Growing emphasis on insurance systems

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World Meteorological Organisation, Commission for Agricultural Meteorology.

IDMP Geneva September 14-16, 2016

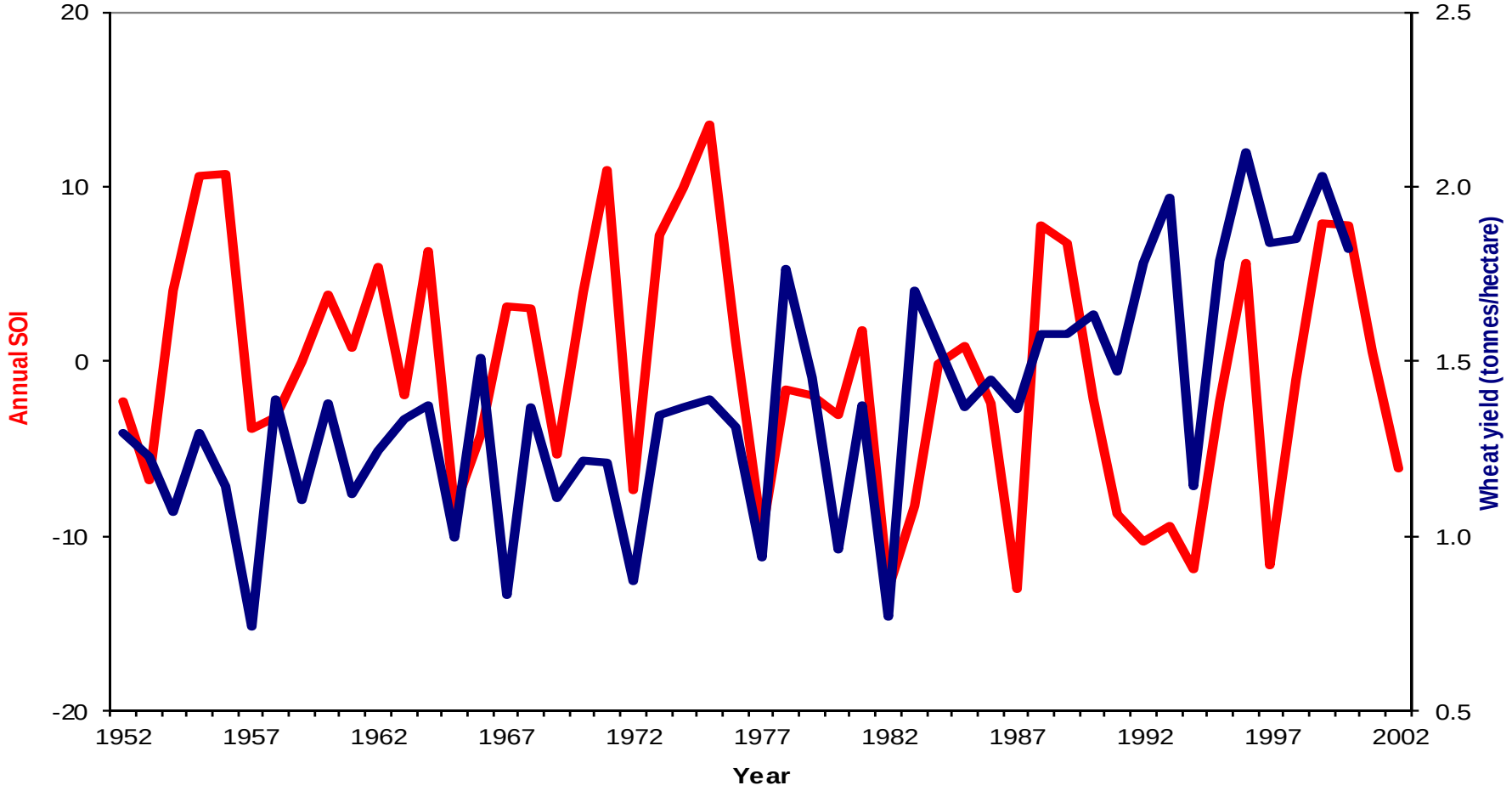
GRDC
Grains Research & Development Corporation

Australian Government
Sugar Research and Development Corporation

Grains Research UPDATE

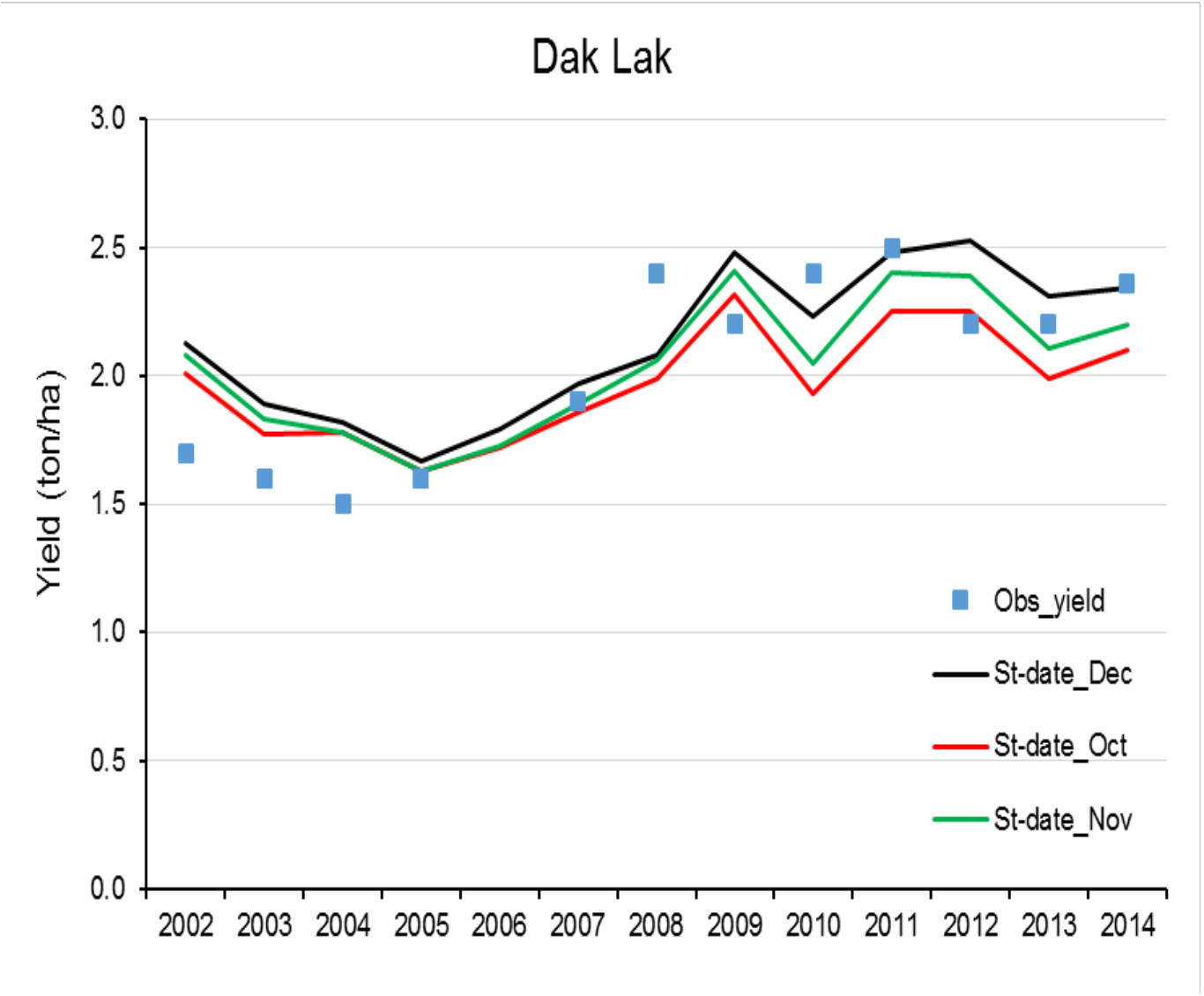
ECOM

QSL
WE EXPORT AROUND THREE MILLION TONNES OF RAW SUGAR PER ANNUM FROM AUSTRALIA TO SUGAR REFINERIES AROUND THE WORLD ON BEHALF OF SEVEN MILLING COMPANIES AND MORE THAN 3,000 CANE GROWERS.



The problem of high volatility/variability - relationship between annual variation in the SOI and annual (Australian) wheat yield (N Nicholls)

Observed and predicted green coffee yields (USQ/ICACS/CATIE) - VietNam



• *Key issues for insurance*: **Risk identification, measurement, pooling and diversification are essential features of any successful insurance program.**

•**Data are a problem** – links to various National Met and Hydro Services seen as essential – but **how to finance data acquisition and digitisation** / financing of hydromet monitoring network remains challenge – satellite data? - needs to be ground truthed with in-situ data to be robust.

•Standard setting of WMO seen as important - **who is willing to invest in data as a public good? Insurers seem reluctant**, facing dilemma of high-upfront investments and potential free-riding of competitors - if insurance companies invest in data acquisition, it is not to share the data

(courtesy F. Pischke)

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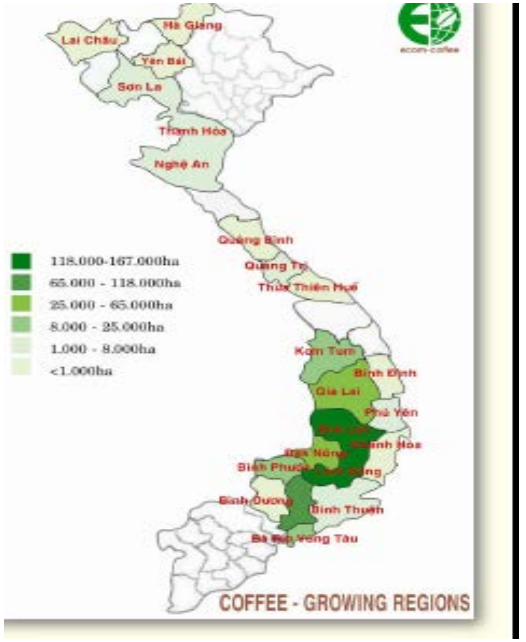
Image courtesy
IEDRO/ACRE

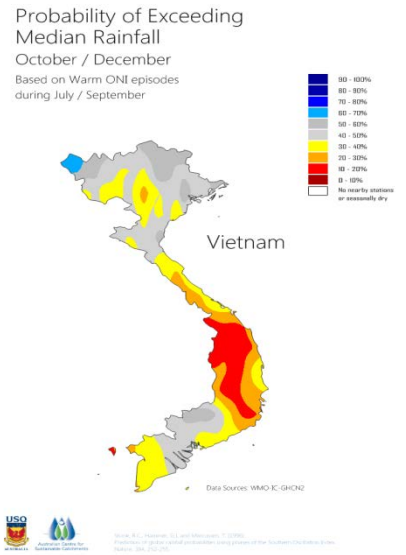
- **Investments also needed in (climate) risk management, reducing risk exposure …**

•Geographical spread is important not least to deal with covariate risk (risks that affect a large number of people at one time) in agriculture (and water management)

•Insurance needs to be embedded in political and legal frameworks.

•Element of dignity in insurance – “entitlement not beggar” – a means to empower and a vehicle to dare to maximize yields (rather than minimize risk to sustain livelihood in worst case scenario) ..





Subsidies:

- **“90 % of all crop-insurance would not be sold without premium subsidies” (Allianz).**
- Without a business case that phases out subsidies, which is integrated from the beginning in the system, very hard to get away from subsidies.
- In some places insurance is 100% subsidized, which, at this extreme is a social protection measure, rather than an insurance, and goes counter to communicate value and being cost effective.
- Transaction costs are very high to insure smallholder farmers. However, the extreme poor cannot pay premiums and are the least responsible for climate change and disproportionally affected.
- The issue of microinsurance is as a term somewhat debated and challenges related to subsidies and transaction cost exist in practice, which are being worked on in pilots for example in Peru and Ethiopia

- **Insurance is successful if it is part of an *integrated risk management* solution, i.e. insurance as part of a broader service package**, i.e. seed provider and insurance provider or, climate risk management plus insurance - but not as a stand alone system.
- **Interest in data is high – but who is willing to pay for getting primary data?** – partnership with WMO seen as attractive for weather-index insurance schemes!
- **Weather-index insurance schemes**, in which pay-outs are based on *triggering of certain hydrometeorological parameters such as rainfall, irrespective of actual losses*, **are seen by many as the way forward for climate risk insurance in developing countries, despite** many challenges.
- Avoids (intrinsically) the moral hazard of indemnity-based insurance programmes, in which the actual loss incurred is the basis for compensation – *which also carries high transaction costs in assessing the actual loss incurred.*

Hail damaged cotton

IKI proposal South-East Asia: "*Applying seasonal climate forecasting and innovative insurance solutions* (Willis Ltd) to climate risk management in the agriculture sector in SE Asia"

- *"Develop resilient climate risk management systems, best practices and insurance products, to shield smallholder farmers and businesses engaged in coffee, sugar, rice, cassava, rubber, and grazing across the agricultural value chain from physical and financial disaster associated with climate variability and change in SE Asia.*

- *The project will prepare smallholders, national governments and agricultural businesses for these climate risks by researching, developing and implementing improved crop specific climate risk management systems, training tools and relevant (weather-based index) insurance products"*.

- USQ/WMO/Willis/CIAT (Includes CCAFS/CGIAR) Hanoi

http://www.international-climate-initiative.com/en/ Home - International Clima...

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Links to funded projects - International Climate Initiative – IKI - Annual Call - (International Organisations and 'UN Bodies' favoured).....+ Willis Ltd

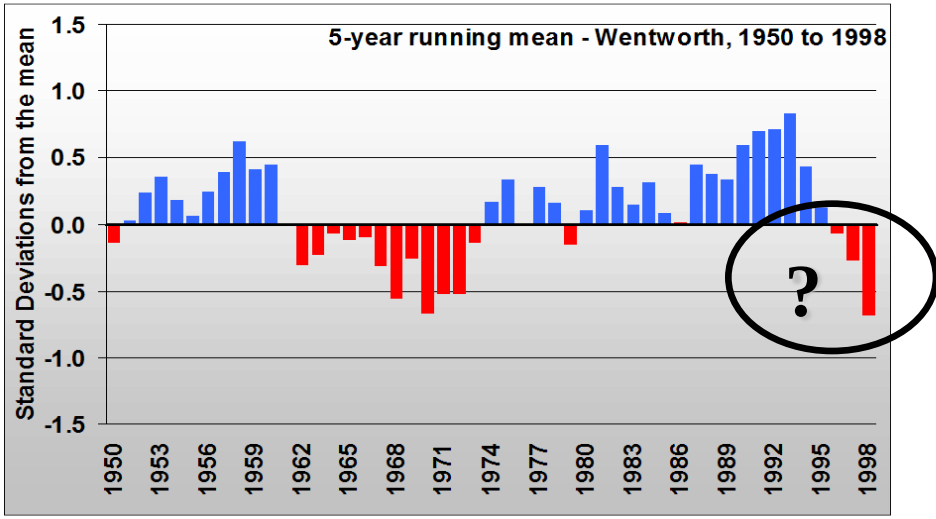
ABOUT THE IKI | ISSUES | PROJECT PROMOTION | PROJECTS | MEDIA CENTRE

INTERNATIONAL CLIMATE INITIATIVE (IKI)

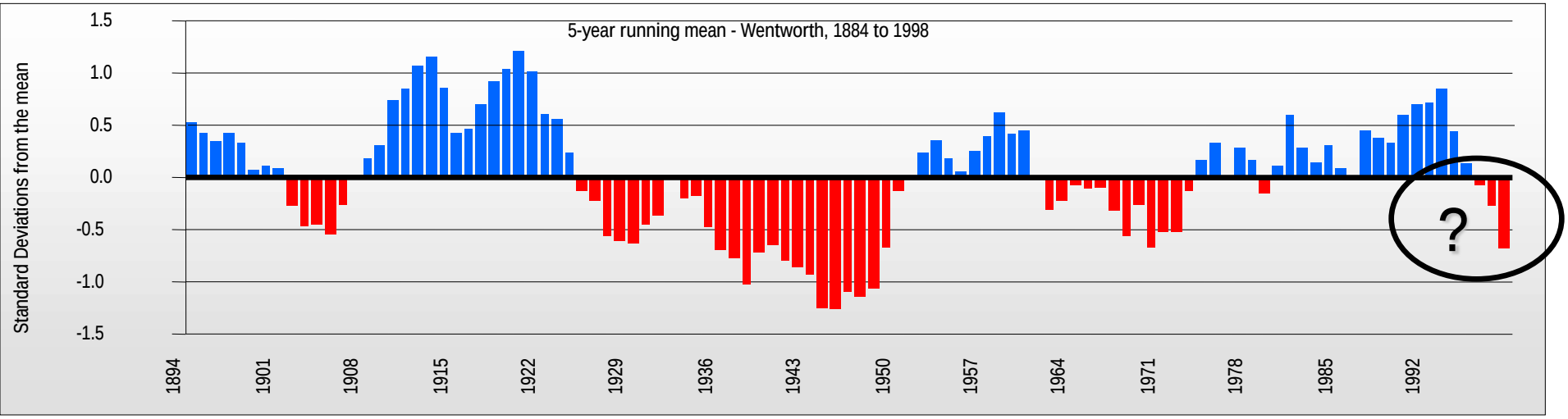
NEWS

‘Unravelling the data’ - assists aspects related to need for long-term data – (and assessing the potential for exceptional drought assistance - use of simulation models to determine the relevance of recent agricultural droughts in an historical context).

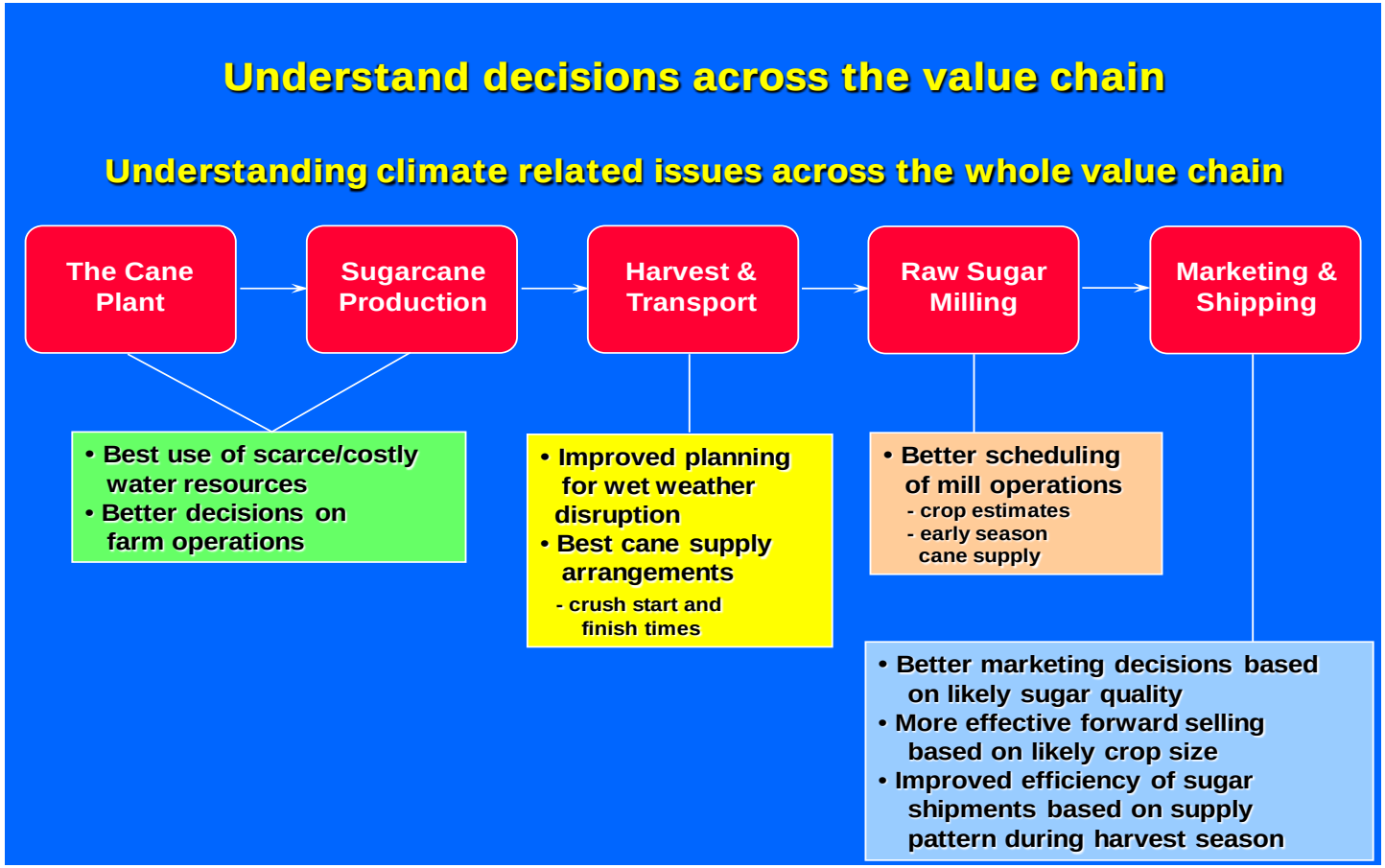
Simulated Wheat Yield 1950+



Simulated Wheat Yield 1890+



- **Work needs to be done on insurance of critical parts of value chain!**



Key points..

- Historical Data often the problem – key is how to finance data acquisition and digitisation?
- Who is willing to invest in data as a public good? Insurers seem reluctant – however, governments may ‘come to the rescue’ if they are made aware of the longer-term benefits for such as ag/insurance.
- Investments also needed in climate risk management, reducing the overall risk exposure ...smallholders benefit; insurance companies benefit .
- Geographical spread is important, not least to deal with covariate risk (risks that affect a large number of people at the one time) in agriculture/water management..
- Issue of subsidies – needs to be addressed ‘up front’ with Ministries
- Insurance is successful if it is part of an integrated (climate) risk management solution, i.e. insurance is part of a broader service package.
- Need to address aspects associated with the whole value chain.
- Need to ‘unravel’ the data.


Thank you

Department of Agriculture and Fisheries
Queensland 4001 Australia – University of Southern Queensland – new projects in this area

DCAP2 USQ Improving seasonal climate forecasts

DCAP3 USQ Improve the ability of forecasts to predict multi year drought- Integrate DePreSys model or similar into decadal forecasts

DCAP5 USQ Regional climate change adaptation for agricultural industries

DCAP6 USQ **Producing enhanced multi-peril crop insurance systems /similar (**Willis Ltd)

DCAP7.1 USQ Developing products for use in drought monitoring: drought index application

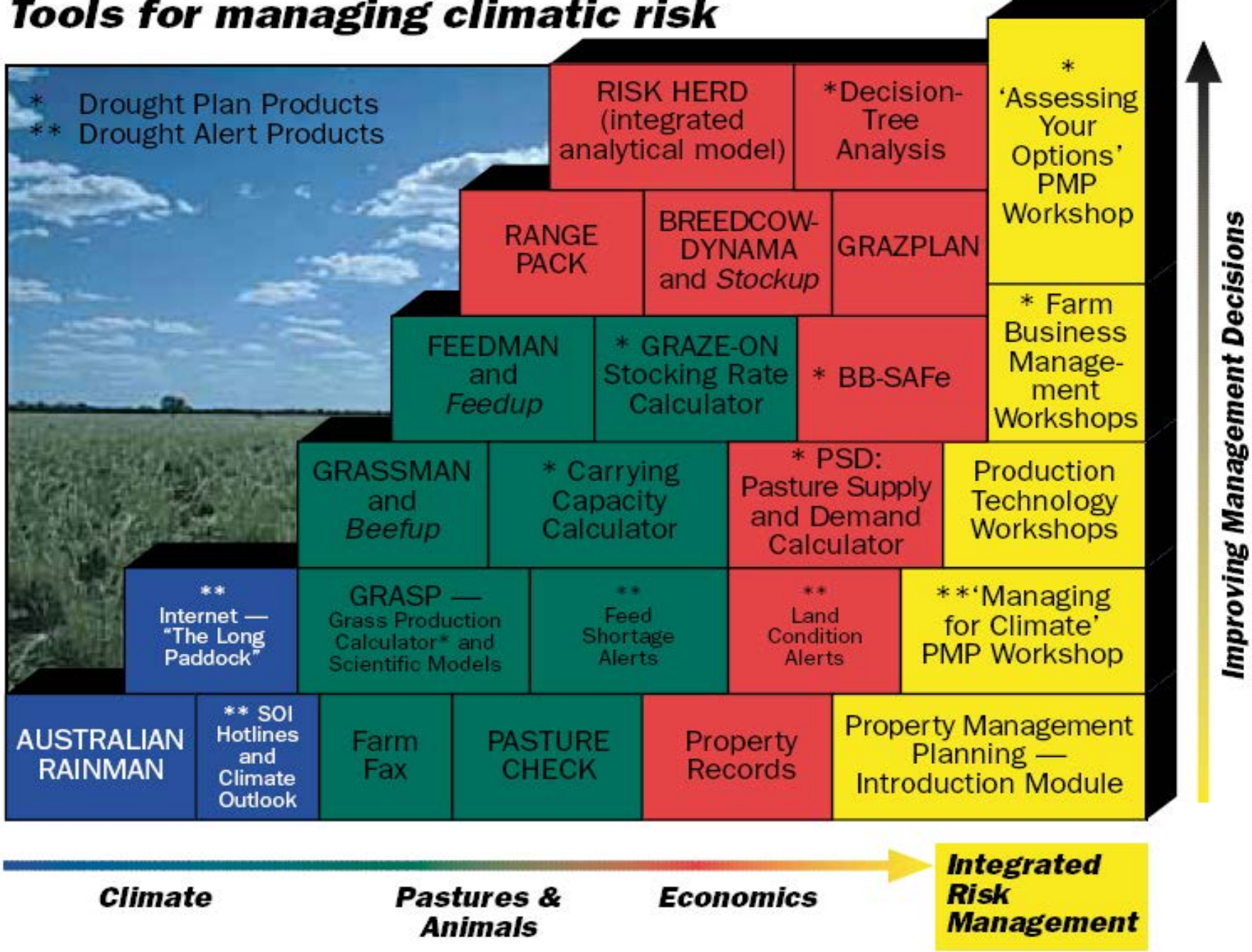
DCAP7.2 USQ Developing products for use in drought monitoring: Improved crop yield and production forecasts (integrating seasonal forecasts with a multi-crop modelling approach)

DCAP9 USQ Developing and customising decision support tools (GRAZe-ON, 'Rainman')

DCAP13 USQ Revamping Managing for Climate (MFC) Workshops

DCAP14 USQ Crop production modelling under climate change and regional adaptation

DCAP15 USQ Assessing the economic value of improved climate risk management strategies through the application of seasonal climate forecasts for key agricultural industries in Queensland



Developing targeted **decision support tools** - examples for the grazing industry .....

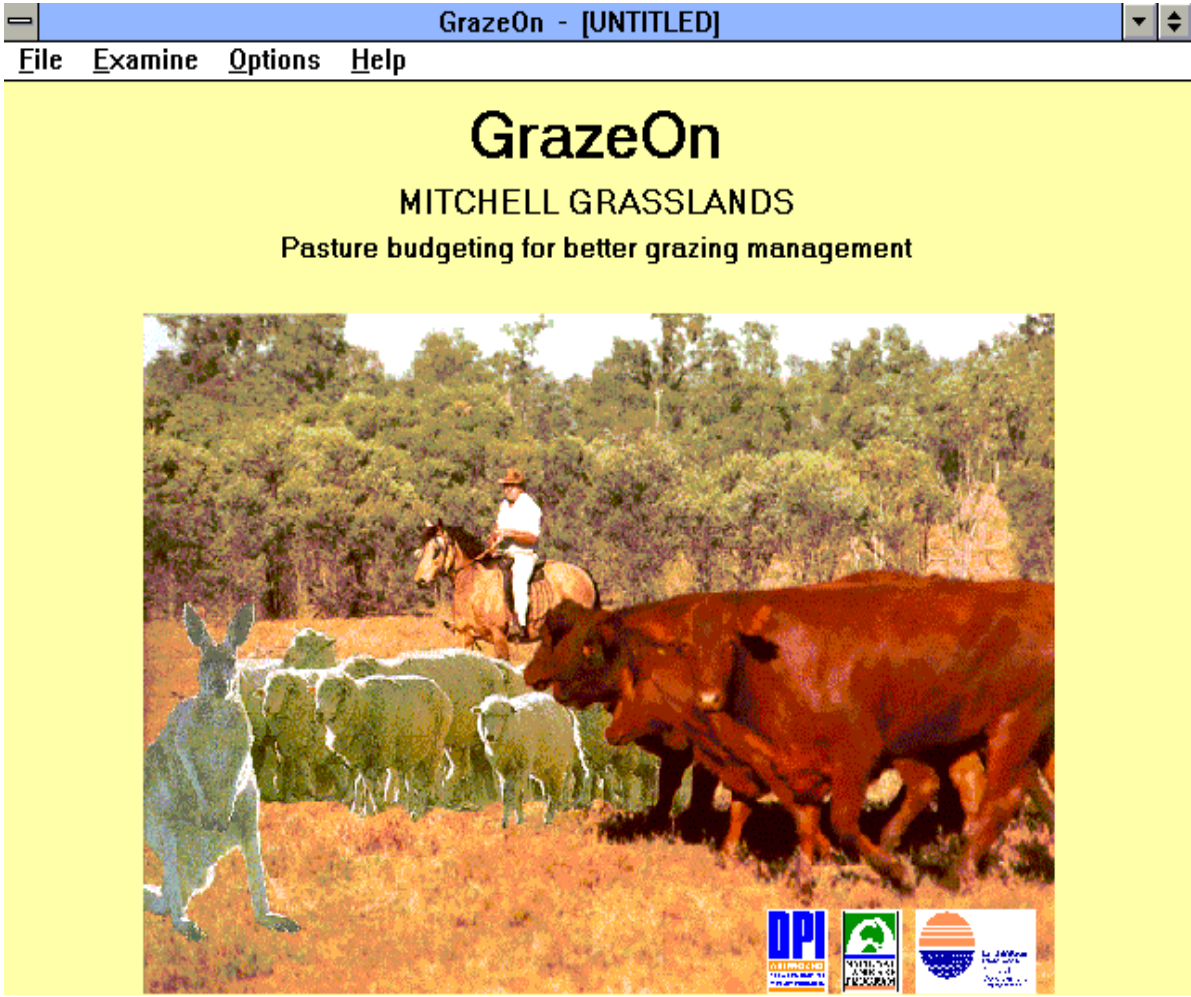
Assisting decision processes for stakeholders? – developing decision-support systems that link climate information, agricultural models and user decisions – make sure they actually add value ...

Decisions related to estimation of future stocking rates

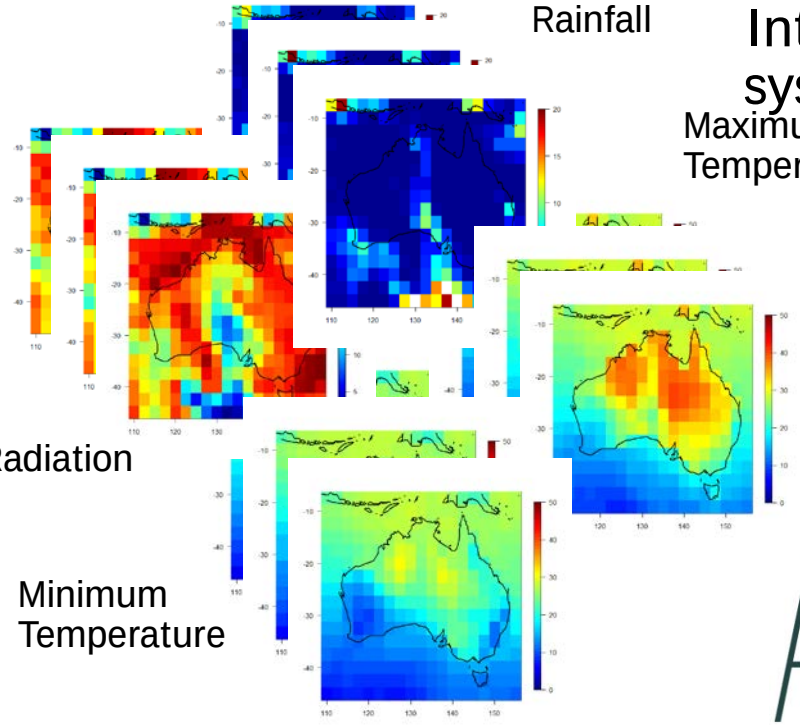
Decisions related to pasture budgeting monitoring

Decisions related to total grazing pressure

Decisions related to drought preparation.

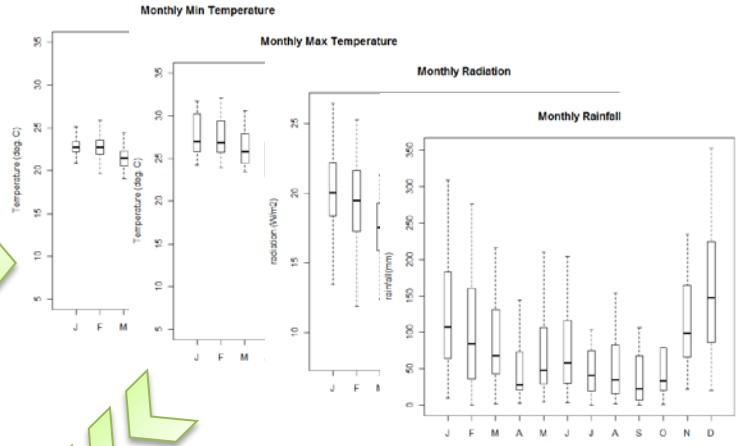


Multiple Gridded POAMA/UKMO (+ECMWF?) Realizations



Integrated systems

Distributions of Station Climate Data

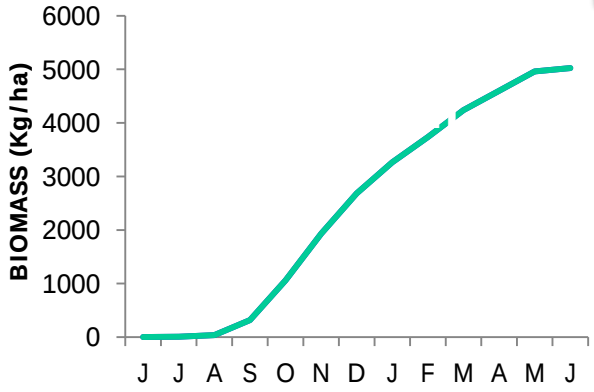


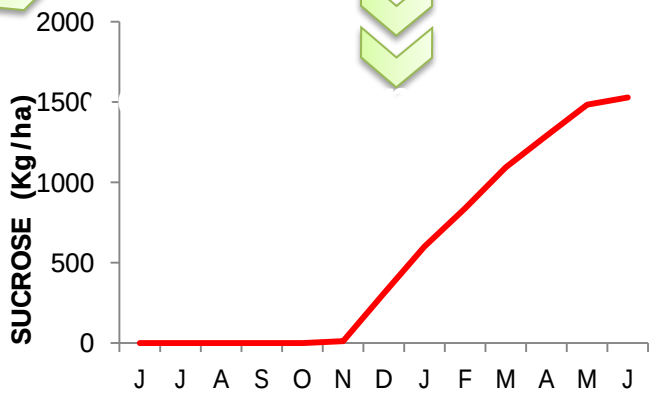
Run APSIM for each ensemble member for 30 years

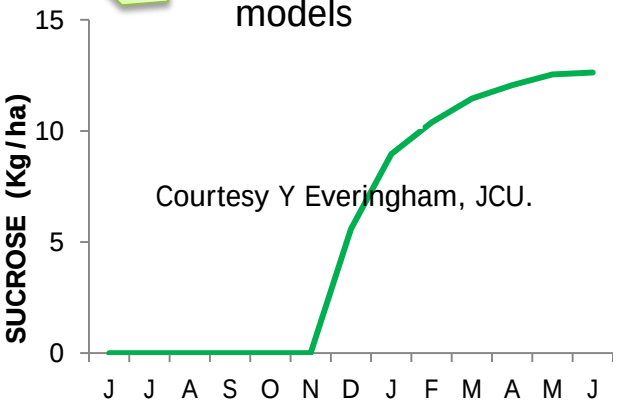
APSIM

AGRICULTURAL PRODUCTION SYSTEMS SIMULATOR

New projects aim to develop linkages between coupled models and crop models







Courtesy Y Everingham, JCU.

Suggested Outputs:

- **Insurance products (e.g. index-based insurance) developed to assist smallholders and businesses across the agricultural value chain, including easy-to-access insurance products;**

- **Enhanced decision-support tools involving integrated climate/agricultural/hydrological models developed especially to assist smallholder farming systems decisions;**

- Integrated extreme climate risk modelling with insurance models and which link with and develop new associated tailored insurance index-based products..

- ***Willis Ltd is supporting this project by contributing £2.0 million <u>in-kind</u> to develop brokerage arrangements on-ground in order to develop appropriate insurance products.***
- ***Willis Ltd will facilitate joint workshops and meetings at Willis Ltd, London, regarding risk management research conducted in this project. The in-kind contribution will include the salary level of Willis Ltd staff (eg meteorologists and actuarial staff) (Julian Roberts: Head of Global Weather Risks).***

- Total project volume €13,516,993 – BMUB €7,980,445

Willis Ltd., Lime Street, London

What attracted Willis Ltd? The development of targeted agricultural-specific seasonal-to-yearly climate forecast outputs, including aspects related to extreme seasonal conditions, *focused on the needs of smallholders, rural businesses, exporters, environmental managers, community, governments, and especially insurance institutions.*

Delivering:

- improved data collection network coverage in the region;
- improved seasonal climate forecasting system targeted for the needs of decision makers;
- Organizational and technical capacity building systems for local key stakeholders;
- *An enabling legal and regulatory framework for climate risk; insurance and, re-insurance*;
- Involvement of WMO/CAgM.
- National funding from the German Government.
- **Systems relevant to global reinsurance markets and innovative insurance systems linked to an enhanced understanding of extreme climate risks.**

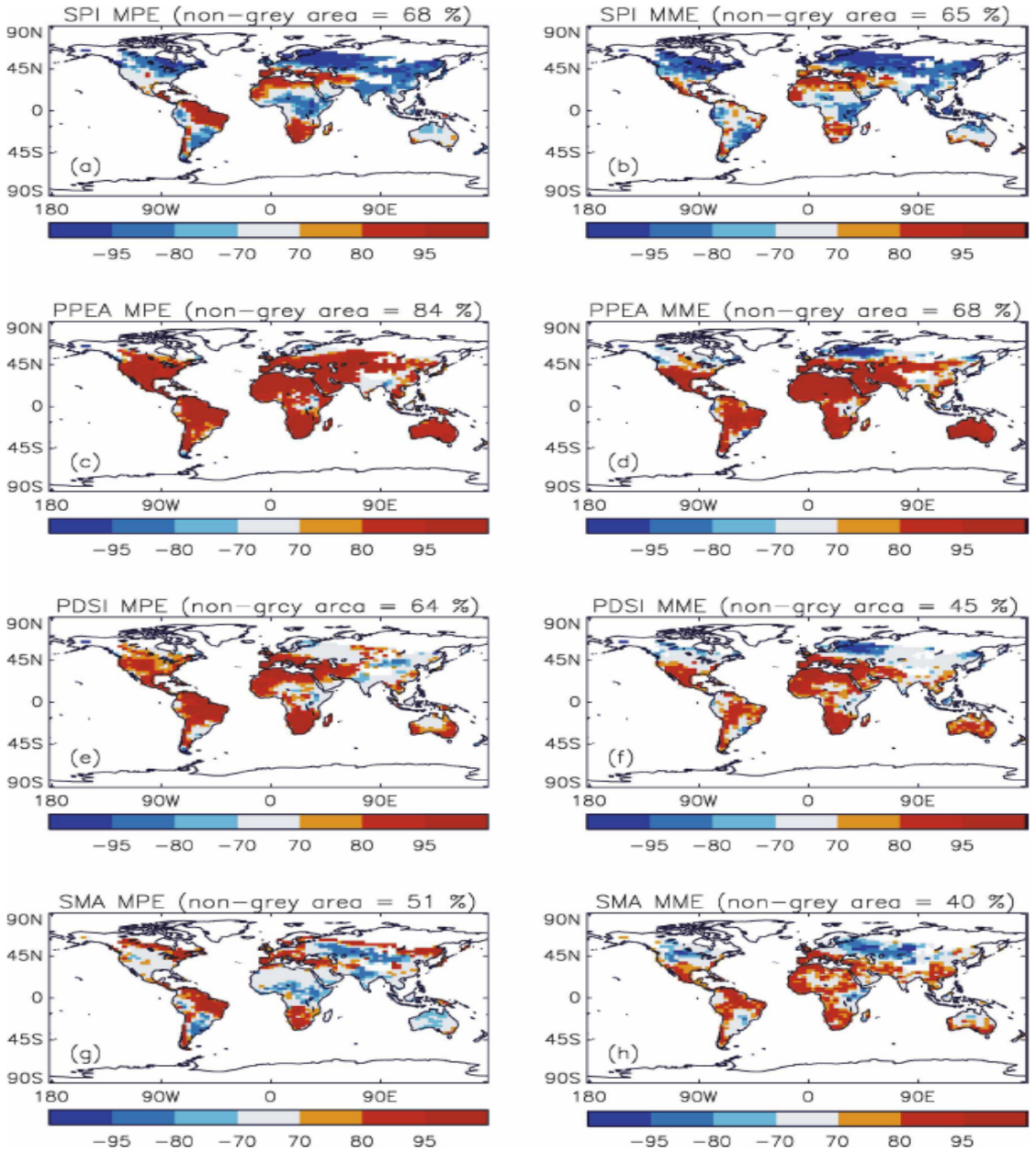


FIG. 3. Spatial distribution of the likelihood of increase or decrease of moderate drought for MPE and MME. Locations where more than 70% of the ensemble members show a decrease (increase) in moderate drought are in blue (red). Places where less than 70% of the ensemble members agree on either an increase or a decrease are in gray. The percentage of the total area where more than 70% of the models agree is given.

Spatial distribution of the increase (or decrease) in moderate drought using Hadley centre model or 11 Model ensemble (courtesy Burke and Brown, 2007)

Index	Original Purpose	Advantages	Limitations
Effective drought index (Byun and Wilhite, 1999)	Emphasis on recovery from accumulated rainfall deficit	Emphasises effective precipitation	Omits temperature and losses from evaporation and transpiration
Prescott (ratio) Index (Prescott, 1949).	Periods of plant stress	Simple – includes evaporation losses	Excludes transpiration losses - unsuited for accurately monitoring crops and losses
Hutchinson Drought Severity Index (HDSI)	Progressive index aimed at targeting agricultural droughts.	Uses only rainfall data	Omits rainfall effectiveness and temperature
Plant growth index (McDonald, 1994)	Estimates the duration of the pasture growing season	Intermediate level index	Requires further evaluation.. including across a wider range of agricultural ecosystems

TEMPERATURA A LA SOMBRA EN Gr. C.

(Termómetro seco)

Mes de Noviembre

Año	Media mensual	Máxima media	Mínima media	Oscilación diurna, media
1912	22.2	28.9	16,9	12,0
1913	22.8	29.6	15,9	13,7
1914	22.9	33,0	17,1	15,9
1915	22.8	32,9	16,7	16,2
1916	22.3	33,3	16,4	17,0
1917	21.4	31,3	15,7	15,6
1918	23.6	33.3	15,9	17,4
1919	22.5	33,7	16,5	17,2
1920	22.3	30.5	16,6	13,9

Presión Atmosférica a 0o C. en m|m

Mes de Enero

Año	Media mensual	Máxima extrema	Mínima extrema	Oscilación diurna, media.
1912	705.5	708.2	703.3	2.2
1913	706.5	709.1	703.8	1.8
1914	706.8	709.3	703.2	1.9
1915	703.8	706.6	700.9	2.2
1916	705.1	708.6	702.6	2.2
1917	706.4	708.4	703.6	2.1
1918	705.2	708.3	702.8	1.7
1919	704.4	707.8	701.4	1.9
1920	703.6	706.0	700.9	2.2

Presión Atmosférica a 0o C. en m|m

Mes de Febrero

Año	Media mensual	Máxima extrema	Mínima extrema	Oscilación diurna, media
1912	705.7	708.5	702.1	2.2
1913	706.4	708.3	703.9	1.8
1914	706.4	708.5	704.1	1.7
1915	704.2	707.0	701.3	2.2
	705.3	707.6	702.1	2.2
		709.2	704.4	2.0
			703.0	1.9
				1.9

WEATHER RISK

Traditional insurance offers protection against events such as floods and storms, but in the UK and in Europe there is not yet a wide use of protection against the effects of seasonal weather patterns such as temperature, rainfall or sunshine. However, these factors can have a major influence on corporate results and many firms publicly acknowledge this. As weather hedging becomes more commonplace, blaming the weather for poor results will become less acceptable.

Weather derivatives or insurance generally provide volumetric hedge protection against a reduction in sales volumes, rather than profit. Companies interested in such protection therefore generally have a good correlation between their volumes and a weather index. The index used is most commonly temperature, but rainfall, sunshine, wind speed, or other measure may also be used.

Willis is one of the pioneers of weather risk hedging. In the US, we have led the development of the business, with clients including industrial companies, utilities, insurers and energy traders.

We can advise organisations on all aspects of managing their weather risk, from determining and evaluating exposure, up to and including advice on trading in the market. We can model and price derivatives and insurance programmes and have access to extensive weather data and climatic research. The Willis team has already transacted over 50 major weather deals worldwide Our particular strength is in whole-season or multi-year deals.

Weather Risk Main Contacts

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+44 (0)20 7558 9203
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Matthew James
+44 (0) 20 3124 8249

All Weather Risk Contacts

•How to make the business case for insuring residual risk in a manner that makes economic sense for premium buyers and does not depend to an unsustainable extent on subsidies

•- Think about integrated water-risk management solutions – i.e. where are opportunities in water management to link to insurance products that create a value for potential premium holders.

•- Insurance solutions need to be integrated into overarching development strategy

•- Potential to look into the role of insurance throughout disaster risk management, i.e. what is the role of insurance in risk analysis (e.g. data, evaluation of loss potential, setting a price for cover (premium) based on assessed risk), prevention and mitigation (e.g. lowering risk profile, spur action, put a price-tag on risk (i.e. insurance premium)), preparedness (e.g. time from damage incurred to insurance payout), risk transfer (this is were insurance has traditionally focused, but there are other transfer mechanisms – upstream – downstream, floodplains, reservoirs, where insurance can play a role in spurring action?),

Department of Agriculture and Fisheries (DAF)

Details of Individual Projects

DCAP2 USQ Improving seasonal climate forecasts

DCAP3 USQ Improve the ability of forecasts to predict multi year drought- Integrate DePreSys model into decadal forecasts

DCAP5 USQ Regional climate change adaptation for agricultural industries

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