

SUMMARY

ICARDA Strategic Plan 2017-2026

Science for
resilient livelihoods
in dry areas



Why dry areas matter.....	3
A new ICARDA research strategy to spur development in dry areas.....	3
Our vision.....	4
Our mission	4
Our goals.....	4
Pathways to impact for thriving and resilient communities in dry areas.....	5
Organizational effectiveness.....	8
Who benefits from our research?.....	8
Where we work.....	9
ICARDA's unique attributes.....	10
Partnerships for lasting impact in the dry areas.....	11
About ICARDA.....	12



CGIAR

A CGIAR Research Center

cgiar.org

Why dry areas matter

Non-tropical dry areas¹ are home to almost a third of humanity. Around 2.5 billion people depend on these dry areas for their survival, and one in six of them endure chronic poverty. The population of these areas is rising more rapidly than the global average, increasing pressure on natural resources. Water, not surprisingly, is a scarce and valuable resource. Despite covering 47% of the planet's land, dry areas contain only 8% of global renewable water resources. In many countries, annual water availability per person is considerably less than the UN's poverty threshold of 1,000 m³. Dry areas are fragile, losing 12 million hectares to drought and desertification each year. They are also hotspots for worsening heat, drought, and aridity, with climate change predicted to bring greater extremes of temperature, changed water regimes, and new pests and diseases. In the Middle East, for example, climate projections in the Intergovernmental Panel on Climate Change Fifth Assessment Report show that under a moderate scenario temperatures will increase by 3°C by the end of the century, while a more severe scenario will push temperatures even higher. ICARDA believes that an increase of 4°C is very likely for a significant share of non-tropical dry areas, together with a decrease in precipitation of up to 20%.

Nevertheless, dry areas are productive. They grow 44% of the world's food and are home to 50% of its livestock, and they could provide much more. The yield gap means that countries could harvest an extra 20 million tons of grain each year. This shortfall costs developing countries in non-tropical dry areas 4–8% of their gross domestic product each year. In the Middle East and North Africa, more than half of the cereals eaten are imported, exposing countries to the fluctuations and unpredictability of global markets and potential civil strife.

Solutions will come from rigorous scientific research that supplies the evidence on which change can be based – research in which ICARDA excels.

A new ICARDA research strategy to spur development in dry areas

To help break the cycle of poverty, improve food and nutritional security, halt or reverse the alarming process of resource degradation in the dry areas, and help communities adapt to the impacts of climate variability and change, ICARDA's Strategic Plan 2017-2026 outlines our research and organizational approach for action to achieve our vision of thriving and resilient communities in the dry areas of the developing world.

It lays the groundwork for building on 40 years of past achievements, lessons learned, successful partnerships, and investments at the regional and global levels. The strategy is aligned with the national development priorities of the countries we work in, the wider Sustainable Development Goals (SDGs), and the Strategy and Results Framework 2016-2030 of CGIAR, with which the Center is affiliated. This Strategic Plan will ensure that the research we undertake and the knowledge we generate continues to be demand-driven, relevant, and aimed at the challenges of smallholder farmers, particularly women and youth.

We recognize that innovation, adaptation, and resilience are key to the future of the organization, just as they are to the future of people in non-tropical dry areas. The ideas are bold and ambitious, and we strongly believe that, underpinned by sufficient resources, they will allow us to achieve the results our partners and stakeholders need and deserve. Cutting-edge, relevant scientific research will spur agricultural transformation and forge a brighter future and better livelihoods for millions of women, men, and young people living in non-tropical dry areas.

We invite you to join us on this journey.

¹ Regions characterized by an aridity index (which takes into account not only rainfall and its distribution through the year, but also average temperatures) of between 0.03 and 0.65, and in which there is at least one month with mean temperature below 20°C.

Our vision

We envision thriving and resilient livelihoods in the non-tropical dry areas of the developing world with adequate incomes, secure access to food, markets, and nutrition, and the capacity to manage natural resources in equitable, sustainable, innovative ways.

Our mission

To reduce poverty and enhance food, water, and nutritional security and environmental health in the face of global challenges including climate change.

Our goals

To achieve our mission and vision, we have set ourselves three main goals, or System Level Outcomes (SLOs), which are also part of the overall CGIAR Strategy and Results Framework 2016-2030:



SLO 1: Reduce Poverty. Making an impact means research to generate higher, diverse, and more sustainable incomes through functional markets that result in better standard of

living for men, women, and children in the non-tropical dry areas of the developing world.



SLO 2: Improve Food and Nutrition Security for Improved Human Health. Making an impact means research to increase food and nutritional security, thereby improving

human health for poor and vulnerable communities in non-tropical dry areas.



SLO 3: Improve Natural Resource and Ecosystem Services. Making an impact means research to develop equitable and sustainable management practices for land,

water resources, energy, and biodiversity in non-tropical dry areas for generations to come.



Our goals contribute strongly to the SDGs targeting no poverty, zero hunger, good health and wellbeing, gender equality, clean water and sanitation, climate action, life on land, and partnerships for impact. They also contribute toward quality education, good jobs and economic growth, reduced inequalities, responsible consumption, and peace and justice.

To tackle challenges in the dry areas on a large scale, our strategy calls for collective action among all partners and stakeholders to engage in generating integrated and resilient farming systems that meet market demands, ensure income generation, and provide opportunities for women, men, and youth to realize their full potential. In doing so, we seek to identify the most innovative and sustainable solutions with benefits that are far-reaching and enduring.

“Our goals contribute strongly to the SDGs targeting no poverty, zero hunger, good health and wellbeing, gender equality, clean water and sanitation, climate action, life on land, and partnerships for impact.”

Pathways to impact for thriving and resilient communities in dry areas

Millions of smallholder farm families in dry areas need to become profit-making enterprises, which will turn their communities into vibrant hubs of economic activity. To achieve such transformation, ICARDA will focus on building and maintaining scientific rigor and excellence in research among its own staff and through capacity development with strategic partners. This will be done through five Strategic Research Priorities and four Cross-Cutting Themes.

Our Strategic Research Priorities

1.  **Collect, conserve, and use agricultural biodiversity**, the source of future improvements to crop varieties and livestock breeds. ICARDA's genebank holds more than 155,000 plant accessions and 1,380 strains of rhizobia in trust for the global community. Conserving those resources in genebanks and in the wild, and making them available to others, is a priority to meet climate and other challenges. Among key activities will be research to gain a better understanding of the traits of the material and pre-breeding to put important genes into lines that breeders can use to transfer traits into elite varieties well adapted to a hotter and drier world.

2.  **Develop climate-adapted crops and livestock** that will perform better in response to emerging climatic, environmental, and market challenges. Much of this breeding will start with the pre-breeding outputs of Strategic Research Priority 1. Breeding programs will optimize yield, yield stability, quality, and nutrition, making use of the latest molecular tools to improve speed and efficiency. One focus will be on water use – to minimize yield losses during drought and maximize yield gains during good seasons. Another will be on

the mechanisms of resistance to pests and diseases, continuing and motivating work in global efforts and with strategic partners. Livestock scientists will use cutting-edge research to understand the genomics of small ruminants to enhance breeding efficiency and identify key traits for resilience to climate change.

3.  **Build climate-resilient, integrated crop-livestock farming systems** that can improve livelihoods sustainably. Such developments are a form of intensification, but the ecological fragility of dry areas requires considerable care. Among the solutions will be improved agronomic practices to reduce the yield gap in rainfed systems and conservation agriculture rolled out more widely. Smallholder farmers will work with ICARDA scientists to improve livestock breeding, using some of the outputs of Strategic Research Priority 2. Optimized solutions that make use of plant biomass both to restore soil health and to feed livestock will power the development of farming systems that are adapted to climate change and that can mitigate some of its impacts.

4.  **Promote sustainable value chains, supportive policies, and viable off-farm activities.** While some of the difficulties of dry area agriculture are the result of biophysical challenges, others are the result of under-investment. The two are linked, of course, in that the riskiness of agriculture reduces the incentive to invest, which does nothing to reduce risk. ICARDA will act as a catalyst to strengthen entire value chains, working closely with key stakeholders along each chain, allowing agriculture to generate income for poor households and wider economic activity in their communities. Women and youth represent crucial groups that have much to gain from taking part in strong value chains, supported by enabling policies and sustainable markets.

5.  **Support sustainable use and management of scarce water and land resources.** It goes without saying that water is the most valuable resource for agriculture in dry areas. ICARDA will therefore continue to build upon past achievements, including landscape modification to improve water harvesting, more efficient approaches to irrigation, and the safe use of wastewater in peri-urban areas. However, partly because of aridity, land degradation is also a formidable challenge. Building on outputs of Strategic Research Priority 3, ICARDA will promote the tightly integrated management of soil, land, and water to ensure that ecosystem services are restored and enhanced.

Our Cross-Cutting Themes

1.  **Scaling up proven technological packages.** The improved varieties, livestock, and other associated research outputs must get into the hands of farmers to do any good. Scaling up and scaling out are essential to large scale impact and require collaborative and synergistic partnerships that are effective in research for development, each playing a supporting role in reaching final beneficiaries. Advanced research institutions, non-traditional partners, private sector actors, non-governmental organizations, development agencies, national extension systems, and financial institutions will have a role. A key activity will be to promote South-South cooperation among partners, which ICARDA has been doing with great success. Decision-makers will be targeted via dialogue, advocacy campaigns, and regional fora to support conducive enabling environments.

2.  **Gender equality and youth engagement.** Although we aim to improve livelihood options for all members of the communities in which we work, we also need to rebalance past efforts to ensure inclusive participation and benefit from development processes. As men migrate for work and climate change impacts take their toll, women's burdens are becoming heavier. Our work will support women's access to the land and water resources they need as well as to knowledge, innovation, finance,

and markets. ICARDA will seek to empower women through capacity development, improving their access to resources and developing their role as active agents of change. Crucially, women need technologies and knowledge to reduce the drudgery of agricultural work and free up their time and energy to engage in more lucrative economic activities. Youth, like women, constitute a large disenfranchised group facing high levels of unemployment. They too have tremendous capacity to innovate and engage meaningfully as agricultural service providers and in value chains. ICARDA will explore innovative ways of attracting youth into agriculture.

3.  **Capacity development** has always been central to ICARDA's mission, and is even more so in our Strategic Plan 2017-2026. We will continue to focus on building the capacities of individuals, institutions, and communities. We will support countries to have a cadre of able young women and men operating in effective institutions. In addition to offering our own diverse courses and partnerships with advanced research institutions and universities, will take full advantage of information and communications technology (ICT) to ensure that young scientists have the knowledge, experience, and ability to help transform agricultural development in their countries.

4.  **Big data and ICT** is revolutionizing research when effectively harnessed. Geo-informatics, remote sensing, and the outpouring of data from molecular research is being used in multiple ways, from real-time maps of crop productivity and water consumption to more accurate targeting of genetic improvements in breeding programs. ICARDA will use all of these tools to enhance the efficiency of its research and guide effective policymaking. A crucial aspect of big data is that it can be even more valuable if shared with others, so an important component of this theme is ICARDA's commitment to open access and extensive cooperation with all other interested parties.

ICARDA's Strategic Results Framework for thriving and resilient dry areas



Sustainable Development Goals



CGIAR Strategic Level Outcomes



Our Research Priorities

<p>SRP1 Collect and conserve agricultural biodiversity in drylands in order to meet future climate- and market-related challenges.</p>	<p>SRP2 Develop improved and resilient crops for greater food security in face of climate change and market volatilities.</p>	<p>SRP3 Develop integrated drylands farming systems for improved and resilient livelihoods.</p>	<p>SRP4 Support the establishment of functional value chains and viable off-farm activities for diversified incomes and improved livelihoods in drylands.</p>	<p>SRP5 Support sustainable use and management of water and land resources in drylands.</p>
---	--	--	--	--

Our Cross-Cutting Themes

Scaling up proven technologies	Gender equality and youth engagement	Capacity development	Big data and ICT
--------------------------------	--------------------------------------	----------------------	------------------

Organizational effectiveness

While the Strategic Research Priorities and Cross-Cutting Themes set the directions for ICARDA's future research, getting there will require a fit-for-purpose organization. To that end, the Strategic Plan incorporates several ways in which ICARDA will improve our organizational operations.

Enhanced scientific quality, doubling the number of papers published in high-impact journals by 2021 and doubling again by 2026.

Strengthened resource mobilization, delivering 5% annual growth in funding over the next five years and tapping into new sources of support such as climate funds.

Investing in human resources to attract and retain highly qualified staff from diverse backgrounds, including a target of 30% of the Center's research and management positions and 35% of support positions occupied by women by 2026.

A new business model adopted and changes to the organizational structure to strengthen decision-making and accountability in a fully decentralized organization, along with reduced institutional costs.

A new platform for monitoring, evaluation, and learning will ensure that **results-based management** provides a coherent foundation for strategic planning and resource allocation.

Because even the most compelling research results are useless if nobody knows about them, ICARDA will strengthen **communications and outreach** to have impact at scale and be recognized as a leading science partner in its field.

Who benefits from our research?

Our strategy supports research that targets primarily smallholder farmers, pastoralists, and agro-pastoralists in the non-tropical dry areas of the developing world. Others who add value along the chain from producers to consumers also stand to benefit from our work. Crucially, our research empowers women and young people with concrete knowledge and opportunities to improve their livelihoods. We believe our research efforts to address the needs of these communities in the dry areas are critical contributions to achieving the Sustainable Development Goals by 2030.



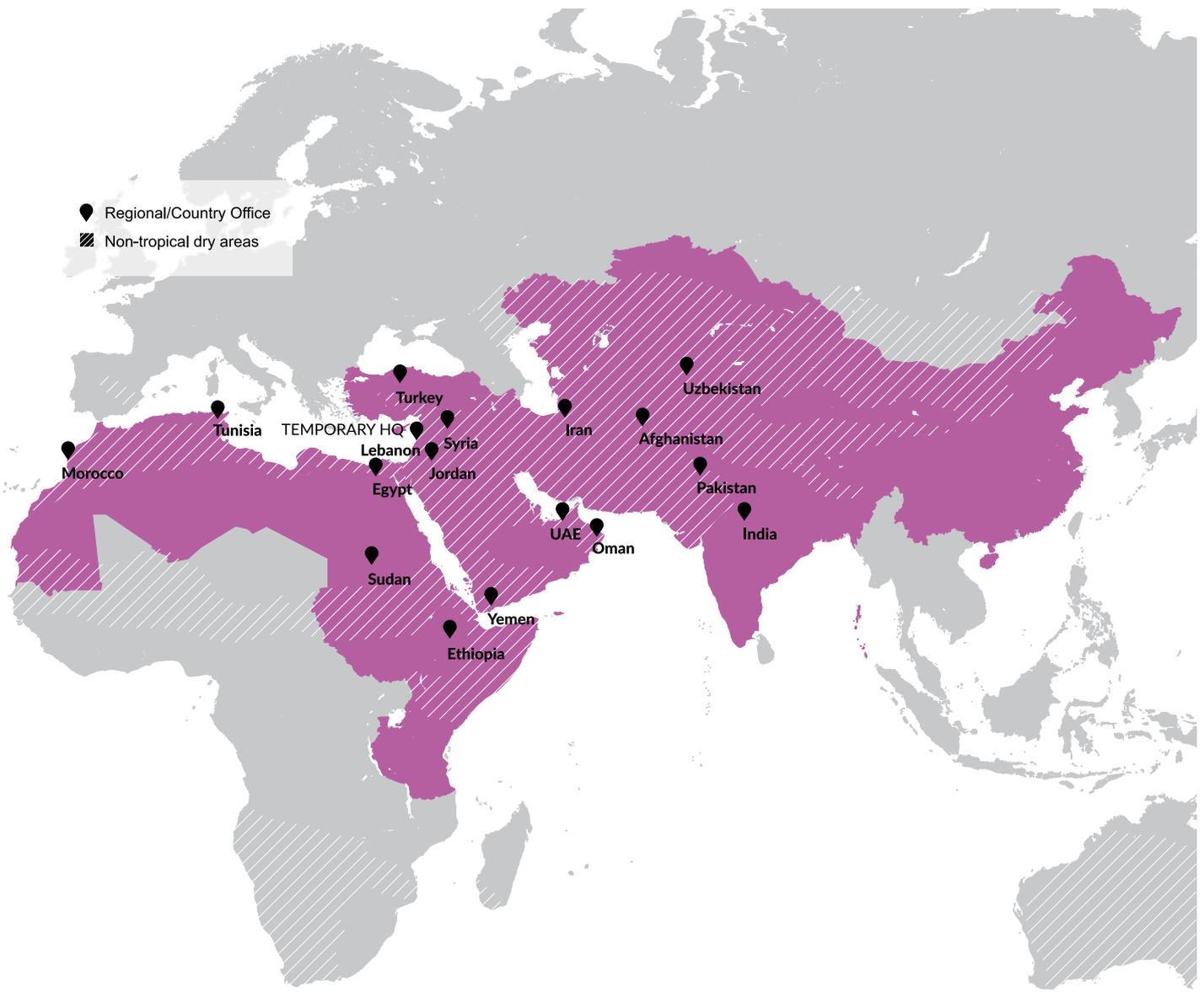
Adapting to climate change

We developed heat- and rust-tolerant, fast-growing wheat varieties in Sudan and Ethiopia as part of an initiative to boost wheat production across 12 sub-Saharan African countries. The varieties, together with a package of interventions including optimized land preparation and pest management technologies, reached around 7,500 farmers. These innovations tripled the farmers' wheat yields and convinced policymakers to invest in wheat production as a way of reducing dependence on imports.

Where we work

ICARDA works in many locations to ensure that local concerns can be addressed and global solutions shared. We work in three key strategic regional hubs: Morocco on rainfed cereal-based production systems; Ethiopia on crop-livestock systems; and India on food legume systems. Our geographic spread also extends to thematic research locations in Egypt on high input irrigation systems; Turkey on winter cereals and cereal rust

diseases; Jordan on building resilience in marginal lands; Sudan on heat-tolerant cereal and food legume varieties; and Iran and Uzbekistan on addressing challenges in cold agro-ecosystems. ICARDA will continue to build on our footprint in the Middle East and North Africa with activities in Central and South Asia, the West African Sahel and Dry Savannas, and East Africa, wherever we have a comparative advantage.



ICARDA's unique attributes

ICARDA's added value and comparative advantages, which set us apart from other international organizations and research institutions working in the dry areas, are founded on six unique attributes and approaches.

- **Delivering science for impact.** ICARDA's ability to attract and retain a diversity of internationally talented scientists with a range of specialized skills allows us to mobilize multidisciplinary teams that are able to generate evidence-based solutions grounded on in-depth knowledge of the science, the regions, and the countries.
- **Strength in relationships.** ICARDA is the go-to organization for linkages in the regions where we operate. Our understanding of the culture and language, insights, and access enable us to leverage a network of partners, actors, and stakeholders through our independence, objectivity, and apolitical agenda. We are able to convene regional science fora and bring decision-makers and actors around the table to make effective collaboration possible.
- **Working in difficult environments for development.** ICARDA has a history of effectively operating in fragile states and post-conflict countries, contributing to the rebuilding of agricultural research capacity and the sector as a whole. This history includes a strong focus on taking research outputs and outcomes to scale by partnering with development practitioners.
- **The genes we hold in trust.** Through our unique collections of the major crops, held in trust in our genebank, ICARDA is a world leader in the collection and characterization of plant genetic diversity and the provision of this material to breeding programs globally. Key to our comparative advantage is the use of this genetic material to provide traits needed to cope with the biotic and abiotic stresses that will become more prevalent with climate change.
- **Enhancing the sustainable use of water and land resources.** Our approach to rain-fed, irrigated and agropastoral farming helps to reverse environmental degradation, improve water productivity, and support

sustainable intensification. We target agricultural production systems that deliver “more with less,” against a backdrop of increasing land degradation, scarce water resources, and the impacts of climate variability and change.

- **Organizational structure.** ICARDA's success is founded on our resilience as an organization to innovate and adapt to change. The decentralized approach to managing our research agenda ensures that we respond to local and contextual issues on the ground, where they arise. This contextual understanding and geographic presence, which includes our ability to support donors and manage grants in volatile contexts, are not shared by many international organizations. We intend to strengthen it further.



Building resilience in marginal dry areas

In Jordan, we developed micro-water harvesting techniques by merging a GPS-based guidance system with the Vallerani plow machine. This has ensured that the ecosystem in the Jordanian Badia (dry rangelands) is preserved. Our Vallerani rainwater-harvesting package has been implemented on around 3,900 hectares of rangeland in Jordan so far. Analysis suggests that it could be scaled up to an area of 300 million hectares across the Middle East and North Africa.

Partnerships for lasting impact in the dry areas

Research at ICARDA aims at securing vibrant, resilient, sustainable agricultural communities in non-tropical dry areas, but we recognize that genuine transformation requires a strong network of diverse partners. National governments and their agricultural research systems, universities, our sister CGIAR centers, the private sector, and civil society organizations all have roles to play in creating the enabling environment for this transformation.

We recognize that over the past decades, the countries where ICARDA works have increased their investments in agricultural research, and their national institutions have made significant contributions to crop improvement, natural resource management, and environmental sustainability. This is an extremely positive development that signals an important change in ICARDA's role as a strategic research partner and provider of international knowledge to further enhance the efforts, skills, and competencies of our partners to shape and drive their own national and regional agricultural research agendas. These well-established partnerships will be expanded to include collaborations with other partners that have the knowledge and resources to open new avenues for the development of dry areas and to reach impact at scale: development agencies, which have a potential role in the up- and out-scaling of innovations through their engagement in development programs; grassroots, community-based and non-governmental organizations, in testing and adapting innovations and market linkages; and the private sector, in identifying and developing value-added options, market opportunities, and linkages for out-scaling innovations. It is a misconception that solutions to agricultural problems must involve large investments that are beyond the means of national governments. We believe that, together with our partners, we can challenge this by going beyond agriculture alone to encompass functional and sustainable value chains and alternative livelihood options. Improved circumstances in these areas will ensure re-investments that enhance overall performance and resilience, kick-starting a virtuous cycle of sustainable development.



Enhancing nutrition security

To fight malnutrition, we developed hundreds of genetically crossed varieties using high-micronutrient-content germplasm, breeding lines, and popular cultivars. As a result, in Bangladesh alone, around 956,000 farmers adopted new lentil varieties high in iron and zinc, covering 86% of the lentil cultivation area and producing an additional 33,000 tonnes of harvest worth US\$30 million annually. And in Nepal, almost 60% of farmers adopted the new varieties, resulting in additional lentil production of over 36,000 tonnes worth US\$29 million annually.



About ICARDA

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is a non-governmental, non-profit, CGIAR research center that focuses on delivering innovative solutions for sustainable agricultural development in the non-tropical dry areas of the developing world.

ICARDA is headquartered in the Middle East, with regional offices across North Africa, sub-Saharan Africa, and West, Central, and South Asia. ICARDA works in partnership with national agricultural research systems, governments, civil society, and the private sector to develop scalable agricultural solutions that contribute to poverty reduction, food and nutritional security, and sustainable utilization of natural resources.

We provide innovative, science-based solutions to improve the livelihoods and resilience of resource-poor smallholder farmers in non-tropical dry areas. We do this through strategic partnerships, linking research to development and capacity development and taking into account gender equality and the role of youth in transforming non-tropical dry areas.

For more information, please visit:

www.icarda.org

