

## **Lessons from global Genotype x Environment x Management (GxExM) systems research to unlock yield potential.**

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Advances in individual technologies (e.g., genetic improvements, new pesticides, seeding technologies) are of little benefit until they are melded into resilient Genotype x Environment x Management (GxExM) systems that will flourish in the field under unpredictable conditions. For example, while breeders develop new cultivars with higher potential yield and resistance to abiotic and biotic stresses, agronomists must design and help implement cropping systems that allow the potential to be realised in a range of environments. These cropping systems must also maintain or improve soil, water and air quality, and ensure profitability and economic security for farmers. In the face of ever-rising input and capital costs, a fragmented or silo-mentality approach will never provide farmers with the yield gap closure needed to maintain a viable farm business. Thus, acceleration in the pace of innovative and integrated approaches adopted on-farm is the key to unlocking the potential of GxExM synergies, which is critical for both yield stability and meeting the ever-increasing global market demand for wheat. For agronomists and producers, the key to overcoming production challenges is to harness these synergies from GxExM interactions to develop production systems that suit specific agroecozones and close the yield gap between what is genetically possible vs. what is attained at the farm level. This presentation provides an overview of the concept and explores how recent GxExM systems research and selected management innovation from around the world has yielded lessons that, if embraced by the Canadian ag value chains, can lead to a resilient and transformative production system.