



The Science Source for Food,  
Agricultural, and Environmental Issues

## ***Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges***

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### **Overview:**

Today, highly automated systems are employed in crop and animal industries to enhance agricultural input efficiency and thus increase agricultural output with reduced adverse impact on the environment. Ground and aerial robots combined with artificial intelligence techniques are able to tackle the rising food, fiber, and fuel demands of the rapidly growing population that is slated to be around 10 billion by the year 2050. This issue paper presents opportunities provided by ground and aerial robots for improved crop and animal production, and the challenges associated with their progress and adoption.

### **Learning Outcomes**

- *Compare ground and aerial robots used in both row crop and animal agriculture.*
- *Describe some of the challenges farmers may face in adopting future technology.*
- *Explain how robots may change farming practices in the future.*

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### **Resources**

Access the Issue Paper, Ag quickCAST, and webinar here: <https://www.cast-science.org/publication/ground-and-aerial-robots-for-agricultural-production-opportunities-and-challenges/>

“Five Roles Robots Will Play in the Future of Farming”:  
<https://www.smithsonianmag.com/innovation/five-roles-robots-will-play-future-farming-180973242/>

“The Age of Robot Farmers”:  
<https://www.newyorker.com/magazine/2019/04/15/the-age-of-robot-farmers>

“Farming: There's an App for That”:  
<https://www.nationalgeographic.com/environment/future-of-food/food-future-precision-agriculture/>



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### **Assessment Questions**

1. Write a summary of this article highlighting 3-5 important facts you learned.
2. What are the different types of robots used on crop agriculture? Explain the different types of both ground and aerial robots.
3. What robots are used in animal agriculture? Compare the different robots that may be used in dairy, swine, and poultry farming.
4. What are the current infrastructure limitations that hinder the adoption of robotic farm machines?
5. What are some of the benefits of using robots in agriculture compared to current practices?

### **Student Reflection**

1. How do you think robots will change farming in the future? Consider environmental impacts, employment, generational concerns, infrastructure, and animal welfare.