

Emerging independent government science advice in the Philippines in a time of crisis

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The meteorological and climate events of the last 15 years in the Philippines have been framed as crises needing science-informed advice. The disasters brought upon Typhoon Ketsana (Philippine name "Ondoy") in 2009 in the National Capital Region by Supertyphoon Haiyan (Philippine name "Yolanda") in 2013 in the central Philippines brought to public attention the need to come up with efficient science modes of government science advice for disaster risk reduction and management (DRRM) policies. In the wake of these disasters, there was a need to understand the meaning of "resilience" within the Hyogo Framework (Dialante et al 2012). While science-based approaches to DRRM have provided the theoretical base for disaster resilience, translating these to praxis and policy has proved challenging.

DRRM in the Philippines was legislated by Congress as the DRRM law or more formally as Philippine Disaster Reduction

and Management Act (Republic Act Number 10121). This law institutionalizes and mainstreams capacities in disaster management at every level of governance, disaster risk reduction in physical and land-use planning, budget, infrastructure, education, health, environment, housing, and other sectors. The law also institutes the establishment of DRRM councils at each level of government. The councils are composed of members from government departments, the armed forces and police, civil society, humanitarian agencies but most notably, does not include academic research scientists.

While the academic science research community was instrumental in DRRM policy, their absence in the DRRM councils at each level of governance is emblematic of the role of effective and formal and informal government science advice in the Philippines. A study commissioned by the independent think tank Odi.org and by researchers of De La Salle University in Manila (Pellini et al 2013) concluded that there is a "low uptake of research and analysis" to inform local decision in DRRM. It is at this level of governance where government science advice

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is much needed especially in crises. And much of this science advice came from independent and informal actors such as civil society organizations (CSO) and people's organizations. (PO). The formal modalities of science advice, largely ignored in the law, are not adaptive to crisis and the DRRM has shown that this is so. In this gap, informal science advice fills in the need.

In this essay, we comment on the prospects of independent government science advice in the Philippines. In the COVID-19 pandemic, independent science advice has proven as more effective in providing government science advice but has certain constraints and limitations. This role of independent science advice is influential in Science, Technology, and Society studies especially in the context of countries' level of development, political cultures, and the size, strengths, and weaknesses of academic science communities.

The Philippine science advice ecosystem

Science advice for the government may take two forms, formal and informal. This can further be classified as solicited and unsolicited. Formal science advice is given by state-chartered science academies, national and state research universities, private research universities with formal recognition from the state as centers of excellence, and government science research agencies. Informal science advice is provided by scientific societies and associations, science-oriented civil society and peoples' organizations, and private think tanks and consultants.

If science advice were formally sought by the government, then it would have been solicited; if it were not sought but was presented for consideration, then it would have been unsolicited. We recognize that government may solicit science advice from formal and informal science advice actors. Organizations with a government mandate or charter can give formal and unsolicited advice (Vallejo and Ong 2020). This is occasionally done by the University of the Philippines which in certain instances, offers formal but unsolicited advice. We can metaphorically call this community of science advice actors a "science advice ecosystem", a term popularized by the former Chief Science Advisor to the Prime Minister of New Zealand and former President of the International Network of Government Science Advice, Sir Peter Gluckman.

In the Philippines, Presidential Executive Order 812 created the National Academy of Science and Technology (NAST). The NAST is the formal science advisor to the President of the Philippines. The government solicits science advice from the NAST which provides these as position or white papers to the government through the Secretary for Science and Technology for consideration. The NAST is not a wholly independent body from the government. It is attached to the Department of Science and Technology (DOST) for administrative and fiscal purposes. By the law constituting it, the scientific advice provided by NAST is formal and solicited. The Philippines has no one Chief Science Advisor (CSA) to the Head of Government as in the UK, New Zealand, Malaysia, and other member countries of the Commonwealth. The CSA concept is premised on having a chief advisor who has high credibility, is well renowned in science, and is acceptable to all political interests in government. This however may not be transplantable to Filipino political and academic culture without a shift in social attitudes and governance paradigms. Academic culture in the Philippines has not yet fully developed a trans and cross-disciplinary ethos. Science advice in the Philippines is closed and places a premium on credentials. Because of this, it is more likely that expertise and policy boundaries are deterministic rather than flexible and less adaptive to uncertainty which characterizes a crisis (Bjilker et al 2009).

The University of the Philippines (UP) is designated by its charter (Republic Act Number 8500) as the national, research, and graduate university. As such, UP is mandated to provide science advice to the government. UP academics in their individual capacities may provide formal and solicited science advice if they are appointed to do so by the university. Otherwise, they provide informal and unsolicited advice. As many UP academics are members of think tanks and scientific associations, their advice in this capacity is informal but could be solicited.

Academics who are part of non-government science academies such as the Philippine American Academy of Science and Engineering (PAASE) or professional societies informally provide solicited or unsolicited science advice. Whatever the science advice, this is presented as scientific papers, position papers, or white papers. Informal science advice is disseminated by the organizations through print, broadcast, social media, and webinars (a popular information avenue arising from the effects of the COVID-19 pandemic).

The science advice ecosystem in the Philippines is diverse with each actor having its own political and development advocacy and professional competency niche. The system is largely ad hoc and informal, as science advice given to the government is largely unsolicited. This dynamic determines its role with the government. When these science advice actors are consulted by the government, they are all *primus inter pares* in dealing with political actors in government. In the informal science advice community, there is no umbrella group or alliance as groups are defined by professional and disciplinary competencies. Members of the science advisory bodies are mostly practicing academics. They are all knowledge producers and users at the same time. This we will examine as a shortcoming especially in a crisis.

Science advise in crisis: COVID-19

COVID-19 is a global scale science policy "wicked problem" (Ritter and Webber 1973) where a problem lacks definition because multiple and often incompatible characterizations are possible depending on the agents' perspectives and underlying values especially of the uncertainties involved. With these, there cannot be a single deterministic solution to a problem but rather but a variety of multiple and often contradictory solutions. Many of the practical approaches for a solution will be ad hoc and emergent and at times will be a product of consensus in weighing and considering scientific evidence.

And so, we can consider COVID-19 as THE crisis where the structures, protocols, and modalities of government science advice worldwide were tested and examined especially in the science-policy interface (SPI). The consensus of government science advisors is that the structures are largely ad hoc and informal, and this has resulted in various political and health policy outcomes. The demands of understanding SARS CoV-2 and COVID-19 require coherence in the collection, reporting, and analysis of data for evidence synthesis. The latter is needed in policy making and it is here where major gaps in government science advice have been noted.

These gaps are a consequence of the uncertainty of outcomes associated with the pandemic. The pandemic requires a rapid evidentiary synthesis of scientific information which under accepted science advice modalities, should have passed the standard of peer review. With the explosion of scientific papers on COVID-19 published either as pre-prints or under open peer review under a fast-tracked arrangement, there is a question of the reliability of the review for the science published. While in general, the quality of peer review for COVID-19 science has

not declined, there has been a shift in criteria for evaluation, especially for the medical and epidemiological literature. There also have been lesser requests by readers by clarification, additional experiments and comments tend to be more cooperative (Horbach 2021). This likely is a consequence of the urgent need for evidence. The long-term ramifications for science, especially under crises remain to be seen.

The above-mentioned situation complicates the function of science advisors who under the post-normal science (PNS) (Funtowicz and Ravetz, 2003) paradigm will have to consider the plurality of evidence, the value bias evidence, uncertainty, and the diversity of views. This diversity of views is crucial when science meets the policy nexus (Gluckman 2016). When presenting synthesized evidence, Gluckman (2016) suggests that as part of the science advisory process, trust-building is important in the goal of presenting science-informed policy options to the government and maintaining the privilege of science information for government advice.

PNS is also predicated by a well-established system of academic and extended peer review. A small science community constrains the effectiveness of peer review as well as evidentiary synthesis. Peer review and evidentiary synthesis are partners in assuring the quality of science advice. And the advice must be communicated to its users and beneficiaries.

The succeeding sections illustrate some of the issues and praxis of science advice in crises especially when a national science community is small, and the system of research universities is in its development stage.

Challenges and opportunities for science advice

The Filipino science community is small, and this presents an interesting context and challenge for government science advice. If formal science advice is the norm, a large and active science community is necessary, especially in the system of well capacitated and productive research universities and at its apex the National Academy of Science and Technology (NAST). In the People's Republic of China, the Chinese Academy of Science (CAS) is partnered with think tanks in providing formal science advice to the Central Government (Li et al 2016). The inclusion of think tanks is to extend the review and evidence synthesis process and thereby maintain the quality of science advice. In the Chinese system, science advice is formal.

In countries where the science community is small and politically underrepresented, performing these well-defined functions will be difficult due to a lack of experts and the range of scientific expertise they can provide. In the Philippines, most of the research and evidence generation is with the University of the Philippines (UP) and the other research universities do not match the capacity of UP in knowledge generation. Individual academics may provide independent, informal, and usually unsolicited science advice. Academics also are more prone to role conflation as generators, users, and reviewers of science advice. Even in an advocacy role, this conflation is present. In these conflated roles, the academic may be prone to political pressure and co-optation. When the academic is appointed to be seconded to a government bureaucracy, then he/she cannot act as a broker as he/she will have to make policy recommendations. It is not possible for a science advisor to occupy the role of science knowledge generator, broker, reviewer, and user at the same time.

The small science communities and the problems of role conflation of science advisors can only be remedied by increasing the size of the active science community and providing opportunities for an independent and extended review.

To a certain extent, this can be performed by private think tanks, science-oriented civil society, and people's organizations. However, these organizations are likely to have certain political or economic advocacies that may hinder their effectiveness in trust-building and evidence brokerage with the government of the day. This is also an extension of role conflation earlier mentioned.

Emergent Independent Science Advice: the case of OCTA Research with IATF-EID

The Inter-agency Task Force on Emerging Infectious Diseases (IATF-EID) is the government's main policy recommending body for COVID 19 suppression and is composed of members from the cabinet and health agencies of the government. The IATF-EID is not a scientific evidence-synthesizing or peer review body. It must rely on many science advice actors as consultants who are expected to provide evidence synthesis and review. Among the science advisory actors is OCTA Research (hereafter referred to as OCTA). OCTA is composed mainly of academics from the University of the Philippines and the University of Santo Tomas as well as medical practitioners, media specialists, legal and political consultants, and independent government science advisors. OCTA has emerged as the leading science advice actor for COVID 19. As it provides science advice directly to the public and does not sit as a consultant with IATF-EID, it provides independent and unsolicited science advice.

OCTA bills itself as a "polling, research, and consultancy firm". That OCTA was initially identified in media reports as the "University of the Philippines OCTA Research group" is expected as academic credibility is a premium in the Philippines as in other countries (Doubleday and Wilsdon 2012). This however can constrain its political relationship with government science advice actors and so OCTA had to publish disclaimers that while it is composed of mostly University of the Philippines academics, it is an independent entity. From official government data sources, OCTA epidemiological modelers and policy analysts have provided robust estimates on the COVID 19 reproductive number R_0 , positivity rates, hospital capacity, and attack rates at the national, provincial, and local government levels every fortnight beginning April 27, 2020. It has since issued 56 advisories and updates. Local and provincial governments have used their forecasts in deciding quarantine and lockdown policies in their jurisdictions. OCTA publicly released these forecasts on academic websites, institutional media, and social media. This allowed for public vetting and extended peer review with other independent scientists validating its forecast estimates.

OCTA has been asked to give policy options on quarantine lockdowns. It is in lockdown policies that uncertainty perception takes on a large political dimension (Gluckman 2016; Domette and Pearce 2019, 1). Science advisors must provide forecasts on the trajectory of R_0 for politicians to decide on tightening or relaxing quarantine. In this manner, OCTA has provided not only the quarantine grade option but the best option while recognizing that the data quality constraints.

OCTA is not immune from role conflation and this has been a focus of political criticism. Its fellows who are academics of research universities are targets of this criticism with unwarranted demands for them to be completely alienated from their academic institutional linkages (Manila Times 2021). OCTA's weakness, and the weakness of the Philippines crisis science advisory system overall, is the lack of external and extended peer review. This is a consequence of a small science community where few actors can perform this role effectively with citizen scientists. In a PNS advisory environment, the role

of extended peer review is important in validating policy options and creating public consensus.

Role conflation is also related to the dampening of scientific evidence. This is symptomatic of political pressure on science advisors to ensure that scientific advice conforms to political expediency. This is made worse by science advisors not coming to a consensus about uncertainty. Pandemic policy response is all about the management of multiple epidemiological uncertainties and science advisors must not issue divergent epidemiological estimates and unwarranted uncertainty. In the UK, the politics of conflation in science advice was demonstrated when two esteemed epidemiologists belonging to two research groups, Professor Neil Ferguson of the Imperial College London (ICL) and Professor John Edmunds of the London School of Hygiene and Tropical Medicine (LSHTM) released R0 estimates to the public. ICL and LSHTM provided advisories to media and the UK government Science Advisory Group for Emergencies (SAGE), with two different estimates for R0. The ICL estimate (2.0 – 2.6) was earlier made known to the media while the LSHTM estimate (2.7-3.99) underwent peer review and was published in *Lancet Public Health* (Davies et al 2020). The two estimates became the focus of controversy as the UK Chief Science Advisor Professor Patrick Vallance echoed Edmunds's claim of a case doubling time of 5-6 days. The SAGE consensus was 3-4 days, thus necessitating a sooner rather than later lockdown. The question of when to impose a lockdown is also a political matter. This placed SAGE and its established protocols of keeping experts anonymous under public criticism and scrutiny (Pearce 2020).

Consensus building on an extended and identifying policy options for science advice is a modality that is now only emerging in the relationship between the science community and the government. OCTA has taken steps for consensus with IATF-EID and government ministers on pandemic management. Political leaders recognize that in this de facto relationship there is an advantageous occasion to demonstrate personal leadership to their constituencies which expect effective but personalistic crisis management. Business leaders also have recognized the importance of consensus in weighing policy options. In this context, independent science advice plays a crucial political dynamic by building public trust, ensuring reliable statistical estimates reviewed by the academic science community, and managing political advantages and risks. The public needs to see the advice as legitimate in its science, political, and social contexts (Rainey et al. 2021, 3)

OCTA also has experienced the same quandary of the UK's SAGE with IATF-EID on the problems of "dampening of evidence" and divergent epidemiological estimates. These were the result of minor differences in modeling approaches with IATF-EID's internal consultants' estimates even if the same data set was used. OCTA has taken great care that its experts come up with a consensus estimate from various modeling trajectories that were done. This is to insulate the think tank from political pressure and to build public scientific credibility, especially with local government unit (LGU) executives, who are the immediate users of OCTA science advice. This mirrors what has been noted in DRRM, where LGU executives are more open to local informal science advice.

OCTA's emergent modalities may be a model for other independent science advisors focusing on science and society issues such as climate change, DRRM, and food security. The new modality addresses the lack of "strategic agility" of the Filipino science community and government to mobilize scientific expertise and synthesize science-informed advice options in governance (Aguilar 2020). Independent science

advisors can act as a "challenge function" to government experts whose recommendation may be dampened if not ignored will contribute to further erosion of public trust in government (Dommett and Pearce 2019). Independent science advice when framed in the context of parliamentary democracy can be likened to "shadow cabinets" in this way they provide a check, balance, and review of scientific evidence and is called "shadow science advice" (Pielke 2021). Explicitly including independent science advice in crisis response legislation such as the DRRM law may improve the use of science-informed advice at all levels of governance, especially at the local level.

This 'shadow advice' culture can only be developed by increasing the size and the disciplinary range capacity of the science community. There is also a need to cross-disciplines in science advice in the Philippines where social scientists are sidelined and marginalized in crisis government science advice. As a first step, an independent but national science advisory group can act as an extended peer review body for independent and government-sourced science advice. This networked group is roughly analogous to the UK government's SAGE but has more independence for review. As pandemic and environmental crises are "wicked problems", there is a need to have a wide disciplinary bench for PNS consensus building. Independent science advice, therefore, is a challenge for the Philippines to invest more in its scientific community.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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The authors contributed equally to all sections of this commentary.

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