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The U.S. Government's Global Hunger & Food Security Initiative

Crop Production & Climate Change

The Ag-Input Equation (Pesticides, Fertilizer, Seeds)

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**Workshop on the Strategic Alignment in Climate, Agriculture, and the Environment
Malawi • October 24-28, 2016**

Photo credits: Bill Thomas, Kenneth Wilson, NASA



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A person in a white garment is walking away from the viewer across a vast, flat, and severely dry landscape. The ground is covered in a dense network of deep, irregular cracks, indicating extreme drought. The horizon is low, and the sky is a pale, clear blue.

**“The past is no longer
prologue.”**

-- Lewis H. Ziska, USDA-ARS



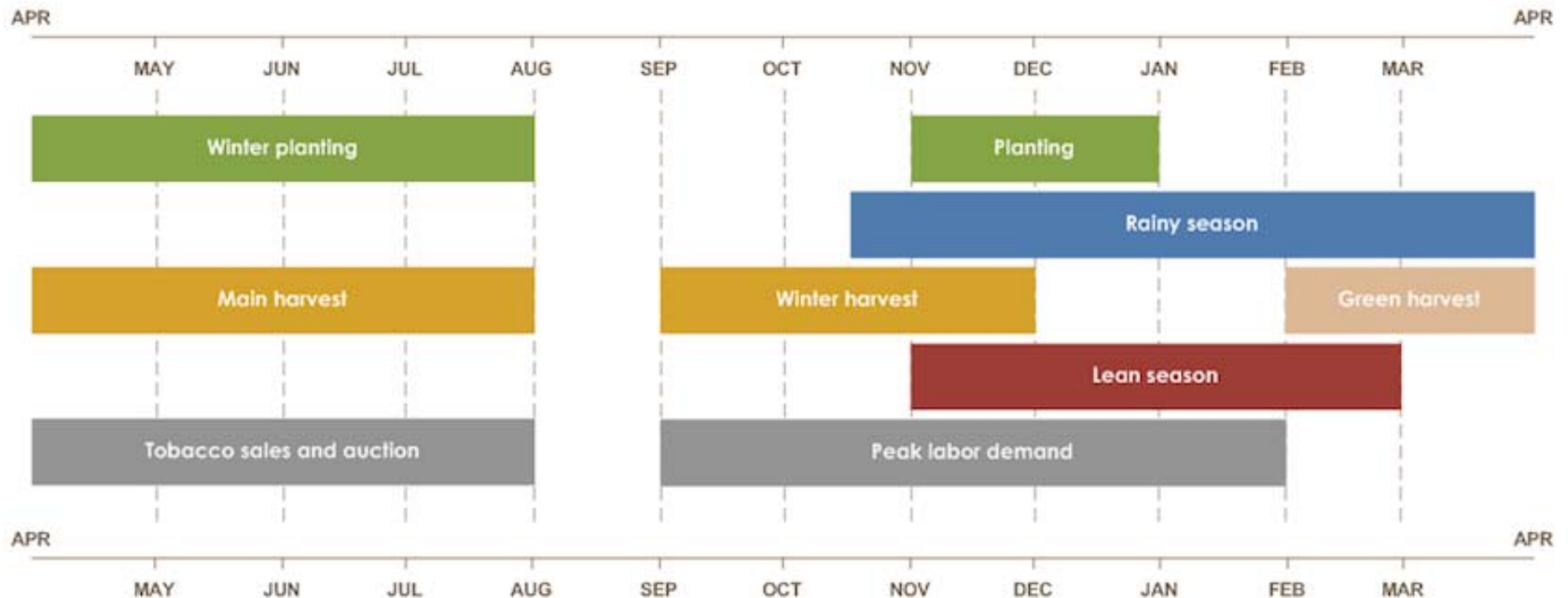
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WHAT MIGHT CHANGE?



Source: FEWSNET Malawi 2013



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Photo: Maize, Katsumwa, Malawi,
Adriana Zyskowski



Photo: Maize, Nsanje district, Malawi, Aletta
Gardner



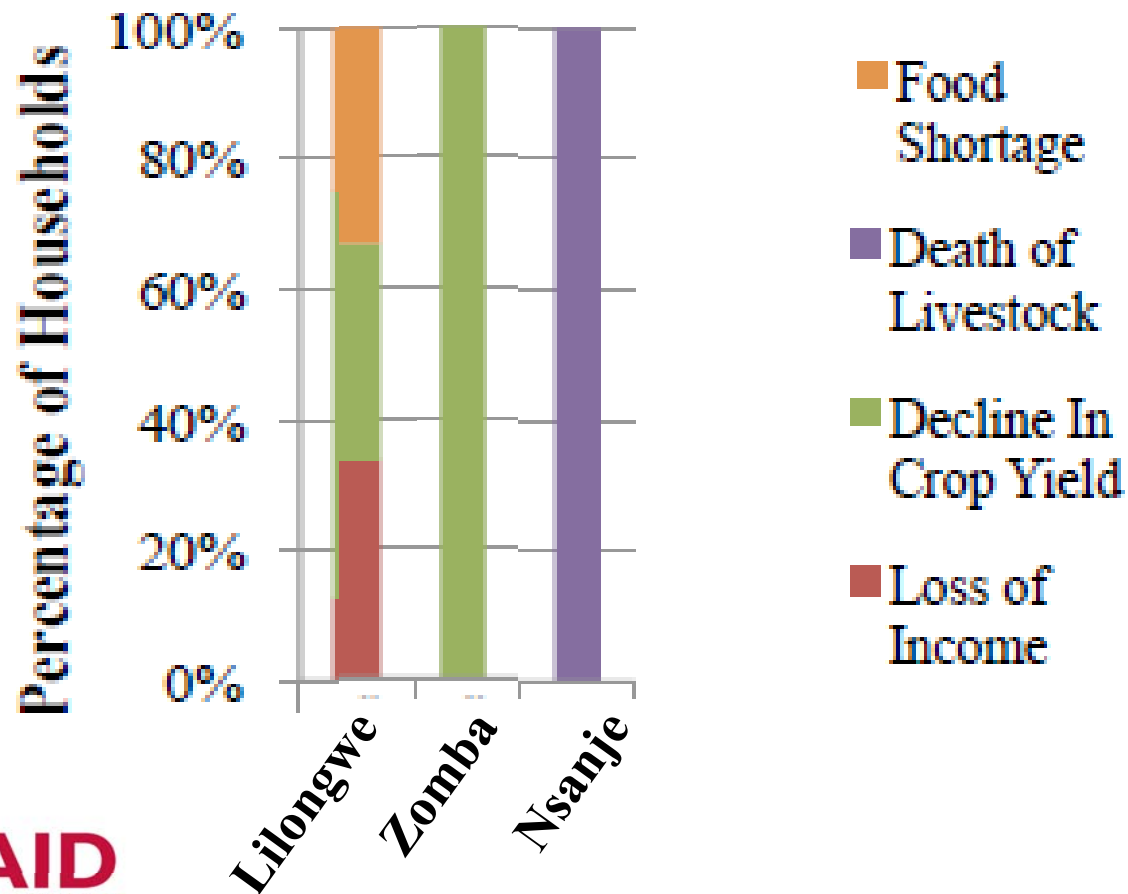
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CLIMATE SHOCK IMPACTS ON PESTS OR DISEASES (2010-2014)



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Source: CGIAR (2015)



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Ag-Inputs

- Pesticides
- Fertilizer
- Seeds
- Application equipment
- Personal protection Equipment



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Photos: Gates Foundation, Morgana Wingard



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Photos: Phil Stevenson, Dan TerAvest, T. Breedy



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Method	Pest management technique	Challenges
Cultural	<ul style="list-style-type: none">• Early maturing plants• Weeding• Good crop storage	<ul style="list-style-type: none">• Meticulous process• Length of time to adopt
Mechanical	<ul style="list-style-type: none">• Heavy equipment to disturb pest habitat• Hand-picking of pests	<ul style="list-style-type: none">• Expensive• Limited target of intervention (soil)
Biological	<ul style="list-style-type: none">• Use of living organisms to control pests through predation	<ul style="list-style-type: none">• Pest specific• Process takes a long time• Expansive technical know-how• High risk of unintended consequences
Botanical	<ul style="list-style-type: none">• Use of plant extracts to spray pests	<ul style="list-style-type: none">• Cumbersome process
Composite	<ul style="list-style-type: none">• Simultaneous application of chemical & mechanical methods	<ul style="list-style-type: none">• Expensive



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PEST MANAGEMENT IN MALAWI