The Hong Kong University of Science and Technology
Dept of Information Systems, Business Statistics and Operations Management
Zoom Webinar Announcement

Avoiding Fields on Fire:
Information Dissemination Policies for
Environmentally Safe Crop-Residue Management
by
Dr Mehdi Farahani
Postdoctoral Associate
Massachusetts Institute of Technology

Date	:	**13 December 2021 (Monday)**
Time	:	**10:00 - 11:15 AM**
Zoom ID	:	**915 8229 8109 (passcode 162225)**

Abstract: Agricultural open burning, i.e., the practice of burning crop residue in harvested fields to prepare land for sowing a new crop, is well-recognized as a significant contributor to CO_2 and black-carbon emissions, and long-term climate change. Low-soil-tillage practices using a specific agricultural machine called Happy Seeder, which can sow the new seed without removing the previous crop residue, have emerged as the most effective and profitable alternative to open burning. However, given the limited number of Happy Seeders that the government can supply, and the fact that farmers incur a significant yield loss if they delay sowing the new crop, farmers are often unwilling to wait to be processed by the Happy Seeder and, instead, decide to burn their crop residue. We study how the government can use effective information-disclosure policies in the operation of Happy Seeders to minimize agricultural open burning. A Happy Seeder is assigned to process a group of farms in an arbitrary order. The government knows, but does not necessarily disclose, the Happy Seeder's schedule at the start of the sowing season. Farmers incur a disutility per unit of time while waiting for the Happy Seeder due to the yield loss as a result of late sowing of the new crop. If the Happy Seeder processes a farm, then the farmer gains a positive utility. At the beginning of each period, each farmer decides whether to burn her crop residue or to wait, given the information provided by the government about the Happy Seeder's schedule. We propose a class of information-disclosure policies, which we refer to as dilatory policies that provide no information to the farmers about the schedule until a pre-specified period and then reveal the entire schedule. By obtaining the unique symmetric Markov perfect equilibrium under any dilatory policy, we show that the use of an optimal dilatory policy can significantly lower the number of farms burnt compared to that under the full-disclosure and the no-disclosure policies. Using data from the rice-wheat crop system in northwestern India – an area of the world with the highest prevalence of open burning – we conduct a comprehensive case study and demonstrate that the optimal dilatory policy can reduce CO_2 and black-carbon emissions by at least 14%.

Biography: Mehdi Farahani is a Postdoctoral Associate at MIT Center for Transportation & Logistics. His research has been mainly focused on Socially-Responsible Operations, Service Operations Management, and Supply-Chain Contracting. Mehdi received his PhD in Operations Management from Jindal School of Management, University of Texas at Dallas, where he was awarded the Best PhD Student of the Year and the Dean's Excellence Scholarship, and was nominated for the Best PhD Student Teacher award. Mehdi's works have been accepted for publication at leading academic journals such as *Operations Research* and *Manufacturing & Service Operations Management*. He has also worked as an Operations Research & Data Scientist at Nordstrom Inc. where he developed algorithms for inventory management in omni-channel distribution networks.

All interested are welcome!
Enquiries: Dept of ISOM