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## International Commission on Irrigation and Drainage (ICID)



**Mr Maher Salman**  
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**Smart Irrigation Management as a  
Pathway to Climate Resilience,  
Resource Efficiency, and Food Security**

**2<sup>nd</sup> Indo Global Irrigation Summit**

**24-25 June 2026, New Delhi India**

# Smart irrigation management as a pathway to climate resilience, resource efficiency and food security

**Maher Salman**

Senior Land and Water Officer

Land and Water Division

Food and Agriculture Organization of the UN

**2nd Indo-Global Irrigation Summit**

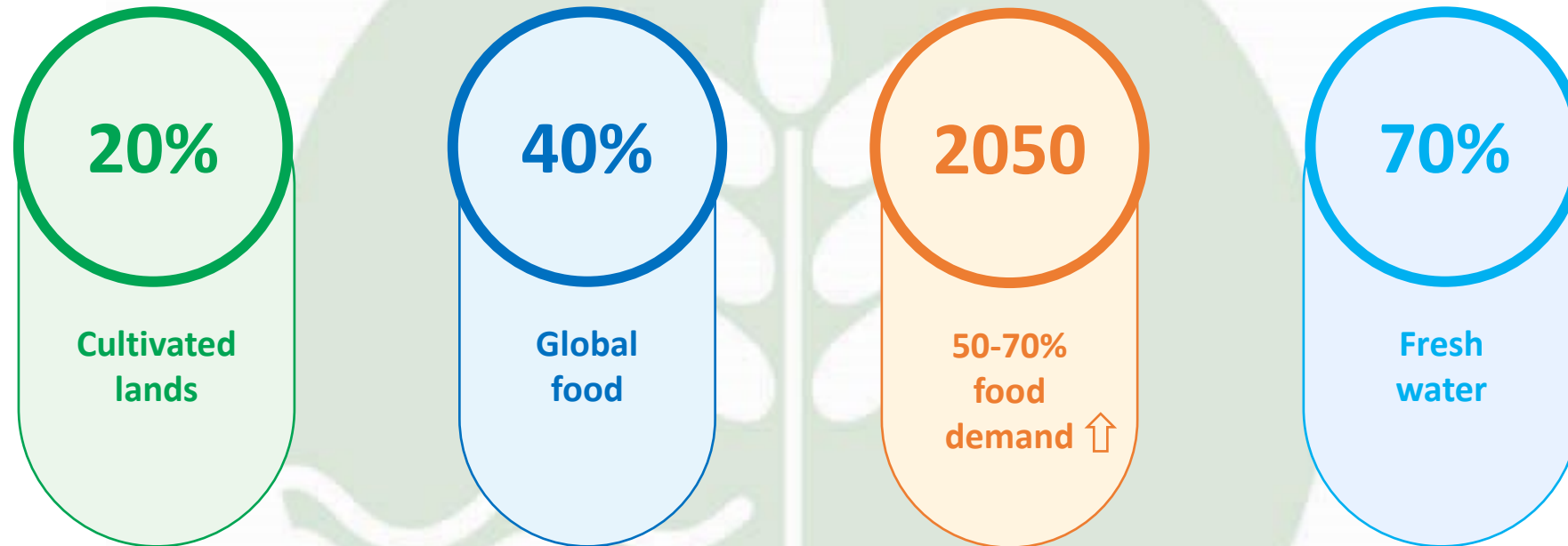
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# Why irrigation matters for global food security

A strategic lever for food, livelihoods and climate adaptation



**Irrigation is a high-impact entry point for resilient food systems**

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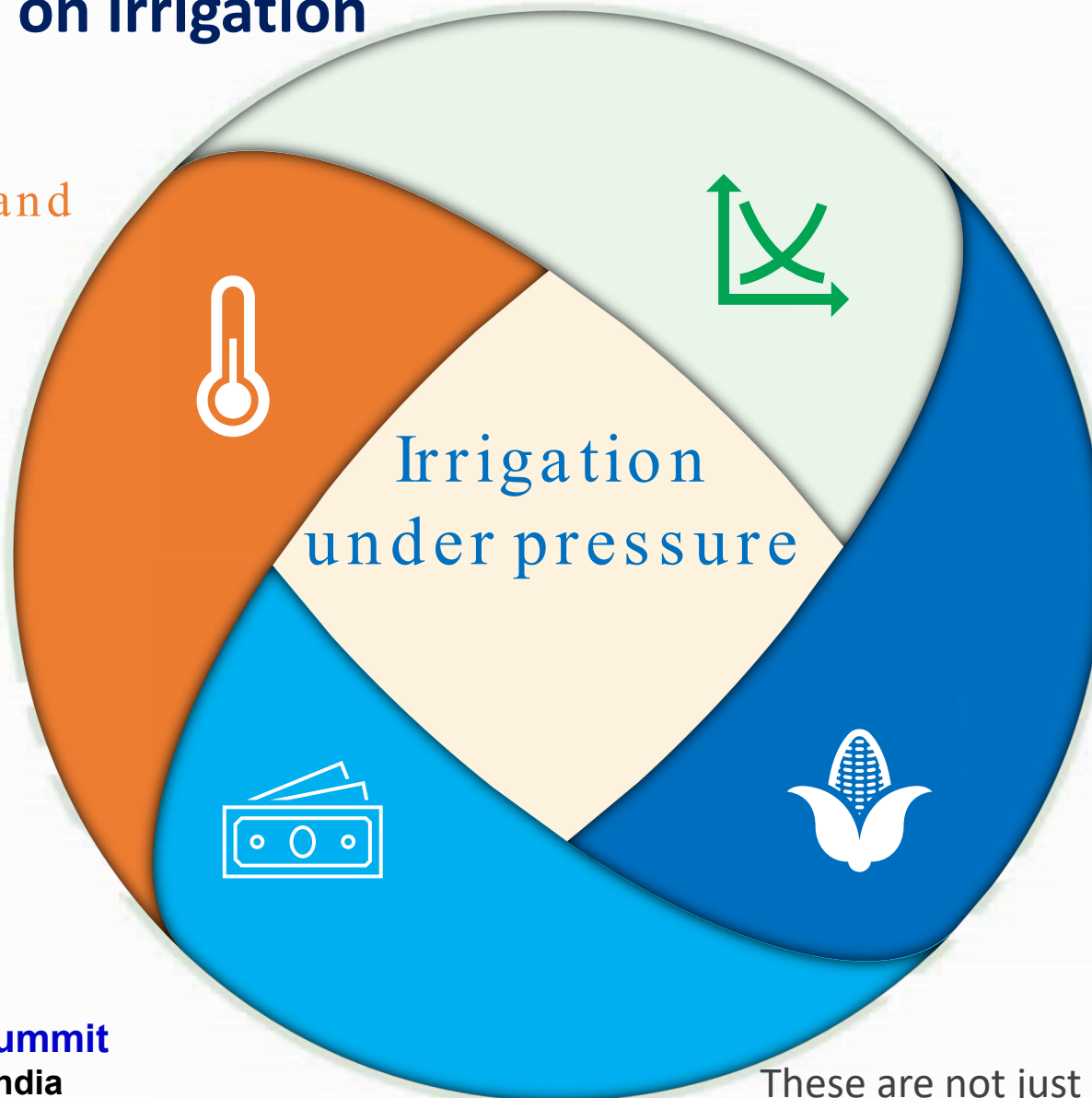
# Increasing pressures on irrigation

1  
Climate variability and  
drought

2  
Water scarcity and  
competition

3  
Energy cost  
and emission

4  
Food demand and  
livelihoods



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These are not just future risks - they are already  
shaping irrigation operation, planning and investment

# The management gap: from water supply to water service

Modernization is a technical, managerial and institutional transformation

## Traditional irrigation model



Fixed schedules

Limited monitoring

Supply-driven allocation

Weak feedback

## Smart irrigation model



Real-time data

Demand-responsive delivery

Performance tracking

Farmers' feedback

**Closing the gap requires better decisions, not only more infrastructure**

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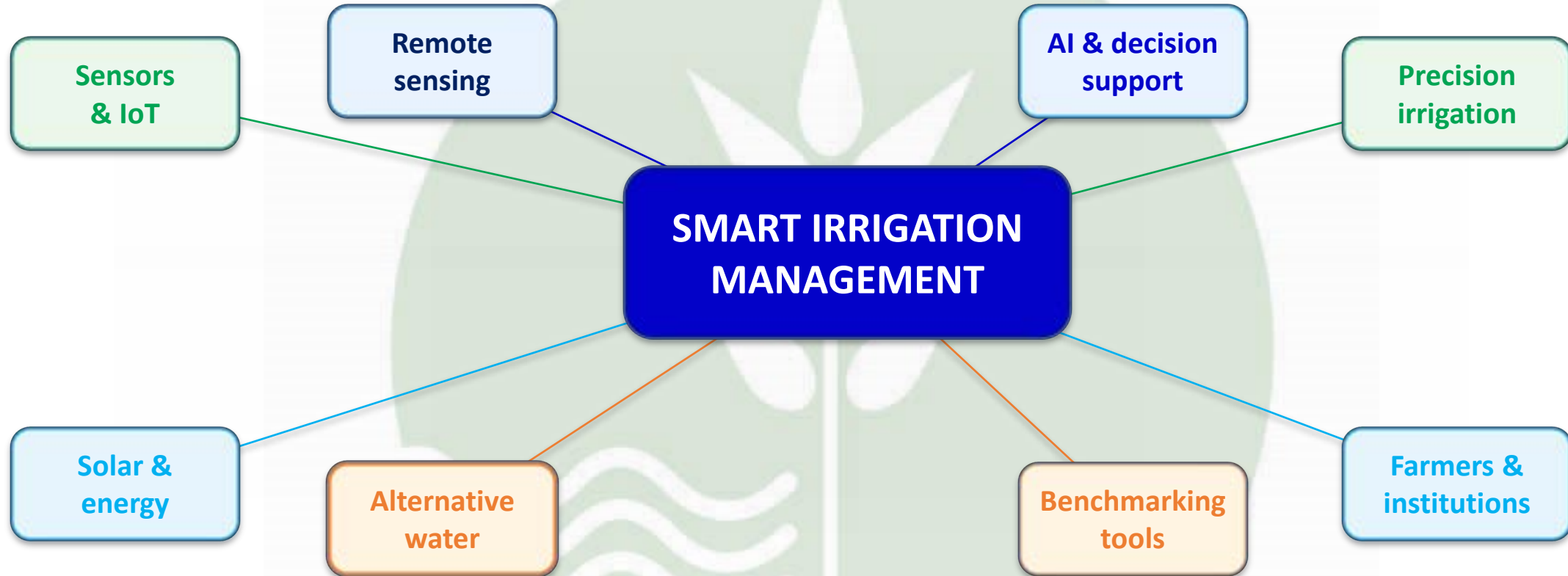
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# What do we mean by smart irrigation management?

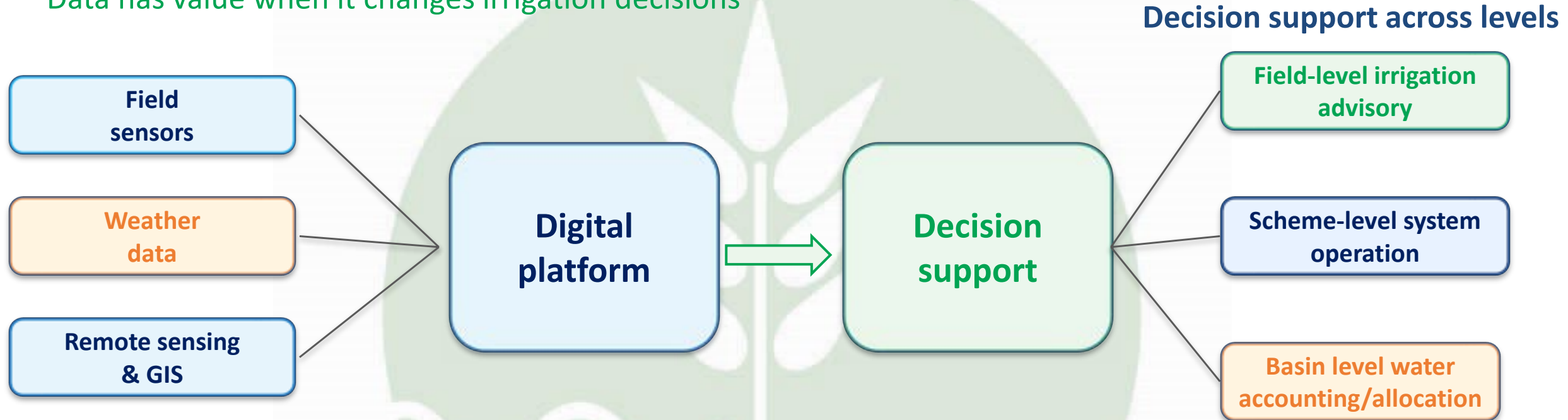
An integrated system of data, infrastructure, institutions, incentives and users



Right water • right time • right amount • right place • lower resource cost

# Digital transformation: from data collection to decision-making

Data has value when it changes irrigation decisions



The shift: reactive irrigation → proactive and anticipatory management

# Precision irrigation: producing more with each drop

Applying water according to crop demand, soil condition and field variability



**10 – 30%**

Water saving

**16 – 30%**

Higher water  
productivity

**POLICY  
CONSIDERATION:**  
**Crop specific**  
not one-size  
fits all

**REAL OPPORTUNITY:**  
**Service  
supported**  
capacity and  
maintenance

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# Smart monitoring and IoT: turning irrigation into a feedback system

From calendar-based irrigation to real-time, feedback-based decisions

The case study of FAO paddy pilot project in Sri Lanka



FAO - Sri Lanka

Readings - Pinawela (04020014)

From Date: 16/06/2026 To Date: 16/06/2026 Aggregation period: None Q. SEARCH Export DOWNLOAD

Sensor: SoilMoist at 30 cm depth SoilMoist at 15 cm depth \*3

| Date              | Sensor Index | Sensor Name                         | Value       | Previous Value | Time Difference | Difference  |
|-------------------|--------------|-------------------------------------|-------------|----------------|-----------------|-------------|
| 16 Jun 2026 11:00 | 2            | SoilMoist at 30 cm depth            | 94.14 RH(%) | 94.37 RH(%)    | 1800 s          | -0.23 RH(%) |
| 16 Jun 2026 11:00 | 3            | SoilMoist at 15 cm depth            | 99.21 RH(%) | 99.54 RH(%)    | 1800 s          | -0.33 RH(%) |
| 16 Jun 2026 11:00 | 8            | Analog Sensor 3 - Field water level | 202.384 mm  | 192.937 mm     | 1800 s          | 10.447 mm   |
| 16 Jun 2026 11:00 | 9            | Analog Sensor 4 - V-notch Sensor    | 302.439 mm  | 316.996 mm     | 1800 s          | -14.556 mm  |
| 16 Jun 2026 11:00 | 10           | Discharge volume l/s                | 0.07214     | 0.08114        | 1800 s          | -0.00899    |
| 16 Jun 2026 10:30 | 2            | SoilMoist at 30 cm depth            | 94.37 RH(%) | 94.4 RH(%)     | 1800 s          | -0.03 RH(%) |
| 16 Jun 2026 10:30 | 3            | SoilMoist at 15 cm depth            | 99.54 RH(%) | 99.42 RH(%)    | 1800 s          | 0.12 RH(%)  |
| 16 Jun 2026 10:30 | 8            | Analog Sensor 3 - Field water level | 192.937 mm  | 179.691 mm     | 1800 s          | 13.246 mm   |
| 16 Jun 2026 10:30 | 9            | Analog Sensor 4 - V-notch Sensor    | 316.996 mm  | 307.816 mm     | 1800 s          | 9.179 mm    |
| 16 Jun 2026 10:30 | 10           | Discharge volume l/s                | 0.08114     | 0.07914        | 1800 s          | 0.00200     |

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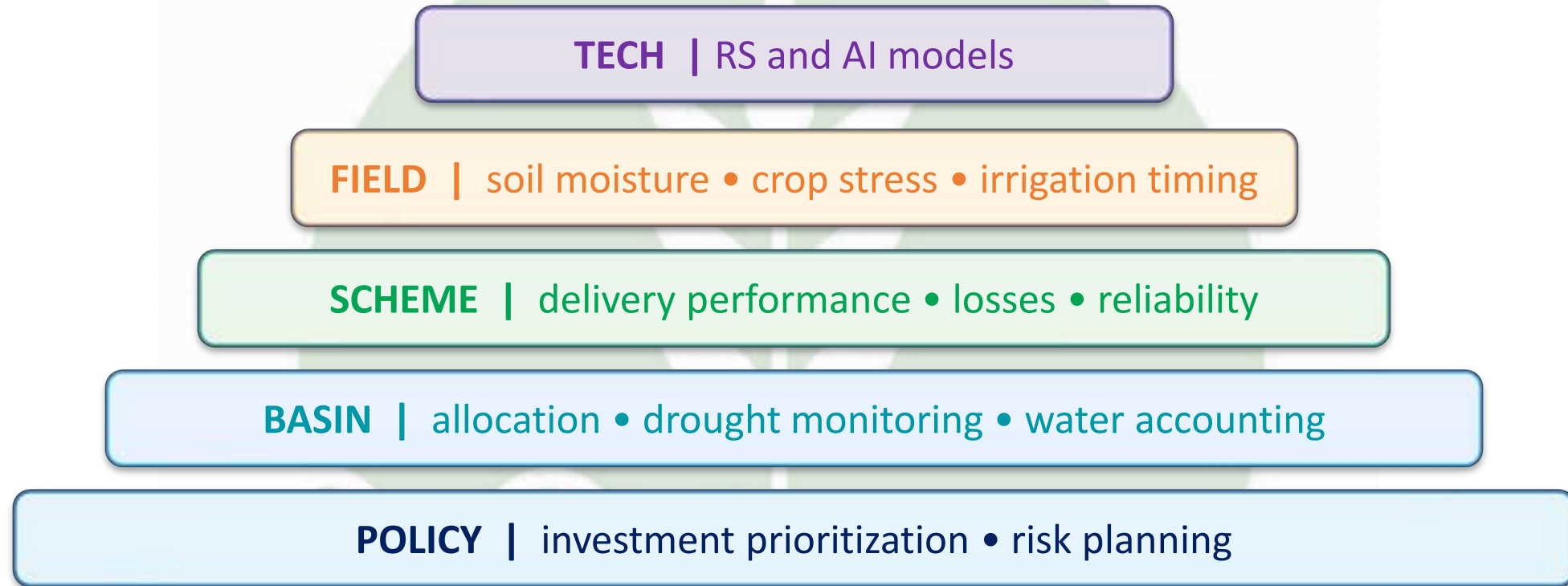
**~40%**  
less irrigation  
water applied

**~50%**  
fewer irrigation  
events

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# AI, remote sensing and modelling: from observation to anticipation

The strategic value is better targeting, prediction and accountability

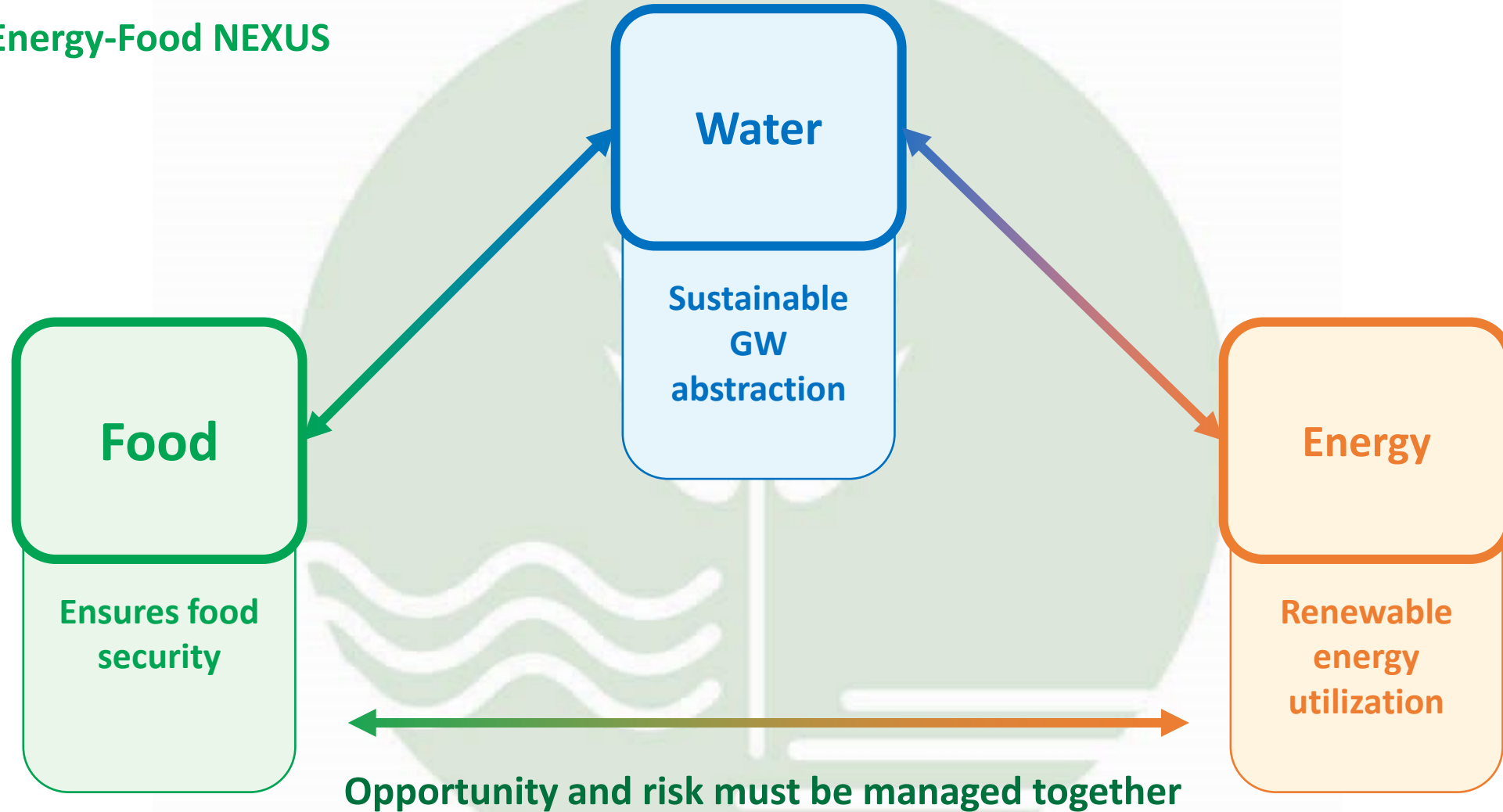


Observation becomes anticipation when models are embedded in decisions

Digital tools need to be technically credible, understandable, interoperable and trusted by users

# Water–energy efficiency: linking irrigation with renewable energy

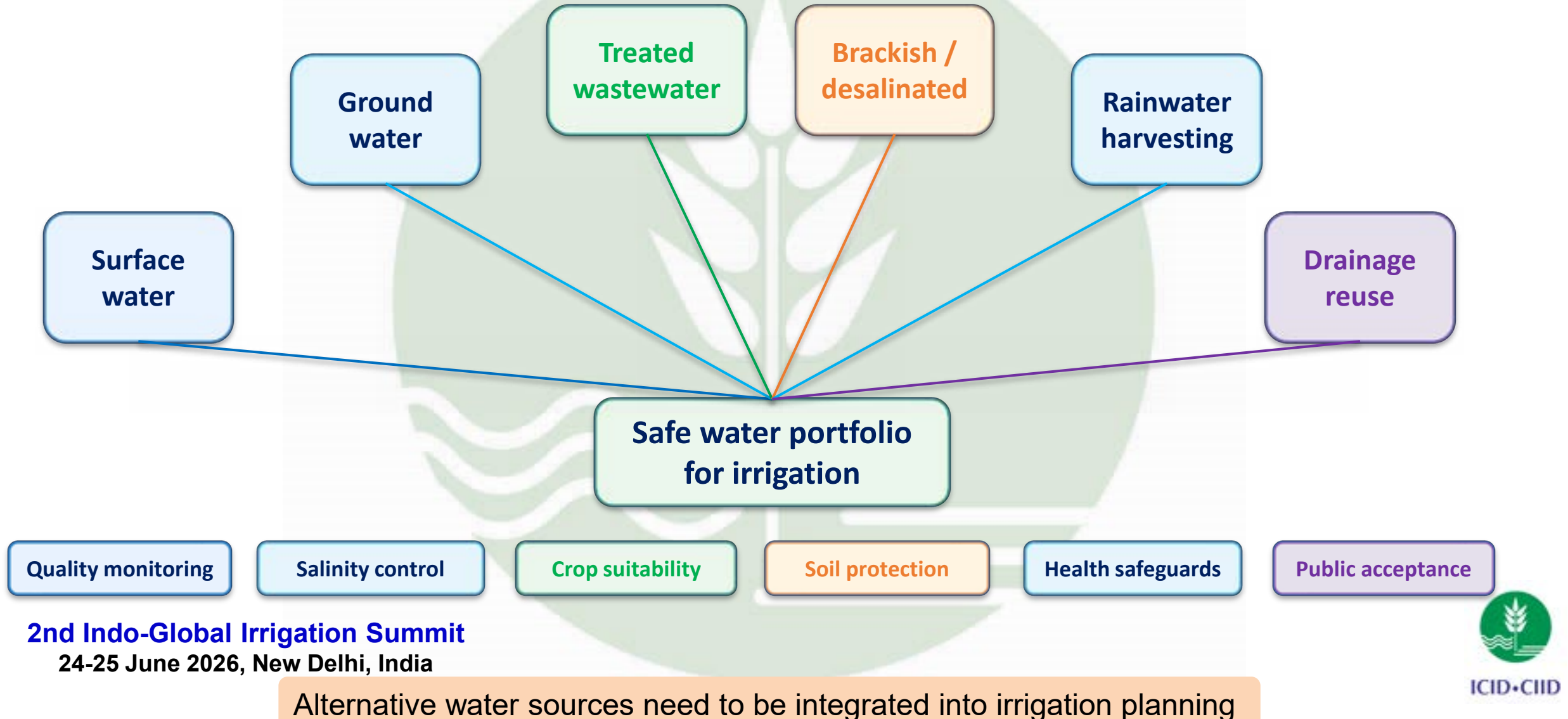
## Water-Energy-Food NEXUS



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# Alternative water sources: expanding the safe water portfolio

Water-scarce regions need risk-managed and context-specific options



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Alternative water sources need to be integrated into irrigation planning

# Benchmarking and decision support: investing where it matters most

Smart modernization links investments to measured performance



RAP / MASSCOTE

PRISM

Digital dashboards

Diagnose

Benchmark

Prioritize

Invest

Monitor

Adapt

Public finance **linked to** verified water, energy and productivity outcomes

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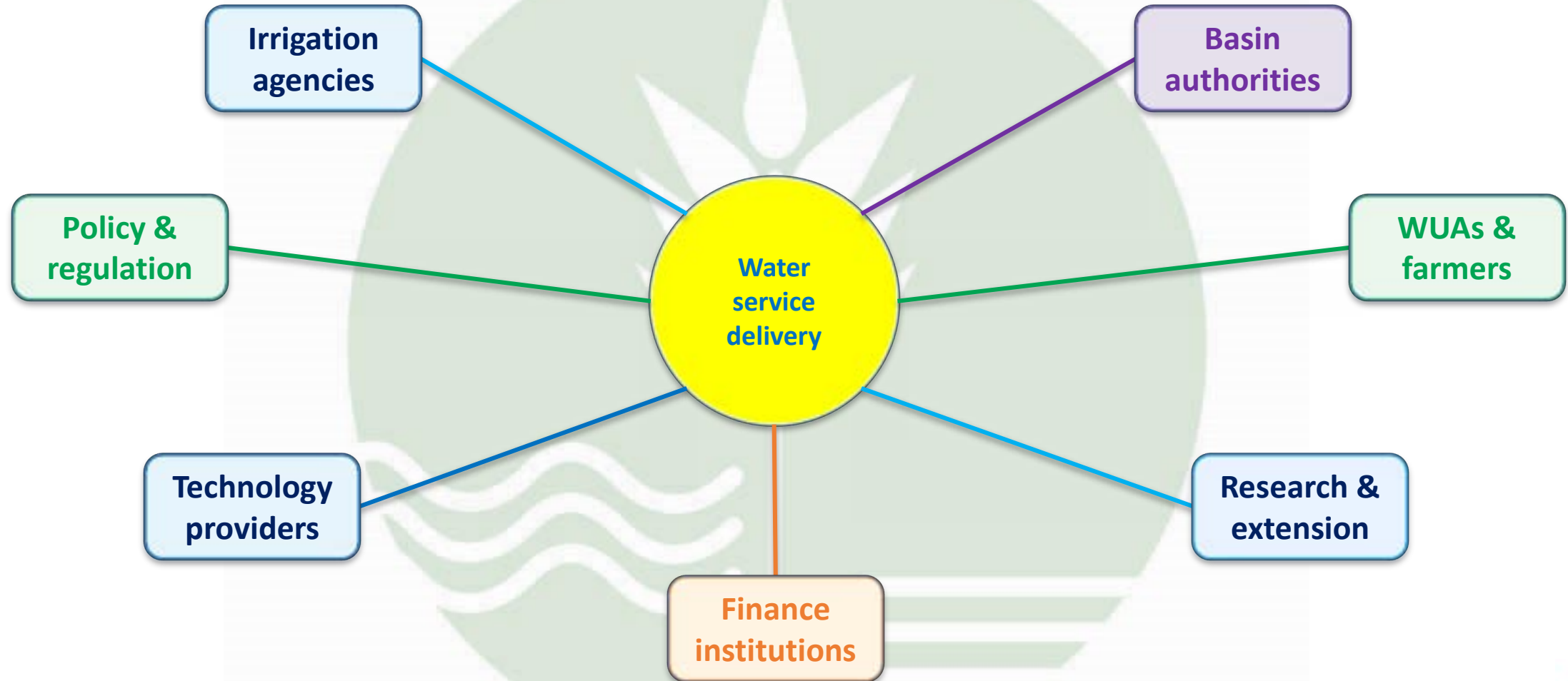
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# Institutional modernization: technology must be embedded in systems

Smart irrigation should be demand-driven, farmer-centered and institutionally owned

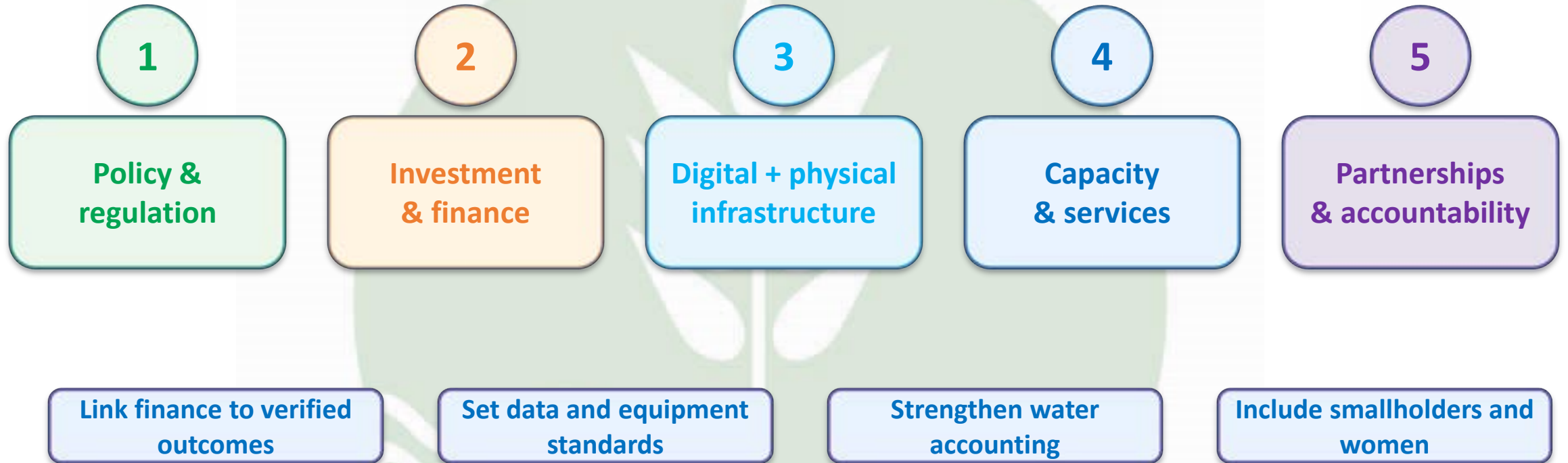


Without institutions and people, smart tools remain isolated pilots



# Policy and investment agenda for scaling smart irrigation

A coordinated package for national and regional modernization programmes



**Modernization should build intelligent, accountable and climate-resilient water service systems**

# Final call to action: from pilots to resilient irrigation systems

Scale smart irrigation from demonstrations to inclusive, performance-based systems



**Data + Infrastructure + Institutions + Farmers = Climate Resilient Irrigation**

**Invest in intelligence. Modernize institutions. Empower farmers.  
Measure every drop, every kilowatt and every outcome**



Thank You

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