Accelerating Systemic Transformation of Dryland Agriculture in Africa and Asia

Summary Report of the DryArc – Australia Dialogue on dryland cereal-based and agro-silvo pastoral systems transformation and Research and Development Interface, August-September 2020

In August 2020, ICARDA, ICRISAT and ACIAR brought together experts from Australia and the CGIAR Centers in order to focus on the best development science (biophysical and social sciences), development policy, stakeholder inclusion, and theory of change for the DryArc Initiative for the benefit of dryland agri-food systems in the global drylands. Over one hundred scientists and development practitioners representing CGIAR Centers, Australian universities, research institutions, government and non-government organizations, among others, tapped into their collective knowledge and experience and shared perspectives and lessons for the systemic transformation of dryland agriculture. Discussions took place within the framework of the CGIAR regions, strategies and SDGs, and broad rural development system approaches that link rural communities, natural resource management, production, inclusive value chains, rural business entrepreneurship and economic growth.

The Dialogue comprised three 2.5-hour webinars:
Webinar 1: Plugging the rainfed gap and de-risking sustainable intensification in cereal-based systems (including legumes, forages and livestock);
Webinar 2: Resilience and livelihood in low rainfall agro-silvo-pastoral systems with integrated rangeland management and water harvesting;
Webinar 3: Effective research-development interfaces for the systemic transformation of the drylands

A follow-up 1.5-hour Research and Development Interface (RDI) webinar was held, informed by the outcomes of the DryArc-Australia Dialogue meetings. Representatives of CGIAR Centers, Australian scientists and development partners, including FAO, the World Bank, EU, IFAD, Islamic Development Bank, AfDB, CIRAD, GRDC, ACIAR, representatives of the governments of India and the Netherlands, among others, discussed modalities for One CGIAR and its partners to support integrated regional research for development for the systemic transformation of the drylands of Asia and Africa during the next 10 years.

Australia Science for the Drylands

Australia is the driest inhabited continent in the world and degradation is common across many agroecologies. Most crop production takes place under dryland conditions in the 300-600 mm annual precipitation zone. Australian farmers and graziers experience greater annual volatility in yield and price than most other farmers and pastoralists around the world. However, precision agriculture, conservation agriculture and improved grazing and livestock management have been widely adopted and water use efficiency is high as a result of agricultural research and good farm management.

Australia also has extensive experience in transformative partnerships with rural communities and the private sector. The DryArc-Australia Dialogue identified many areas of synergies and models to transfer to drylands under similar ecological conditions in other parts of the world.

The list of participants and agenda for the webinars is provided as Annex 1 and 2 to this report. Detailed agenda and presentations are found on ICARDA's Monitoring, Evaluation, and Learning (MEL) platform.

This brief summary report presents highlights and key messages from the webinars **to support the development of integrated R4D country and regional projects for the systemic transformation of African and Asian drylands in the One CGIAR**.

Opportunities from Dryland Agriculture Research in Development

Drylands in Africa and Asia cover 60% and 40% of the land area, respectively, and if transformed and utilized under appropriate management can have potential for increased food and diversified livelihoods, and enhanced environmental services (e.g., carbon, biodiversity). Lessons from the drylands can also provide cultural and technical knowledge (e.g., water use efficiency innovations) of immense value to other ecosystems.

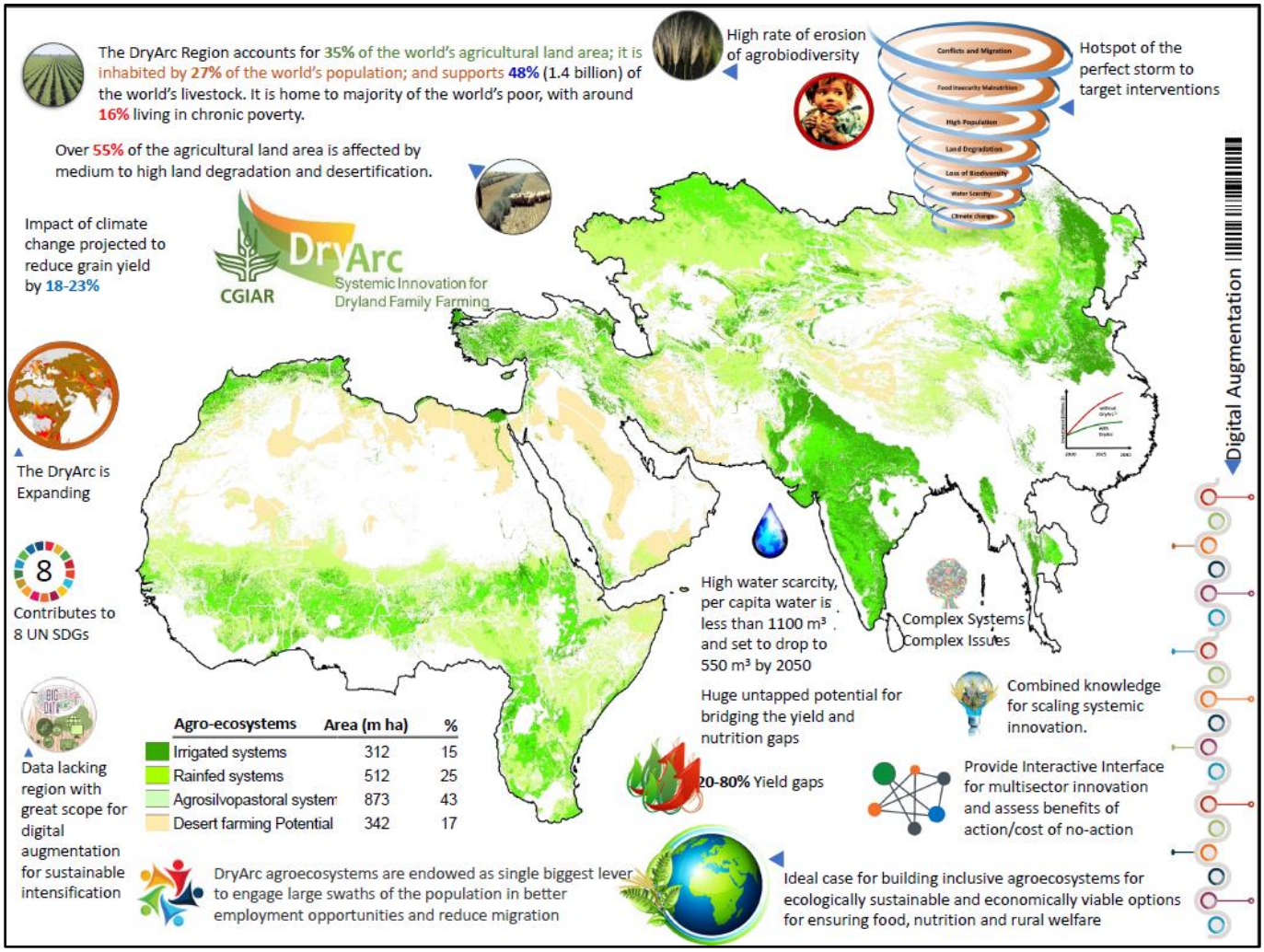

Figure 1: The DryArc Region – Successful development through systemic transformation of the drylands offers the opportunity to contribute to delivering the SDGs and reduce inequality in Asia, the most populous rural region in the world, and Africa, the region with the fastest rural population growth rate in the world.

Future scenarios project reduced rainfall and higher temperatures along with an increased intensity and frequency of extreme events and a significant fall-out in biodiversity. In addition to water scarcity and climate change, land degradation, salinity, and population growth expose dryland communities to the risk of livelihood shocks and losses. In many cases, the urban-rural divide is growing, and food and nutrition security is under threat. In many parts of Africa and Asia, several of these communities are further plagued by conflicts, social unrest and protracted crises. This combination of daunting challenges that are each amplifying the effects of one another are building up to a perfect storm representing a major threat to the resilience of agri-food systems in African and Asian drylands.

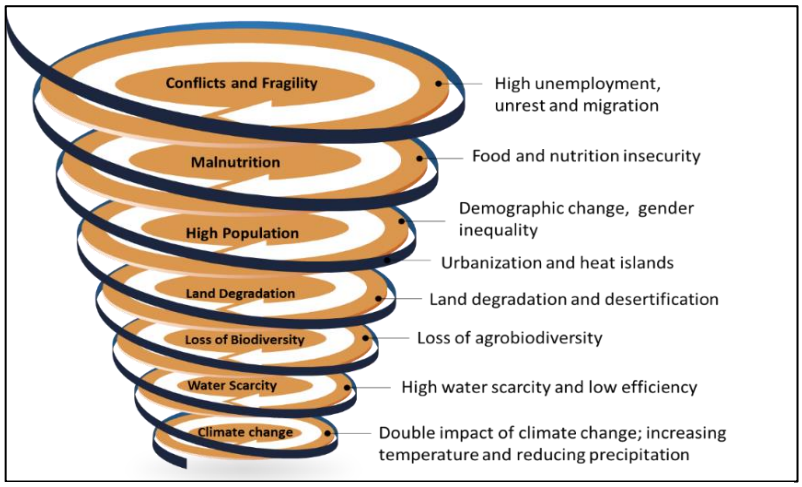

Figure 2: A perfect storm on the DryArc where each driver amplifies the effect of the other under climate change leading to a systemic crisis.

However, there are significant opportunities for agricultural and rural transformation in these regions. Numerous innovations, technologies and knowledge are available to improve dryland rural systems, enhance productivity, de-risk systems, create opportunities for employment, strengthen and create new value-chains and adapt to a changing climate.

Lessons from Australian science for African and Asian dryland agriculture

The three webinars highlighted a **strong overlap in issues and challenges across Australian and the DryArc region** (despite being at different stages of economic development) – i.e. fragile biological systems with poor shallow erodible soils; low biomass productivity, yield gaps – crops and water, non-functional seed systems; climate variability, natural resource degradation, water management issues; long value chains and large distances to markets and cities; underutilized indigenous knowledge; inappropriate policies; and low capacity to change.

The Dialogues resulted in ten Value Propositions - five Thematic and five Regional opportunities. (See Page 9). These are based on the premise that systems approaches that recognize the complexities of the challenges facing communities in the rainfed drylands of Africa and Asia are best placed to create innovations and enabling factors that support transitions towards more sustainable and equitable trajectories. Approaches would include co-design with communities, women and youth engagement, technology, policies and inclusive market development to deliver multiple benefits and improve the resilience of rural communities.

The following sections present the key outcomes and lessons from the three webinar presentations and discussion, as well as key messages from the DryArc-RDI webinar.

System Components for Building Resilience in the Drylands

Sustainable water management, high water productivity and equitable sharing of water resources with small holders are building blocks of resilient dryland agri-food systems. The availability of quality water

for food and feed production is low and uncertain when coming from rainfall and is at threat or will be limited with climate change when extracted from surface and groundwater reserves.

Livestock also **play a key role** in the resilience of most rainfed dryland farming systems, including in cereal-based systems. Effective livestock (long-distance) market chains and mobility of herds are essential elements of resilience in the agropastoral systems, as well as institutional mechanisms to manage resources and conflicts.

Diversification of cereal-based farming systems is essential for resilience to climate, pests/diseases and market shocks. The role of **trees and shrubs** for ecological, economic and social resilience and human nutrition is also important in dryland systems. Technologies for rotations, intercropping, legumes and agroforestry have been developed for the drylands but markets and policies have not been conducive in many countries for decades, although recent price and policy trends have improved the incentives for diversification, at least in Australia.

Mechanisation – at appropriate scales (i.e. value of small scale) in cereal-based agricultural systems are important considerations in building resilience through bringing power to the farm, building labour capacity, providing alternative service industries and making agriculture a more attractive business for the youth. Mechanisation also facilitates adoption of conservation agriculture based sustainable intensification in cereal-based systems which have been successfully trialled in the DryArc region and have delivered good results under periods of drought or climate shocks. Conservation agriculture for sustainable intensification delivers opportunities for enhanced human nutrition and risk management through crop diversification, including intercropping of legumes, vegetables and trees for improved nutrition, reduced herbicide and pesticides use and improved soil and water management.

Market innovation – strategies for connecting smallholders to markets for export and local-market products, value-adding to commodities, and reducing market risk are all important initiatives deserving of targeted research within the DryArc region. Strategies would take into account features of market innovations specific to dryland systems, such as post harvest and storing approaches that would be different in areas with long dry periods.

The development of self-organised farmer groups to connect to markets, the adoption of Good Agricultural Practice standards, and effective contract farming arrangements for higher value products are all potential market innovations. Multi-stakeholder 'learning alliances' can provide a useful institutional platform for identifying research opportunities and engendering stakeholder ownership of the research process and outcomes.

Institutional and policy change – a critical higher-level R4D question within DryArc will be how we develop the multi-stakeholder institutional frameworks and partnerships, and enabling policy environments, that stimulate system level changes and co-investments from farmer and industry groups, governments, and private sector participants. These institutional arrangements can be investigated through participatory

action research approaches that commence at the beginning of the R4D process, and which articulate the critical social, economic and biophysical research questions necessary to design demand-driven research.

Social innovations for rural communities - scaling out (to similar agro-ecologies) and scaling up (to country level) of innovations and behaviour change are social, economic and institutional processes. In many cases the innovations to be scaled will have to be combined and hybridized with local knowledge in a co-design process with rural communities and value-chain stakeholders. High social capital farmer and pastoralist groups have the ability to better cope with shocks, adapt to climate change, and connect to markets. They also function as 'knowledge networks', through social learning and extending, testing, adapting, and adopting social, economic, and bio-technical innovation. As well as investigating bio-technical innovation, DryArc will also investigate transformative social innovation.

Identifying an entry point for systems analysis and transformation – Lessons from Australia

The identification of an underutilized or inefficiently used resource can provide an entry point and opportunity for a holistic and systemic approach to change. In Australia, CSIRO discovered that water was available at depth in the soil profile, yet crops were suffering from terminal water stress, which led a team of researchers and farmers to seek opportunities to capture this underutilized resource. One approach taken was to plant earlier, thereby extending the length of the vegetative phase. By allowing roots to grow deeper and reach necessary moisture early in the growing season improved subsoil water use, leading to higher yield potential and reliable yearly forage. This intervention further opened up an opportunity for grazing which previously did not exist on the landscape, thus paving the way for mixed farming.
Initiated by inefficiency of water use, an entire agronomic system had to be built around the new opportunities, requiring changes in agronomy and breeding. However, scaling such a systemic transformation in Australia is facilitated by the farm management capacities and greater mechanization of large sizes of farms compared to smallholder farms found in other parts of the world. There is a need to structure organizations and working modalities in such a manner that key entry points and opportunities are not missed. Farmers need to be engaged in the process right from the beginning, along with a multidisciplinary team of researchers and practitioners.

Systems Research adds value and delivers impact

Systemic research needs to be **imbedded in research for development projects from the start,** and although **demanding and risky, over time, systems research can provide high payoffs** to investors. For example, the SIMLESA Program in East and Southern Africa, the CANA project in the Maghreb, the integrated watershed programs in South Asia and the TAAT project in Sub-saharan Africa have contributed to trigger a sustainable transformation of dryland agri-food systems.

Research can support systems transformation by providing methods, tools, acting as a facilitator of multi-stakeholder dialogues, knowledge sharing, co-design method and processs for innovation, institutional and policy change. Research design and implementation of methodologies and approaches need to be participatory, and be strongly owned by stakeholders. Establishing clear roles for identifying opportunities for system change, sustainability criteria, research needs and in guiding research direction are important. We must shift from focussing on comparing commodities or technologies impacts to comparing system performance in a sustainability space where synergies and trade-offs between SDGs are made explicit.

Digitalization of services to agriculture, while still largely driven by a commodity or input based approach and incremental innovation processes, should also integrate a systemic approach of farming systems management considering the diversity of farm activities and having the capacity to blend indigenous and scientific knowledge on agriculture and food.

Systemic transformation complements and adds value and impact to research on a specific commodity, resource, technology or benefit, and the latter also frequently provide entry point to a systemic approach – making them and their interactions the building blocks of a transformative pathway. They can also be the trigger of a transformative pathway, such as a new crop variety resistant to disease and with added value in the market, or a water management technology that changes water availability, as well as equity. The TAAT Wheat Compact in Sudan and Ethiopia is a good example of a successful development pathway with impacts on food security, farmers income and job creation at country level, thanks to an entry point with a commodity (wheat) and a seed system innovation process supported by national policies and incentives. The DryArc brings here the framework to embed this process in a more sustainable transformative pathway considering diversified farming systems, improved nutrition, resource use efficiency (water, nutrients) and soil health.

Systemic research in development requires investment in **new additional research areas** such as social science led transdisciplinary investigations, experimentation and co-design of scaling pathways for context specific transformational opportunities. Such research would benefit from the involvement of international scientists with the group of CGIAR scientists already working in these domains.

Targeting Multiple Benefits and Understanding Trade-offs

Social justice, migration and conflict resolution are essential to consider in drylands transformative pathways. **Livelihood improvements and resilience of dryland rural communities** are not necessarily consistent with national food security policies based on yield gap closure of major commodities. Understanding farmers' and pastoralists' livelihood portfolios, their adaptation strategies for coping with shocks, and identifying opportunities for social and market innovation and institutional change, will be critical components of DryArc R4D.

The impact of innovation on **labour requirement and returns, and job creation,** needs to be taken into account from the start of the transformative pathway, making sure to also apply a **gender and youth lens**.

Measuring and understanding tradeoffs, including the value(s) of inefficient ones – where it costs more to take the action, than the perceived gain. For example, in rainfed cereal-based systems there are frequent short-term tradeoffs between productivity increase and climate risk reduction depending on the way soil, water and fertilizers are managed. A study that looked at yield potential in relation to capacity to close yield gaps and mitigating economic risks among Australian wheat farmers showed that in sites with lower yield potential, moderate/highly risk averse producers made different choices from those made by risk neutral producers.[1]

Scales and Boundaries are important

Systemic approach would need to consider problems and solutions at the **right scale and level of complexity** – too much complexity can block action – but far too often too little complexity may be

too much complexity can block action – but, frequently, too little may be misleading in the solutions proposed and miss opportunities for transformation

[1] Monjardino et al. 2019. Yield potential determines Australian wheat growers' capacity to close yield gaps while mitigating economic risk. Agron. Sustain. Dev. 39:49.

misleading in the solutions proposed, or create negative side-effects such as land and water degradation, local inequalities and conflicts, or unexpected price outcomes. We need systems analysis and design approaches that capture the "right" level of complexity to support a transformative pathway in a given context. Australia and the CGIAR have extensive expertise and experience in these approaches.

Sustainable intensification and resilience require an "agri-food system perspective" from production to consumption and waste management – including **whole farming systems,** even **whole of value chain** approach, and in many cases a **landscape/community** approach, taking into account the environment, production, institutions, and social needs.

Engaging the Private Sector Early

Market linkages and involvement of the private sector are key drivers of change. They may tend to drive a system component approach (e.g. focussing on a value-added crop, a technology) but it can be complemented with a community-based approach, with farm-household systems consideration. Blending private and public thinking and design of interventions from the beginning in development projects can help ensure that the value chains and technologies approach generally prioritized by the private sector are consistent with the complexity and diversity of systems to implement at farm and landscape levels to ensure resilience and sustainability.

Public Private partnerships are important not only for a market led transformative pathway at scale but also for the design of innovations to trigger this pathway, including with small operators and start-ups. The private sector can also be an advocate and driver of policy changes. A common example is the adaptation with workshops and factories of zero till drills to local conditions in CWANA and South Asia.

Institutions and Governance are Foundations for Transformation

Transformation at scale requires institutional models that allow effective working modalities between research, stakeholders and development agencies. This requires **removal of barriers** to communication and coordination between NARS and associated government bodies, private sector, NGOs, community/farmer alliances, and research institutions.

Innovation systems need to be re-imagined and mechanisms/institutions for coordination and communication need to be created and strengthened. An increasing volume of relevant innovation occurs outside the CGIAR-NARS axis, most especially in value chains and technologies with the private sector, as well as by farmers with their own fields and herds. For example, Australian farmers co-fund national agricultural research through industry levies, and Australian farmer groups manage a significant amount of translational research and some extension – similar models could be tested in middle income countries of the DyArc region. Such comprehensive views of innovation systems open opportunities for new research by formal research systems requiring new capacities and investments at regional and national levels.

Context dictates the Tools and Methods for Systems Transformation

Systemic transformation starts with a process of fundamentally **challenging beliefs and perceptions** of the systems and underlying problems both in research and in development. There is a large and still untapped potential for **digitalization of agri-food systems** assessment and design **to support stakeholders and decision makers** in the transformative process (including risk analysis, trade-off analysis, trajectory analysis, systems re-design, typologies and scaling).

When using **knowledge management and outscaling tools** in the DryArc, there is a need to take into consideration that while biophysical systems may be similar, often the socio-economic systems are different and there are different knowledge networks. For example, the systematic qualification of Land Use Management options in an open source system like WOCAT can help accelerate knowledge sharing across the global drylands. Tools like GeOC (Global Geo-Informatics Options by Context) can then allow to identify similar biophysical and socio-economic condition where it could be worth to outscale a technology. There is also immense value to **blending this scientific knowledge with indigenous knowledge** on other options in the same context**.**

Changing mindsets through capacity building and inclusion

Systemic transformation requires a change of mindsets of all stakeholders (including farmers, researchers, advisors, policy makers). This implies **capacity development and institutional changes** in the Research-Advisory-Policy continuum from a commodity/technology/single benefit background to an agri-food system/multiple benefits background. System thinking, trade-off analysis and multicriteria impact assessments are typical examples of domains requiring improved capacities for the individual and the institutions of dryland regions.

Systemic transformation requires a change of mindsets of all stakeholders

For sustained progress towards systemic transformation, there is an urgent need to incorporate systems analysis education and training into university and on-the-job training for national researchers, advisory agents and policy makers. It is equally essential to involve communities in the transformation process.

Using lessons from the past and from elsewhere to build the future of DryArc region

Analyzing successes and failures in systemic transformation of agri-food systems in the drylands of Australia, Africa and Asia can support the **identification of transformative pathways as value proposition** for development projects. For example conservation agriculture in rainfed cereal-based systems has already been tested in most of the countries of the MENA region in collaboration with Australian scientists and we can learn from these experiences through the lens of a systemic transformation framework and in the climate and socio-economic context of today.

Constraints, obstacles, success and failures from the vast experiences of AusAID and ACIAR funded work with CGIAR and NARS in West Africa, North Africa, the Middle East and South Asia can inform the identification of research areas around sustainable intensification and **risk management in rainfed cereal-livestock systems,** considering the similarities and differences between Australia and these region, which is something that a systems analysis approach enables.

Considering the importance of social capital for local innovation, adoption and scaling, Australian **Landcare or farmers groups** can be interesting models for taking up a community and non-linear approach - 'Change happens from the ground up'. Based on learnings from the Australian experience, there are now Landcare networks in over 15 developing countries in Africa and Asia.

Some key advances in the Australian pastoral areas arose from coalescence around common vision, policy and investments of the grazing industry, public health and agricultural policy makers and trade interests alongside science, for example in controlling brucellosis. **Being bold and taking on transformation may require riskier research.**

Value proposition for regional projects in which the DryArc group of scientists and their partners can support development projects

Value Propositions for the systemic transformation of the rainfed drylands of Africa and Asia

Drylands of the DryArc region cover 35% percent of the world's surface and support 27% of the world's population, including 16% of the poorest and most food insecure. Systemic transformation of the African and Asian drylands that catalyzes research embedded in development programs would enable the achievement of SDG2 and associated SDGs in the driest parts of the world, in synergy with poverty reduction, nutrition security, job creation and reduction of conflicts, forced migration and instability.

Our premise is that **systems approaches that recognize the complexities of the challenges facing communities in the rainfed drylands of Africa and Asia** are best placed to create innovations and enabling factors that support transitions towards more sustainable and equitable trajectories. Approaches would include co-design with communities, women and youth engagement, technology, policies and inclusive market development to deliver multiple benefits and improve the resilience of rural communities.

Thematic opportunities

1 **Participatory Action Research, embedding systems Research In Development projects from the design phase to the implementation phase** contributes to developing institutions, policies and partnerships that are fit for purpose, outcome-focused, adaptive and accountable to achieve SDG2 under the climate crisis in the drylands of Africa and Asia.

2 **Enhancing the science-policy interface for evidence-based policies and institutions** is conducive to the systemic transformation of drylands. Given the diversity and heterogeneity of drylands from a bio-physical, socio-economic, policy and institutional perspectives, better guidance of development interventions is needed through multi-level ex ante assessment and foresight in order to target interventions across this diversity.

3 **Building adaptive capacity and partnership** between rural communities, public and private sectors and research organizations on systemic transformation and co-design of dryland agri-food systems will drive sustainable development.

4 **Combining de-risking mechanisms (focusing on socio-economic approaches) with systemic innovation can trigger a sustainable intensification and diversification** of mixed cereal-livestock systems and diversification of cropping systems, and close more than 20% of the land, water and labor productivity gaps by 2030 to deliver increased nutrition security in the **250 – 600 mm rainfed zones** of the African and Asian drylands. Socioeconomic approaches will highlight the involvement of women and youth, with greater attention for business opportunities in rural areas.

5 **By 2030, food and nutrition security and resilience of livelihoods can increase by 20% in the < 250 mm zones** of the drylands of Africa and Asia through an integrated livestock-based approach at community/watershed level, and with proper linkages to markets.

Regional opportunities

Transformation of dryland agrifood systems can be implemented in country/region specific conditions with the DryArc framework supporting co-design with multiple stakeholders and for multiple benefits:

6 The extensive **West and Central African drylands** across more than a dozen countries from Senegal to Sudan have excellent opportunities to boost rural incomes from adapting existing technologies and practices for integrated cereals/legumes, livestock and tree systems that restore land and water resources and feeds the emerging megacities.

7 **East African drylands** cut across ten countries (or regions within countries) from Sudan through to Tanzania with an untapped potential in crop (cereals/legumes)-livestock (cattle, small ruminants, and poultry)-trees integration in agro-silvo-pastoral systems at watershed level with value-added products and carbon market linkages.

8 In the **North African rainfed belt** cereal-pulse-forage systems in conservation agriculture offer opportunities to close the total factor productivity gaps (land, water, fertilizer and labour) of wheat in Morocco, Algeria and Tunisia, with improved nutrition in rural and urban communities and create jobs for youth and women in value chains and digital services, while preserving groundwater resources.

9 In the **transition zone between the cereal belt and desert of the Middle East** empowering local communities for integrated management of livestock, soils, water and biodiversity at landscape level and market linkages for added value products can improve income and reduce conflicts and migration in the driest parts of Lebanon, Syria, Jordan and Iraq.

10 Smart combination of rainfed and irrigated systems offers opportunities to achieve SDG2 in a climate crisis in the **South Asian drylands** with comprehensive participatory watershed development of sorghum, millet, pulses, forages, livestock, and agroforestry systems to feed large cities.

Annex 1: DryArc-Australia Dialogue and RDI Agenda

Date and Time	Topic
August 25, 2020 8:00AM-10:30AM (GMT+2)	Plugging the rainfed gap and de-risking sustainable intensification in cereal-based systems (including legumes, forages and livestock)
August 27, 2020 8:00AM-10:30AM (GMT+2)	Resilience and livelihood in low rainfall agro-silvo-pastoral systems with integrated rangeland management and water harvesting
August 31, 2020 8:00AM-10:30AM (GMT+2)	Effective research-development interfaces for systemic transformation of the drylands
September 17, 2020 8:00AM-9:30AM (GMT+2)	Research and Development Interface (RDI) webinar with development partners to discuss implementation of systemic transformation at region and country level in the drylands of Africa and Asia.

Annex 2: DryArc-Australia Dialogue and RDI List of Participants

Facilitator: Dr Julian Prior, Associate Dean, International, Faculty of Science, Agriculture, Business and Law, University of New England, Armidale, NSW, Australia

Affiliation	Name	Position/Expertise
Adelaide University	Matt Denton	Associate Professor, School of Agriculture, Food & Wine
	Wendy Umberger	Executive Director, Center for Global Food & Resources
African Development Bank (AfDB)	Martin Fregene	Director of Agriculture and Natural Resources Management
Agrimix Pastures	Nick Kempe	Founding Director
Australian Centre for International Agricultural Research (ACIAR)	Andrew Campbell	CEO
	Ann Fleming	Research Program Manager, Fisheries
	Anna Okello	Research Program Manager, Livestock Systems
	Eric Huttner	Research Program Manager, Crop Improvement & Management
	Julianne Biddle	Director, Multilateral Engagement
	Robyn Johnston	Research Program Manager, Water
Australian Department of Foreign Affairs and Trade (DFAT)	Fiona Lynn	Director, Agricultural Productivity and Food Security
	Tristan Armstrong	Sector Specialist, Agricultural Productivity and Food Security
Center for International Forestry Research (CIFOR)	Houria Djoudi	Senior Scientist, Forests and Human Well-being
Crawford Fund Ltd	Colin Chatres	CEO
	Shaun Coffey	Director, Capacity Building
Geoscience Australia	Adam Lewis	Managing Director
Grains Research and Developmen Corporation (GRDC)	Peter Carberry	General Manager, Applied R&D
	Stephen Loss	Manager, Soils and Nutrition
ILRI	Augustine Ayantunde	Regional Representative, West Africa
	Iain Wright	Deputy Director General-Research (DDGR)
Indian Council of Agricultural Research (ICAR)	Praveen Kumar	Principal Scientist, Central Arid Zone Research
	C.S. Praharaj	Principal Scientist, Indian Institute of Pulses Research
International Center for Agricultural Research in the Dry Areas (ICARDA)	Aly Abousabaa	Director General (DG)
	Aymen Frija	Agricultural Economist
	Barbara Rischkowksy	Director, Resilient Agricultural Livelihood Systems Program
	Chandra Biradar	Head of Geoinformatics & Research Data Management
	Charles Kleinermann	Head, Capacity Development Unit
	Dina Najjar	Gender Scientist
	Enrico Bonaiuti	Research Team Leader, Monitoring, Evaluation & Learning
	Girma Kassie	Senior Agricultural Market Economist
	Jacques Wery	DDGR
	Julia Hedtjärn Swaling	Proposal Writer
	Mary Margaret McRae	Acting Head of Partnerships and Resource Mobilization
	Michael Baum	Director, Biodiversity & Crop Improvement Program
	Mounir Louhaichi	Research Team Leader of Rangeland Ecology and Forages
	Sarker Ashutosh	Regional Coordinator, South Asia & China
	Stefan Strohmeier	Associate Scientist, Soil & Water Conservation
	Tareq Bremmer	Grants Management Officer
	Vinay Nangia	Research Team Leader, Soil Water & Agronomy (SWA)
	Yemeserach Tessema	Consultant, Technical Research & Resource Mobilization
	Yigezu Yigezu	Senior Agricultural Economist
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	Andre van Rooyen	Senior Scientist, Crop-Livestock Systems
	Andrew Smith	Theme Lead, Farming & Systems Analysis for Climate Smart Agriculture

	Anthony Whitbread	Research Program Director, Innovation Systems for the Drylands & Country Representative, Tanzania
	Birhanu Zemadim	Senior Scientist, Land & Water Management
	Jacqueline Hughes	DG
	Kaushal Garg	Scientist, Watersheds
	Kiran Sharma	DDGR & Director, CRP GLDC
	Rebbie Harrawa	Regional Program Director, Eastern & Southern Africa
	Sabine Homan-Kee Tui	Scientist
	Tilahun Amede Wondifraw	Principal Scientist, Natural Resources/Systems Agronomy, Country Representative, Ethiopia
International Food Policy Research Institute (IFPRI)	Clemens Breisinger	Senior Research Fellow
	Hagar ElDidi	Research Analyst, Environment and Production Technology
	Kibrom Abay	Research Fellow, Development Strategy and Governance
International Fund for Agricultural Development (IFAD)	Samia Akroush	Country Director, Iraq
International Institute of Tropical Agriculture (IITA)	Alpha Kamara	Savannah Systems Agronomist
	Bernard Vanlauwe	Director R4D, Central Africa and Natural Resource Management
	Murat Sartas	Innovation Systems Scientist
	Ousmane Boukar	Cowpea Breeder
	Victor Manyong	Director, Eastern Africa Hub, Social Science & Agribusiness
International Maize and Wheat Improvement Center (CIMMYT)	Bruno Gerard	Program Director, Sustainable Intensification Program
	Frederic Baudron	Principal Scientist, Cropping Systems Agronomist
	Mangi Lal Jat	Principal Scientist, Cropping Systems Agronomist
	Santiago Lopez Ridaura	Senior Researcher, Agricultural Systems/Climate Change Adaptation
International Water Management Institute (IWMI)	Adham Badawy	Research Officer
	Amgad ElMahdi	Representative, MENA Region
	Maha Al-Zu'bi	Researcher, Agriculture and water solutions
	Manuel Magombeyi	Hydrologist, Water, Land & Ecosysems
	Marwa Ali	Research Officer
	Nisreen Lahham	Project Manager
	Paul Pavelic	Senior Researcher
	Petra Schmitter	Research Group Leader
Islamic Development Bank	Bashir Jama Adan	Agriculture & Food Security Specialist
ISPC CGIAR	Holger Meinke	Chair – Independent Science for Development Council, CGIAR
Ministry of Foreign Affairs, The Netherlands	Wijnand van Ijssel	Senior Policy Advisor, Cluster Food & Nutrition Security
Murdoch University	John Howieson	Research Director Crops & Plant Sciences
	Wendy Vance	Researcher
NRM Regions Australia	Kate Andrews	CEO
Other	Brondwen Maclean	Applied Research, Development & Extension
	Bruce Pengelly	Tropical & Subtropical Farming Systems Expert
	Emma Zalcman	Veterinary Epidemiology
	Mellissa Wood	International agricultural R4D in food, land & water systems, **Core Webinars Planning Team member**
Primary Sales Australia	Alan Fisher	Director
RMIT University	Mary Johnson	Research Fellow, Sustainability & Urban Planning
Soil CRC	Michael Crawford	CEO
Soils For Life	Liz Clarke	CEO
The Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Cecile Godde	Food Systems Research Scientist
	Di Mayberry	Senior Research Scientist
	Hayley Norman	Agricultural Scientist
	John Kirkegaard	Farming Systems Agronomist
	Lindsay Bell	Principal Research Scientist

	Mark Stafford Smith	Honorary Fellow
	Marta Monjardino	Agrocultural Systems Economst
	Uday Nidumolu	Project Leader (Climate science)
	Zvi Hochman	Chief Research Scientist & Team Leader, Agrculture and Food
The Cooperative Research Centre for Developing Northern Australia (CRCNA)	Allan Dale	Chief Scientist
The European Union (EU)	Christophe Larose	Head of Sector, Sustainable Agriculture
	Guy Faure	Senior Policy Officer
The French Agricultural Research Centre for International Development (CIRAD)	Patrick Caron	Director of Research & Strategy (& CGIAR Board Member)
The National Farmers' Federation	Adrienne Ryan	General Manager, Rural Affairs
	Warrick Ragg	General Manager, Natural Resource Management
University of New England	Derek Baker	Professor, Agribusiness & Value Chains
	Heather Burrows	Professorial Research Fellow, Faculty of Science, Agriculture Business and Law
University of Queensland	Daniel Rodriguez	Professorial Research Fellow, Centre for Crop Science
	Dave Jordan	Professor, Plant Breeding & Genetics
	John Dixon	Adjunct Professor, Centre for Horticultural Science/ **Core Webinars Planning Team member**
University of Southern Australia	Jack Desboilles	Senior Agricultural Research Engineer
University of Western Australia	Kadambot Siddique	Chair and Director, Institute of Agriculture
World Agroforestry Centre (ICRAF)	Fergus Sinclair	Science Domain Leader, Systems & Principal Advisor, Regions
World Bank	Jonathan Wadsworth	Lead Climate Change Specialist
WorldFish	Harisson Karissa	Country Director, Egypt
	Michael Phillips	DDGR