

Insurance Industry Perspectives

AIR Worldwide

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Your Presenters



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Ten-member AIR Agricultural Risk Modeling Team

- Eight Ph.D. scientists
- Led by Prof. of Agronomy (former)

AIR Research Department

- 115 scientists & engineers
- 75% Ph.D.
- Severe thunderstorm (hail), hurricane, wildfire, flood, earthquake, cyber risk, climate change, supply chain



AIR Worldwide Corporation

- 750 employees; Boston based; Nine international offices
- 400+ (re)insurance, financial, and governmental organization clients
- 99% customer retention rate



Verisk Analytics (ticker: VRSK)

- 50 years delivering data, analytics, and decision support
- **S&P 500, NASDAQ 100**
- Market capitalization \$30 billion



Broader Extreme Event Analytics



Resilience and Sustainability

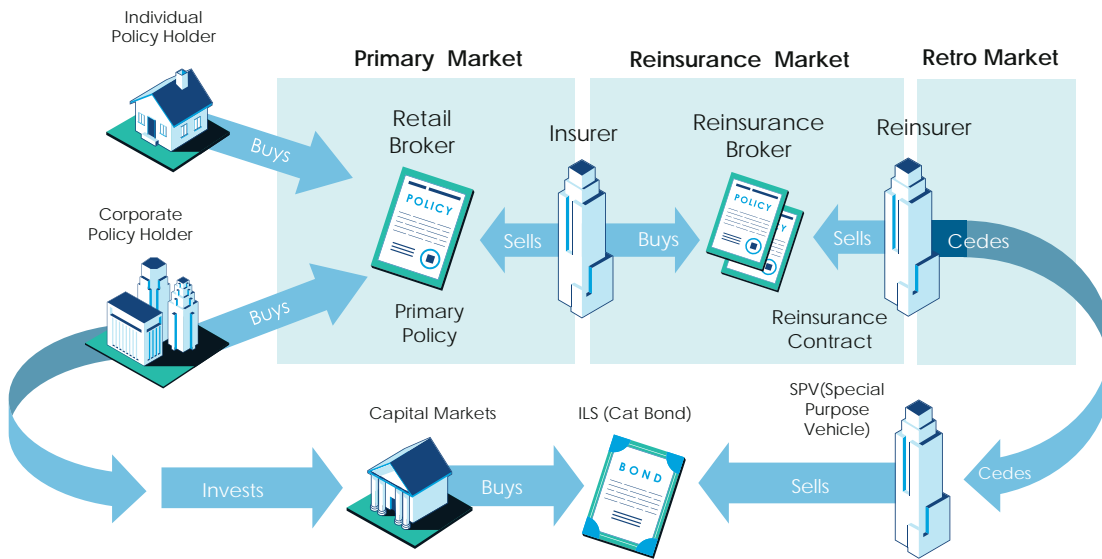


Interconnected Ecosystem



Digital Transformation

AIR Serves All Segments of the Insurance Industry



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Models

- U.S. MPCl
- Canada MPCl
- China MPCl
- India MPCl
- North America Hail Model

Catastrophe Modeling Analytics Software Application

TOUCHSTONE^{re}

Services

- Fund Designation
- Consulting Services
- CropAlert™
- Thought Leadership

Ongoing Research

- Past and future climate change effects on yield
- Extreme event impacts on crop production
- Technological drivers of yield increase
- Drought risk in sub-Saharan Africa
- Hurricane risk to crops in Caribbean region

Developing Climate Change Solutions for the Agricultural Insurance Industry

Future Risk of Climate Change



[Download](#) the white paper!

Climate Extreme Scenarios



Thought Leadership



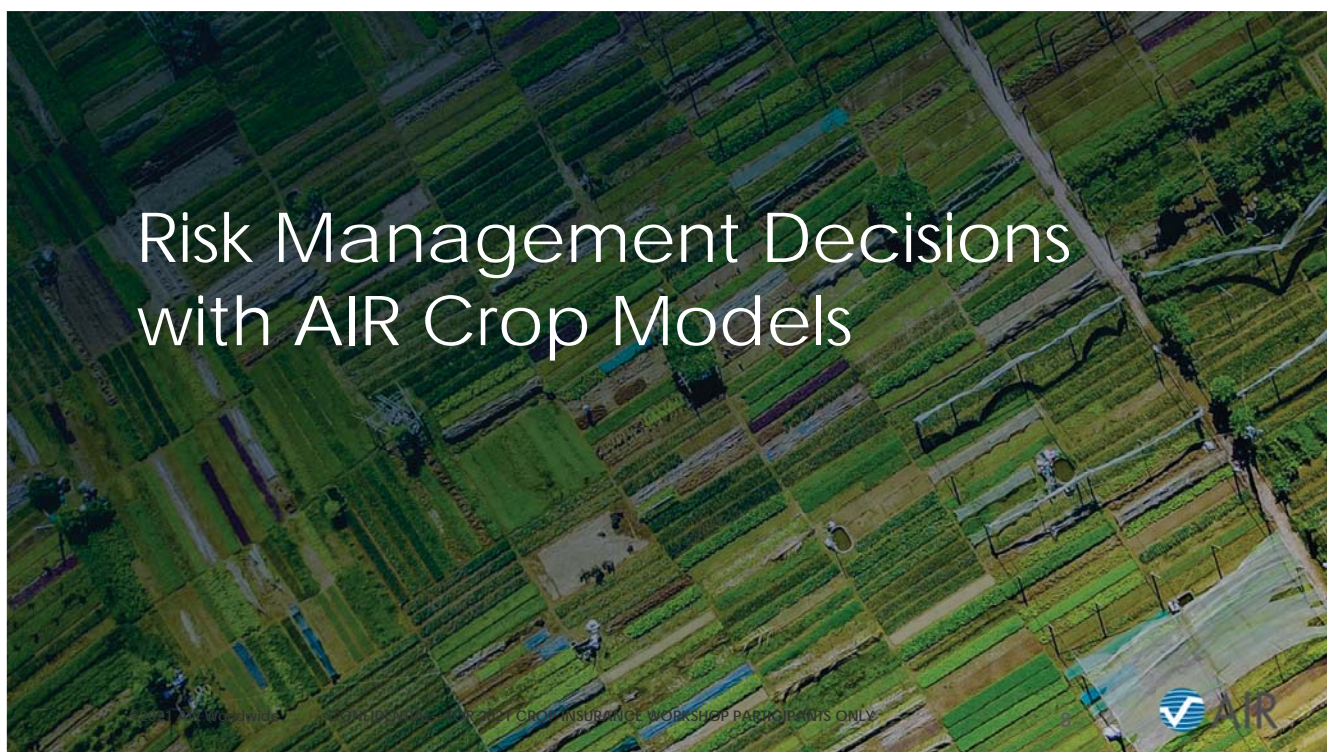
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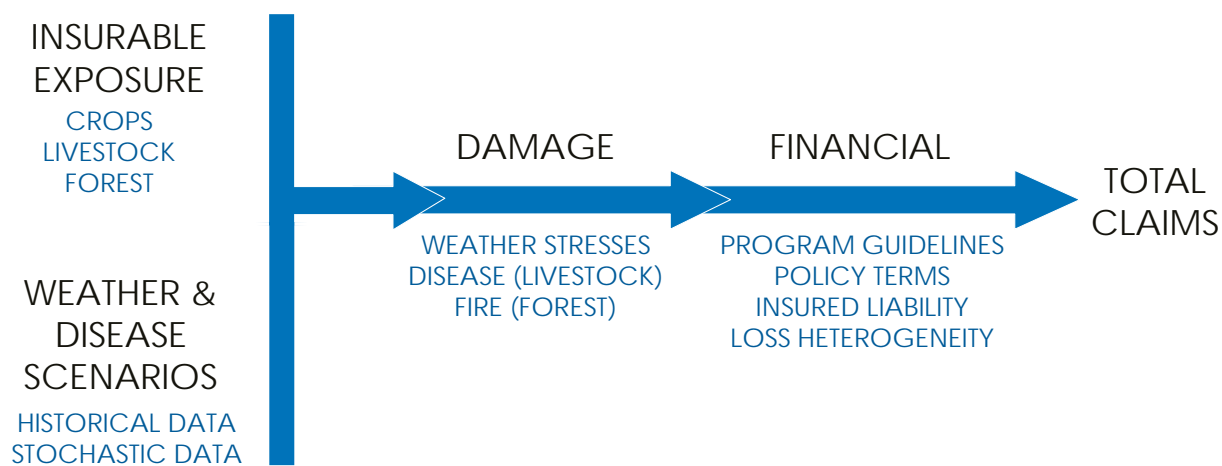
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Risk Management Decisions with AIR Crop Models



AIR Crop Models Work from the Ground Up



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Wide Variety of Crops Modeled (Touchstone Re™)

	Almond	Barley	Bean	Blueberry	Chickpea	Cotton	Flax	Grape	Lentil	Maize	Oat	PRF/AF/Api	Pea	Peanut	Pearl Millet	Potato	Rapeseed	Rice	Rubber	Sorghum	Soybean	Sugar crops	Sunflower	Wheat
U.S. MPCl	X	X	X			X		X		X		X		X		X		X		X	X		X	X
U.S. Hail		X				X				X								X			X			X
Canada MPCl		X		X			X		X	X	X		X			X	X				X			X
Canada Hail		X					X		X	X	X		X			X	X				X			X
China MPCl		X				X				X				X		X	X	X	X		X	X		X
India MPCl	Kharif					X				X				X	X			X			X			
	Rabi				X											X	X	X		X				X

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Crop Model Features

Geographic Domain

- Countrywide (where crop insured)

Yield Shortfall

- Driven by interannual variation in moisture (drought or flood), temperature, and wind
- Climatic change studies underway

Resolution

- Crop Hail 8 km
- U.S. MPCl County

U.S. MPCl Regular Updates

- Update premium rates (annual software supplement)
- Update exposure
- Update policy terms
- Update historical recast (1974–present) with current exposure, insurance terms, policy type mix

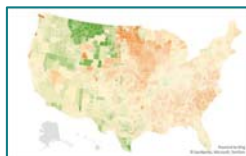
Price Volatility (U.S. MPCl)

- Four price volatility catalogs

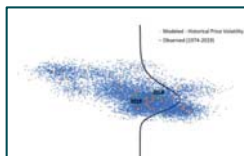


Leverage Stochastic Catalog to Quantify County Scale LC for Any Policy

AIR Stochastic Catalog

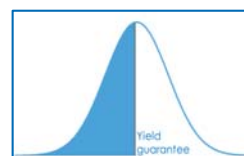


Catalog County Yield (y_A)

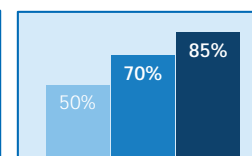


Catalog Price Ratio (p_R)

Policy Terms



Yield Guarantee (y_G)



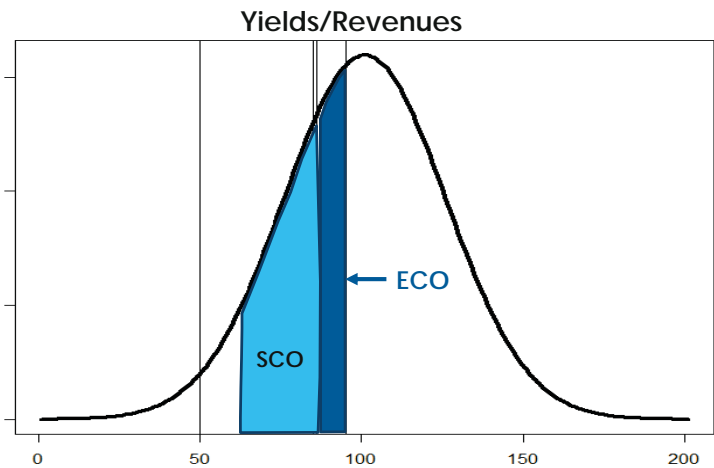
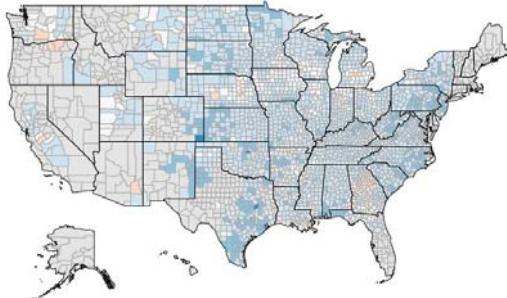
Coverage Level (η)



$$\text{Loss Cost (LC)} = \max \left(1 - \frac{y_A}{y_G \eta \max \left(\frac{1}{p_R}, 1 \right)}, 0 \right) \max(p_R, 1)$$

Enhanced Coverage Option

- With the US MPCl model we have distributions of county yields and revenues.
- We just need to apply the terms of the policy to get an estimate of loss ratios and probabilities of loss.



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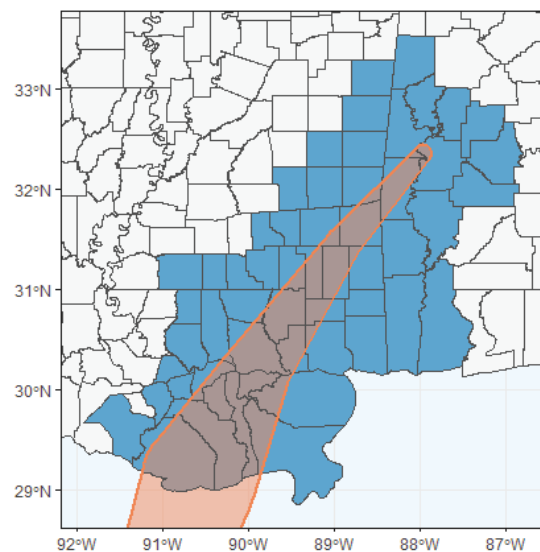
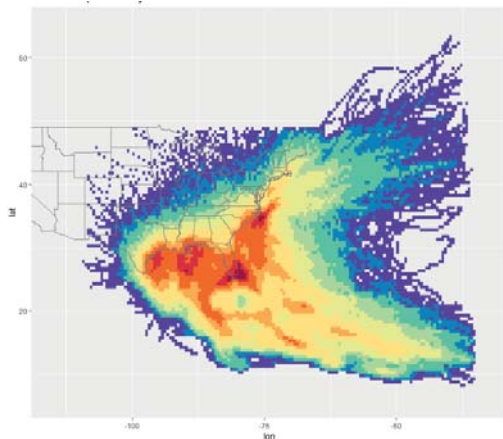
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Hurricane Insurance Protection - Wind Index

Developing our own catalog using the US hurricane model paths and winds



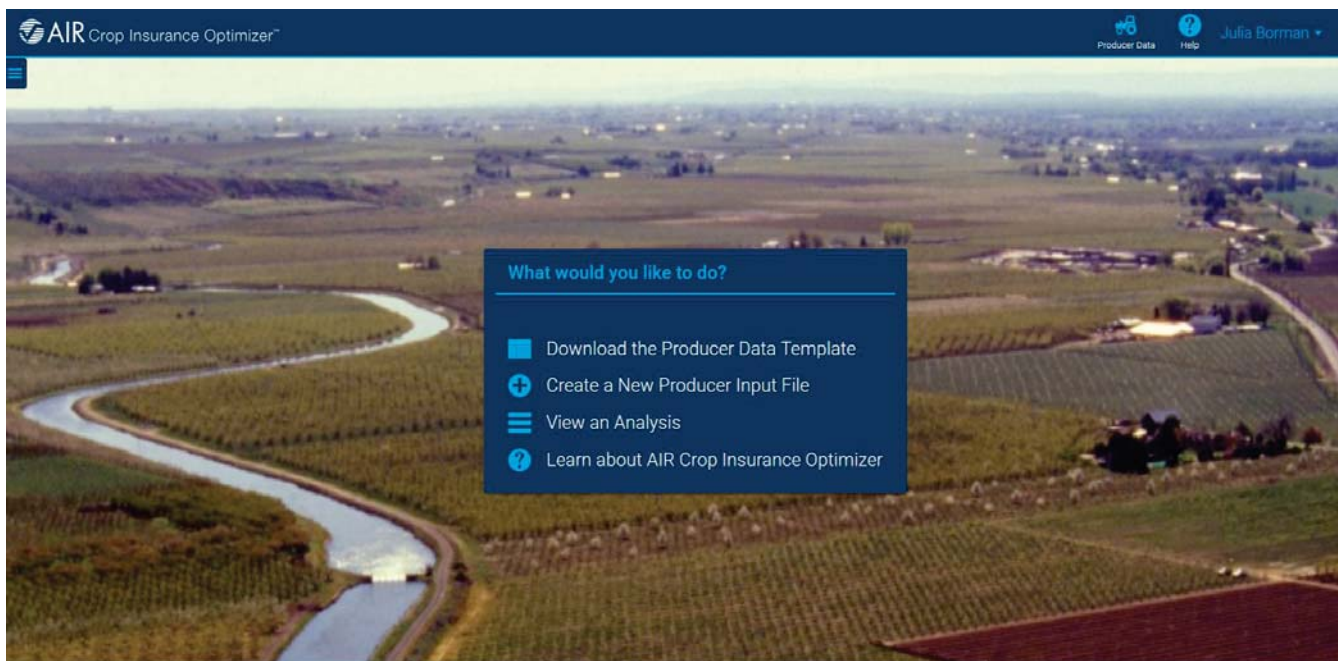
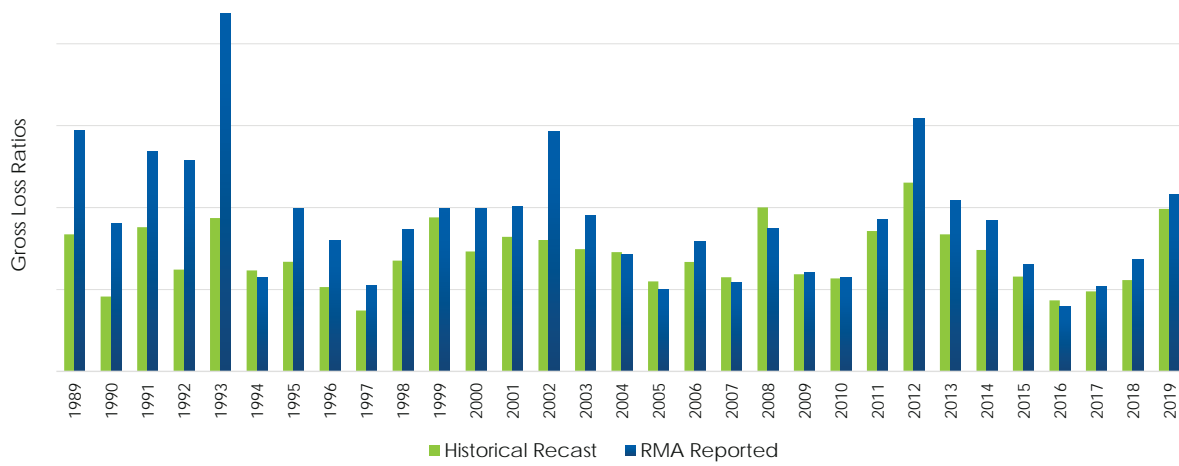
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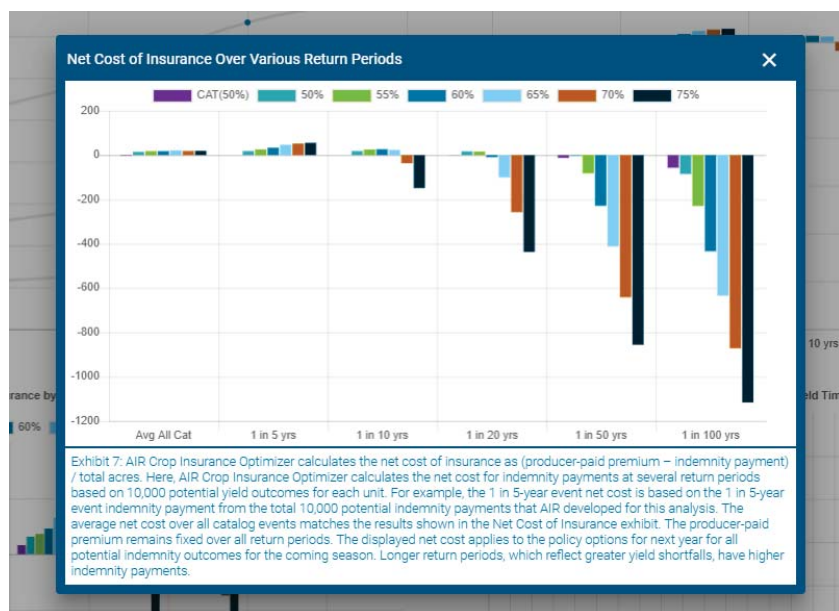
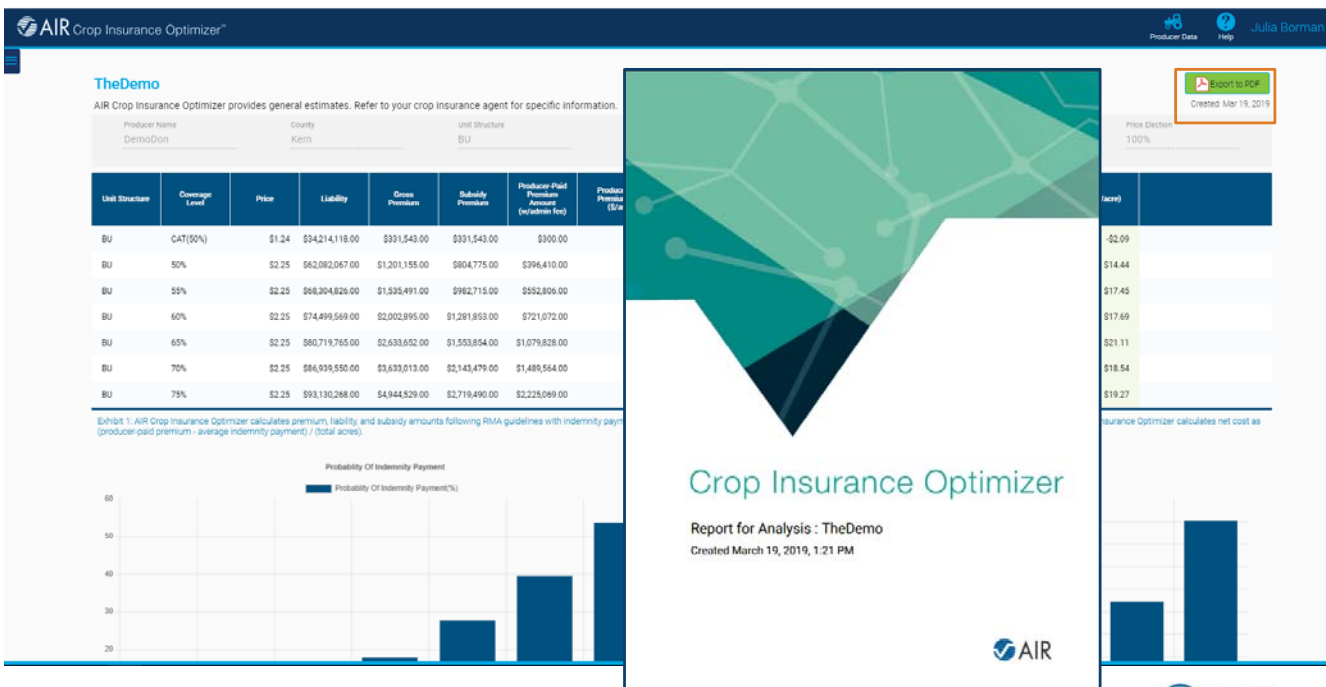
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Historical Recast: Understanding Previous Books of Business in Today's Context





More Information is Available on Our Web Page



Agricultural risk web page:

<https://www.air-worldwide.com/models/Agriculture/>



Blogs:

<https://www.air-worldwide.com/blog/all/?BlogPostsFilter=blogCategoryFilter:Crop>



Articles:

<https://www.air-worldwide.com/searchcontent/articles/?SelectedCategory=75995&Query=&PageNumber=1&SelectedSortOrder=ChangedDateDesc>



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Thank You!

