. For instance, the Hangzhou government proposed expanding the health code system to include public health issues such as smoking and alcohol consumption [35]. Therefore, it is predicted that surveillance will become a key tool for the Chinese government to achieve decarbonization targets.

4. The rise of eco-surveillance?

China's approach to environmental and climate governance has often been describe in terms of authoritarian environmentalism [53, 54]. However, the idea that a powerful state exerts control over society for environmental improvement quickly runs into problems as it ignores challenges related to information politics. First, the state is fragmented. Even if the central government has a genuine intention to achieve carbon neutrality, this intention may not be shared by the local government, which is responsible for implementing central low-carbon policies [55, 56]. This creates a classical principal-agent problem in climate governance. The central government has a problem in monitoring local government performance in reducing carbon emissions; the reliance on local government reporting statistics creates loopholes of data falsification. Second, and in a similar vein, local governments, as policy implementers, do not have accurate and timely information about emissions from their subjects, including businesses and individuals [57]. I suggest that the goal of an eco-surveillance state would be to eliminate these principal-agent

problems and to exert authoritarian carbon control through a series of carbon rationing systems. To achieve a carbon-neutral target, the government may disaggregate the national carbon budget into emission quotas for different stakeholders and use stringent surveillance to ensure that the emission quota is not exceeded. The remainder of this section elaborates on this point by discussing the three dimensions of eco-surveillance.

4.1. Carbon rationing: local governments

China first introduced a carbon rationing system for local governments during the 13th Five-Year Plan (2016–2020). Before the 13th Five-Year Plan, local governments were only required to reduce energy or carbon intensity to a certain degree, which was insufficient to control the rapid rise in carbon emissions [58]. In 2017, the State Council introduced the so-called "double control" system and added a carbon cap as a new requirement that local governments need to meet [56]. The cap represents the yearly emission ceiling for provinces in China. Thus far, carbon caps are rising to provide room for local governments to develop the economy. However, it can be expected that after 2030, the official year for the carbon peaking pledge, regional carbon ratios will start to decline.

However, the problem is the lack of surveillance of the local emissions. The fundamental issue is that China has a bottom-up reporting system. Local governments largely control local statistical bureaus, which are susceptible to local interference and poor data collection practices. To eliminate opportunities for local data falsification, the imposition of top-down surveillance is crucial. This can be done institutionally, such as by centralizing the statistical bureau system. Another recent effort is the establishment of the Central Environmental Inspection Team (CEIT) to inspect how well local authorities enforce national environmental policies and regulations [46]. High-ranking central officials lead inspection teams, typically spending at least one month in a province collecting local information regarding environmental policy implementation. The teams examine relevant documents, hold private talks, and establish hotlines for the public reporting of violations. After the inspections, the teams summarize the problems in publicly accessible reports. The Party's disciplinary apparatus follows up on problems detected during inspection and takes punitive actions such as warnings, dismissal from government positions, expulsion from party ranks, and pressing charges [46]. However, the CEIT is still limited by local coping strategies and the limited time the team spends in a location. Moreover, there are many environmental issues that contest for attention, and climate may not be a priority.

A more robust solution to overcome the limitations of bottom-up reporting systems seems to lie in the use of new digital technologies for top-down surveillance [59]. There has been a rapid development of technologies and methods that can estimate carbon emissions using observations of greenhouse gas concentrations in the atmosphere. These observations can be directly obtained from ambient air or remote sensing [60]. Although top-down surveillance cannot produce fine-grain results in emission sectors, it is useful in verifying the accuracy of emissions reports submitted by local governments. Punitive actions can then be taken if data falsification is discovered, which would give local governments more pressure to obey the carbon budget they received.

Other forms of surveillance can also be used to strengthen the control of local policy implementation. For example, although there is a control system for coal production, the policy has encountered difficulties in implementation owing to data falsification [61]. The use of high-resolution remote sensing surveillance can be useful for detecting illegal mining activities by identifying mining area boundaries and land cover changes in mining areas [62].

4.2. Carbon rationing: businesses

Businesses, especially industrial and large commercial enterprises, are directly responsible for carbon emissions through their consumption of electricity and other energy sources or industrial processes [63]. The carbon rationing system established in the 13th Five-Year Plan also covers businesses, although the scope is limited to energy-intensive enterprises [64]. However, enforcement problems are associated with poor implementation by local governments [65]. In addition, the guidelines for monitoring energy consumption and carbon emissions are vague and ambiguous, often based on estimation rather than direct observation [64]. Therefore, it is important to develop sector-specific carbon surveillance systems to enhance enforcement. One viable option is to mandate the installation of real-time energy monitoring systems for enterprises [66]. The central government can require all enterprises to install energy meters on all energy consumption devices and connect the system to a platform, where energy consumption data will be automatically uploaded to the central government. This is a significant improvement for both enterprises and governments. For enterprises, real-time energy data can be used to improve their understanding of energy consumption and facilitate energy conservation planning. For the government, the data provide better enforcement of the carbon cap and a basis for data-driven policymaking. Furthermore, the central government can use real-time data to better understand the local energy consumption situations. The carbon budgeting system can be integrated with trading mechanisms and become part of the national carbon trading scheme to enhance flexibility in compliance [67,68].

4.3. Carbon rationing: individuals

Perhaps the most controversial form of eco-surveillance involves personal carbon rationing and monitoring all individuals who are responsible for carbon emissions through their everyday activities. This idea, also known as personal carbon allowance (PCA), can be introduced and effectively enforced through mass surveillance [69]. The idea is to assign all adults a carbon allowance that reduces over time, in line with national targets [70]. PCA typically encompasses direct carbon emissions from energy consumption related to travel, space conditioning, water heating, and electricity, but can also account for the embodied emissions from food and consumption. Allowances are deducted from the personal budget for every carbon-emission practice. The scheme is likely to be highly complicated, requiring the handling of emission record with high frequency, volumes, and diversity. Furthermore, the allowance can be traded to enhance flexibility and create monetary incentives [71]. This idea was proposed in the 1990s; however, no practical schemes have been implemented because of technological barriers [69]. In particular, an accurate and timely deduction of the allowance is key to the success of PCA, and digital surveillance can be used to achieve the objective. The rollout of smart energy meters allows for the real-time monitoring of energy consumption in households [72]. Furthermore, surveillance technologies developed to fight COVID-19, especially contact tracing, can provide useful information on how to estimate emissions by tracking movement history. Indirect emissions from food and other consumption can also be estimated using mobile apps to capture personal travel history, dietary behaviors, and purchasing habits, which can then be used to estimate carbon emissions [73]. Therefore, surveillance technologies for PCA are developing rapidly. This scheme must be made compulsory to achieve its impact. Here, grassroots quasi-governmental organizations such as residential committees can play an important role in facilitating and enforcing the adoption of the system by the public. Furthermore, personal carbon rationing can be integrated into apps such as WeChat and Alipay to further integrate the system into digital platforms.

5. Conclusion

The COVID-19 pandemic has accelerated the adoption of surveillance in China and worldwide and may set a precedence for the use of surveillance in other policy domains. This article intends to provoke a discussion and debate on the future of environmental and climate governance in this context. The argument is that surveillance is likely to be a key part of China's strategy to achieve carbon neutrality. Surveillance can play an important role in enforcing the national carbon rationing system by providing accurate information to the central government regarding whether local authorities, businesses, and the public are abiding by the assigned emission quota.

It should be noted that eco-surveillance is a complex multisector system. Some of the surveillance of local governments and enterprises is relatively noncontroversial and is probably barely visible to the public. In contrast, the use of surveillance to control public emissions is likely to have far-reaching implications, as carbon emissions are deeply embedded in the global economy and everyday life. The implication of an eco-surveillance state obviously reaches far beyond simply climate protection, but also delves deep into the debate on human rights and justice. Those who see climate change as an existential crisis would likely support the use of invasive surveillance, acknowledging the need to sacrifice personal liberty and privacy for climate stability. Those who are less pessimistic about the future climate are likely to be more concerned about the socio-political impact of surveillance. Perhaps the real debate is on how to balance, or even resolve, the tension between the urgency of climate action and concerns, such as privacy protection and liberty, and ensuring public participation in the decision-making process [73]. Transitioning away from carbon-intensive growth is urgently needed, but it is also important to do so in a just and socially acceptable manner [74–77]. In this sense, the power offered by surveillance could be appealing, but socio-political concerns are real and should be addressed as much as possible. Finding a middle ground between these potentially conflicting priorities could be a challenging task for climate governance theorists and practitioners.

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