Water – Food – Energy Nexus for Food Security

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Background

- Water, food and energy form a nexus at the heart of sustainable development

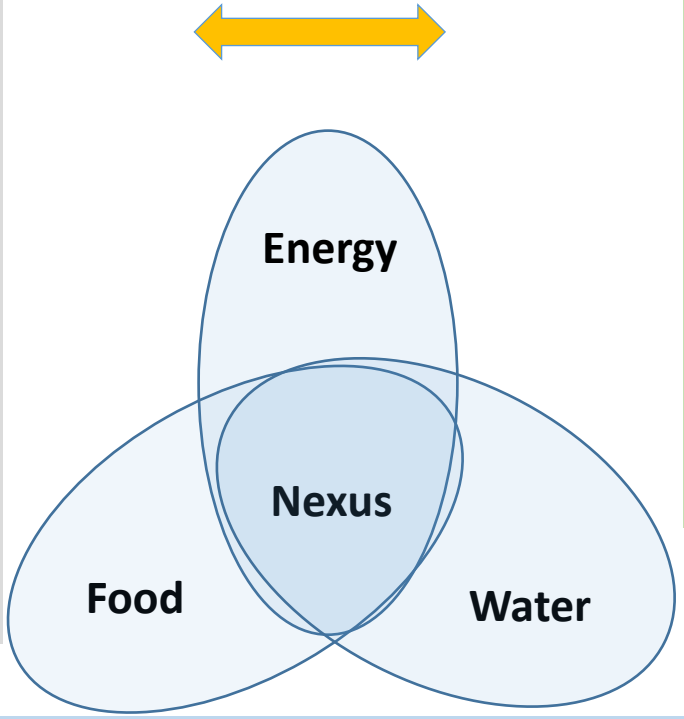
> The Nexus approach identifies the mutually beneficial interactions of water and energy in food production. It represents a framework for determining the tradeoffs and synergies that maintain the sustainability of agricultural production and ecosystems

- Demand for water, food and energy is increasing rapidly. We require integrated and sustainable management of all three aspects to balance the needs of people, the environment and the economy
- Agriculture is the largest consumer of freshwater resources (70%), and more than 25% of the energy used globally is expended on food production and supply

Global Challenge: Water-Food-Energy

Food

- Demand rising: Population growth & wealth, competition animal feed and biofuels.
- Supply constraints (e.g. climate change, land and water availability).
- Rising global food prices.
- Cereals main food. Need for diversification into high value nutritional crops
- Improve household nutrition and income.
- Reduce food waste



Energy

- Rising cost of energy
- Reliability of electricity (especially in many developing countries.
- Demand management and system efficiency improvements.
- Opportunities for renewable energy (Solar, Wind, biofuels, biogas).
- Policy and subsidy influences.

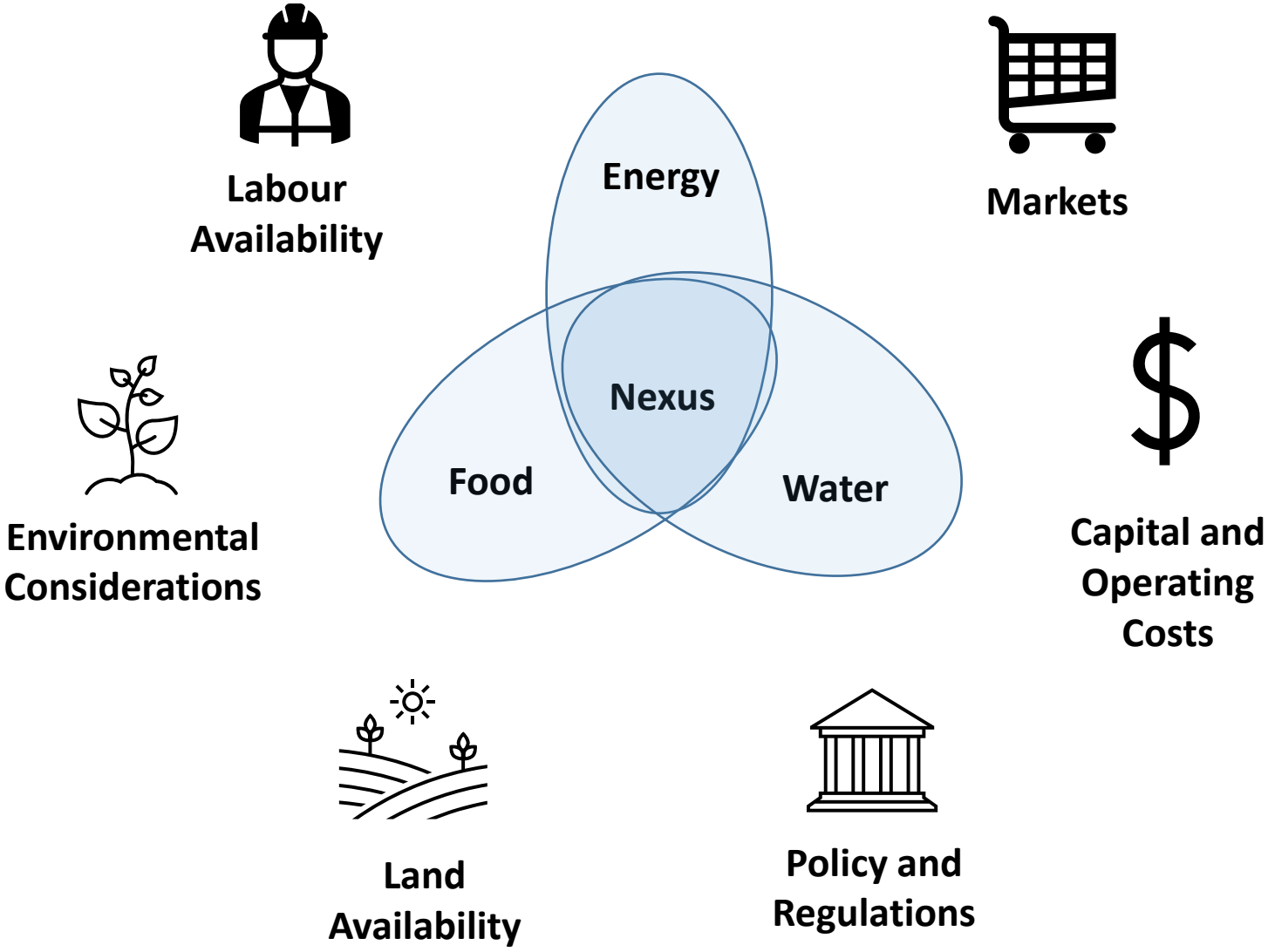
Water and Land

- 60% of global population are facing water scarcity
- Climate change/variability accelerating the impacts of water scarcity and land degradation.
- Limited arable land. Increasing population growth with competition from other land use.
- Over-exploitation of water and soil resources – inefficient farming practices and land degradation.

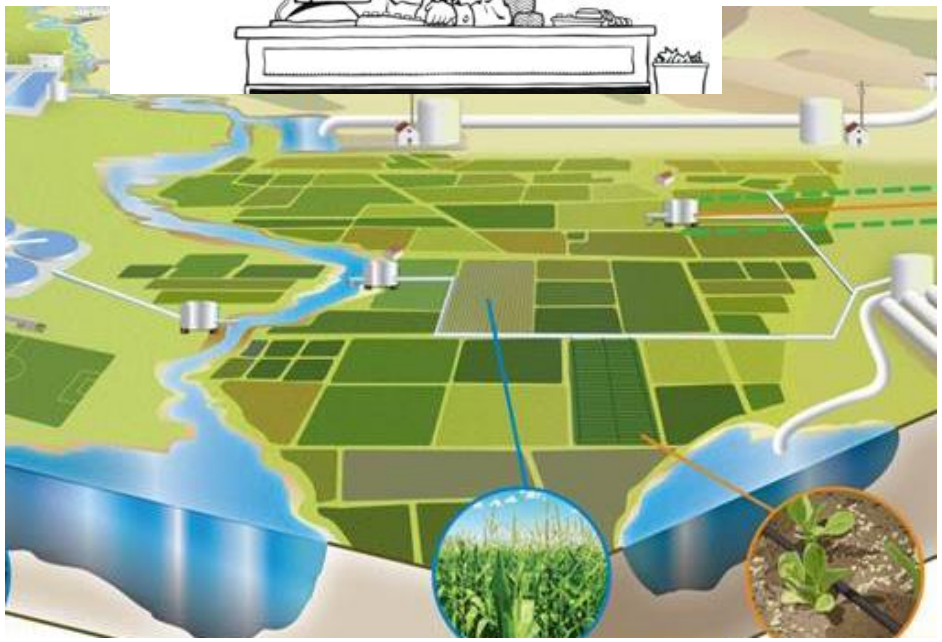
Australian Context - Murray Darling Basin

- Area: 1million sq km
- Length: 3300km
- 5 States/Territories
- 77,000km of river systems
- Low rainfall and high evaporation
- 66% of Australia's irrigated area
- Agricultural Production: $25bn annually
- Market driven agricultural systems
- Labour availability and cost
- Competitive access to water (states & sectors)
- Heavily regulated system
- Priority focus on water, energy and production efficiency

Other Factors Impacting Agricultural Production



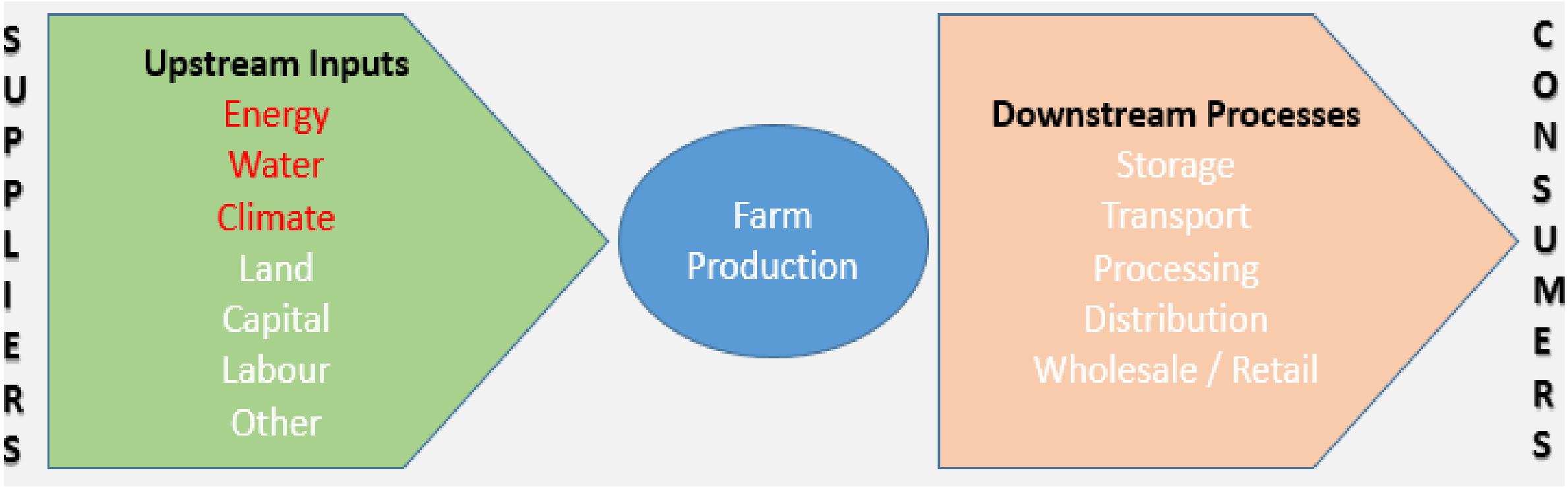
Agricultural Production - Diverse and Complex Environment



Farmer Response

- Crop selection and management
- Water & energy demand management
- System selection
- Improvements to system efficiency
- Precision irrigation
- Tariff switching
- Alternative energy & water sources
- Automation & Autonomous systems
- Whole farm water management

Diverse Agricultural Systems Supply Chain



Need for Innovation and Integrated Solutions

Technologies

- Technologies that are demand driven, leading to adoption and commercialisation.
- Scalable regionally appropriate technologies
- Multidisciplinary approach to projects – researchers, businesses and government organisations

New Knowledge

- New scientific knowledge and better communication to improve adoption and impact.

Capability Building and Training

- Building capability of institutions and individuals. Combining formal education and training programs with ‘learning-by-doing’ skills

Better Decisions

- Improved policies, regulation and governance. Better engagement with decision-makers to improve uptake. Integration of data and information. Informatics and decision support tools

Need for Innovation and Integrated Solutions

Partnerships

- International and national partnerships (e.g. DFAT (ACIAR) and CRC One Basin)
- Partnerships among research providers, the private sector, public and non-government extension and development organisations.
- Cross-disciplinary and interdisciplinary partnerships and approaches.

Changing Perceptions

- Promote agriculture as a critical business and valued profession. Improve communication, promotion and perception

Conclusion

- Agriculture is an extremely diverse and complex enterprise, including food production, processing and distribution.
- It is impacted by complicated biological, environmental, social, political and financial factors.
- The water-food-energy nexus requires collaborative research and development to improve our understanding of the farm and supply chains food production and energy and water tradeoffs and associated management options
- We require integrated and sustainable management of water and energy and other resources to balance the needs of people, the environment and the economy.
- This will require innovative partnerships and solutions which focus not only on technology but also people development and training, our regulatory environment, economic and environmental sustainability.

Thank you

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