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Environmental urgency versus the allure of RCT empiricism ☆

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ABSTRACT

Environmental impact mitigation and conservation projects have also come under the ambit of Randomized Control Trials (RCTs) usage by economists to ascertain the efficacy of specific interventions. However, there are several concerns about the usage of this technique for environmental decision-making which go beyond the usual methodological critiques raised within economic discourse. Environmental planning has established methods of gauging behavioral effectiveness through deliberative processes and collective policy design such as participatory GIS and charrettes. Given the expediency of environmental action when dealing with ecological degradation as well as a normative need to infuse learning about natural resource scarcity and quality, such deliberative methods are far more cost-effective and help to build community relationships and social capital as well. RCT application in environmental policy thus deserves more critical appraisal and should be applied in concert with deliberative planning techniques.

1. Introduction

Human decisions on long-term environmental protection and sustainable use of natural resources are often not incorporated within the short-term calculus of economic gain and commonly treated as "externalities" by mainstream neoclassical economists (Buchholz & Rübbelke, 2019). The term implies that conventional market forces are not able to capture the negative impacts of ecological harm. To this effect, Randomized Control Trials (RCTs) have also been applied to environmental conservation and pollution mitigation decisions in low-income countries with the suggestion by Greenstone and Jack (2015) that a field of "Envirodevnomics" is emergent. The marginal willingness to pay for prevention of environmental harm, even when linked to personal health, remains relatively small in low-income countries and RCTs offer the potential promise of more targeted policy intervention in this regard.

In comparison with earlier techniques in environmental economics such as contingent valuation surveys which provided stated preferences data, RCTs provide a revealed preference approach which has greater empirical credibility, albeit with questionable statistical accuracy (Deaton & Cartwright, 2018; Sampson, 2018), especially in comparison with its original usage in public health research (Favereau, 2016). However, the challenge of applying this technique to environmental problem-solving stems from the expedient need for environmental protection, coupled with the inextricable interaction between ecological and social systems that defy a linear evaluative process.

2. Science-based ecological targets for conservation or pollution control

Given the irreversibility of certain kinds of ecological damage such as species loss or toxic contamination, policy interventions need to be more urgent than other areas of development policy. Furthermore, the impact thresholds for natural systems are exogenously determined by scientific parameters as is the case for climate change. The role of RCT interventions to test specific behavior patterns of participants can thus be a methodological luxury which socio-ecological systems cannot afford. In most cases the question the RCTs address are a "validation of common sense" even though the proponents play up some rare counter-intuitive findings in specific cases which might not even be transferable (Reddy, 2019). Instead the focus of the intervention should be on multiple pathways of effectiveness for preventing leakage of aggregate impact in the system. RCT researchers are intent on trying to see if their intervention is making an impact compared with individual behavior in the desired direction regardless of an intervention ("additionality" challenge as noted by Jack & Jayachandran, 2019). Yet, ascertaining such factors is of little consequence for broader environmental planning.

As an example, consider the RCT on payment for ecosystem services (PES) in Uganda's forests conducted by Jayachandran et al. (2017). The study comprised 121 Ugandan villages over 2 years, 60 of whom received a payment for forest conservation while the

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rest were a control. Remote sensing was used to measure the extent of forest loss in both settings, and the research concluded that payments were an adequate incentive for farmers to conserve around twice as much forest as without the payments. However, the impact of such an intervention could arguably have been more efficiently evaluated by holding a series of carefully monitored design charrettes for PES in the villages (Condon, 2008). A range of stakeholders at these charrettes could have been provided remote sensing images to show how forest loss can be effectively monitored or enforced, and having all 121 villages follow through on conservation efforts in far less time and monetary investment. Furthermore, if there was violation mid-way, there could be action taken to calibrate the payments. Participatory geographic information systems (P-GIS) analysis could also be used to delineate those areas of land where some food crops could be grown.[1] Such an approach would specially address the longer-term concerns about PES studies that show a loss of income and increase in poverty of areas after the initial "high" of cash payments (Yang, Yang, Zhang, Connor, & Liu, 2018).

3. The environmental enforcement imperative

Other applications of RCTs in the environmental arena pertain to incentives provided for improvement of pollution audits. In a landmark study in the Indian state of Gujarat (Duflo, Greenstone, Pande, & Ryan, 2013), third party audit incentives were changed so that payments came from a pool rather than industries and monitoring was introduced. The results, as expected after a two-year trial, showed improved quality of audit outcomes as there was less conflict of interest (no particular new insight after 2 years). In a follow-up study (Duflo, Greenstone, Pande, & Ryan, 2018) subsequently considered how pollution standards are enforced by environmental regulators in India. Here the experimenters, decided to double the inspection audits across the board in half the plants (randomly selected) while keeping the usual norm of inspections for the control. The results may seem counter-intuitive at first because they showed that there was marginal difference in enforcement actions in the intervention set even with increased inspections.

However, as the same authors of the study stated afterwards, this result was misleading because the original inspection profile from the regulators targeted specific plants which they knew had a history of violations while good performers had less audits. A far more efficient way to refine environmental policy in this example would have been to simply do a pollution control focus group between the industry and the regulators following a longitudinal analysis of pollution enforcement data on file. Not only would the targeting approach have been quickly validated without a two year, costly and delayed process but also there would have been an opportunity to consider pathways of getting the laggards to comply as well in the future.

Furthermore, in cases where RCTs present the failure of a technical intervention, the usual explanation provided is a "lack of enforcement." For example, in a much-cited decision of the Karnataka state government in India to discontinue a biometric attendance system for doctors based on an RCT (Dhaliwal & Hanna, 2017), the explanation provided is that government was reluctant to penalize doctors for being absent. However, the role of planners is precisely to formulate policy interventions which have greater chance of compliance and ease of enforcement through a dialectical process rather than a linear intervention. The biometric system and the penalties needed to be better calibrated upfront, or alternative enforcement options formulated. In terms of policy impact, the RCT's limited external validity can be highly problematic in environmental decision-making where planetary processes are at play (Peters, Langbein, & Roberts, 2018). In this case it is quite possible that the RCT led to an ejection of a potentially useful system applied worldwide for attendance and security, without providing a viable alternative or solving the problem of doctor absenteeism.

4. Towards methodological hybridity in environmental planning?

To their credit the proponents of RCTs, especially the Abdul Latif Jamil Poverty Action Lab at MIT (JPAL), have brought a team-work ethic to economic inquiry. RCTs require vast partnerships with public and private sectors as well as with nonprofits to implement the experiments. Yet these partnerships are largely instrumental towards the experimental goal rather than being organically part of the research inquiry itself. Perhaps a way forward with RCTs in an environmental planning context would be to use these partnerships also for deliberative planning techniques being applied, such as participatory GIS, while the RCT is being carried out. However, the empirical purists would perhaps think this would distort the sought for linear linkages of the experiment itself.

For complex adaptive systems in which environmental problems operate, RCTs can provide some useful micro-insights in specific cases but with limited opportunities for transferability. In contrast there could be "natural experiments" of revealed preference that can garner important environmental insights such as the study by Gillingham, Houde, and van Benthem (2019) on consumer choice in fuel efficient cars purchase. Planners also engage in "experiments" in their applied research in what Ansell and Bartenberger (2016) define as "generative experiments." Building on the work of the late MIT urban planner Donald Schön, they present the iterative process by which such an approach attempts to iteratively refine an intervention with a goal of reaching a successful outcome. For mitigation of environmental harm such persistence and a deliberative process that considers collaborative adaptive management for sustainable compliance is particularly appropriate (Roy & Gow, 2018). In contrast, given their narrow focus and relative inflexibility of refinement during the experimental phase itself, the argument that RCTs make policies more efficient is highly questionable in environmental contexts.

RCTs may well be more suitable in educational interventions where the method was originally applied by Kremer (2003). Such a simple didactic learning context, is closer to the clinical roots under which RCTs were originally developed. If resources are available and there is less urgency of irreversible impact, "parallel experiments" might also be considered for environmental cases (Ellerman, 2014). Given the potential for irreversible ecological harm due to errant human behavior in environmental systems, policy interventions need rapid calibration as well as continuous and adaptive social learning. Methods which are able to deliver on such multiple objectives are likely to be more effective in meeting environmental conservation goals. The role of RCTs in such a context should be considered as a supplement with circumscribed policy evaluation metrics, rather than a filter for individual policy interventions.

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[1] Details on a range of participatory methods including P-GIS can be found on the online compendium from the Institute for Development Studies – University of Sussex: https://www.participatorymethods.org/ (Accessed, November 5, 2019)

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