# Prospects for improving global agricultural drought monitoring using microwave remote sensing

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**Project is joint between: USDA ARS, USDA FAS, NOAA and NASA**
**(funded by the NASA Applied Sciences Program)**

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• Globally monitoring root-zone soil moisture availability is critical for the early detection of – and efficient response to – agricultural drought.

• Multiple ***independent*** methods currently exist for such monitoring:

1) Observe rainfall → Water balance model → Soil moisture

2) Microwave remote sensing → Soil moisture

3) Thermal remote sensing → Soil moisture

4) Gravity remote sensing → Soil moisture

• All methods have unique advantages/drawbacks. The future lies in their optimal integration via data assimilation techniques.

• My particular poster focuses on the integration of #1 and #2 above (i.e., assimilating microwave remote sensing observations into water balance models).

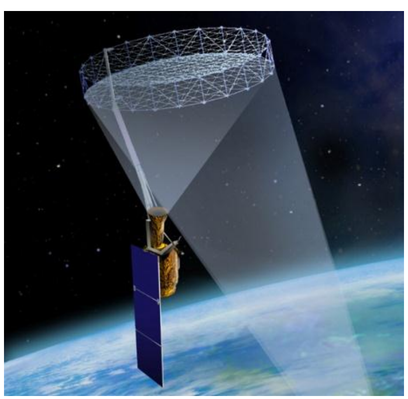
Key Results:

• Water balance modeling alone works well for agricultural drought monitoring EXCEPT in regions of the world lacking adequate ground rain-gauge instrumentation.

• Unfortunately, these under-instrumented regions are prone to food insecurity (e.g., the Horn of Africa, Western Africa and Afghanistan).

• The solution is remote sensing – assimilating microwave remote sensing observations into a water balance model compensates for errors caused by a lack of ground-based observational resources in food-insecure regions.

NASA SMAP



**Now:** System uses existing microwave satellites and delivers operationally to USDA FAS (NASA-funded).

**2015:** System will use enhanced soil moisture retrievals from the NASA Soil Moisture Active Passive (SMAP) and enhanced precipitation estimates from the NASA Global Precipitation Mission (GPM) missions.