

INTEREST GROUP ON AGRICULTURAL DATA (IGAD)

Virtual Meeting May 2020

Obtaining agro-hydrological datasets in the marginal drylands of Jordan: two-sided lesson shared by scientists and farmers

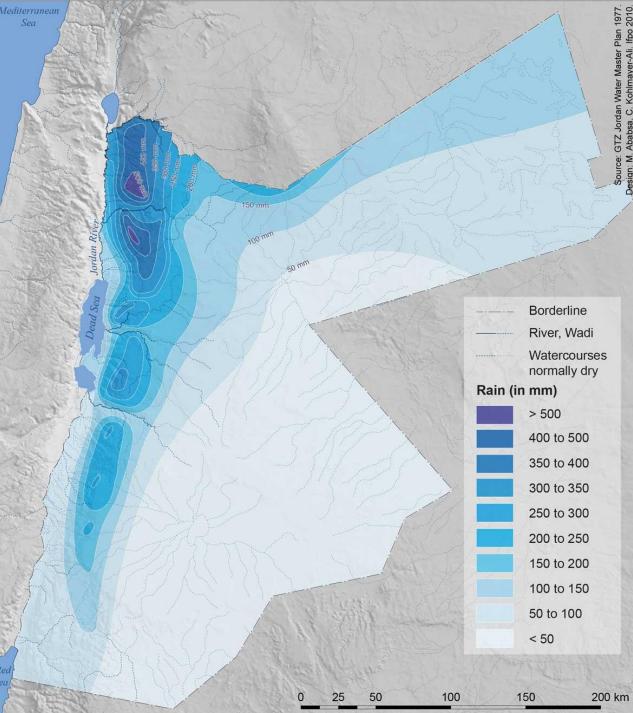
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(1) ICARDA, Jordan(2) Wageningen University, Netherlands

May 25 – 29, 2020

Jordan's Badia: rehabilitation of the once productive dry-rangelands





HOME » NEWS » PICTURE GALLERIES » WORLD NEWS

Torrential rain, snow storms and flooding hit the Middle East



People drive past vehicles stranded on flooded streets in the Jordanian capital Amman

Picture: KHALIL MAZRAAWI/AFP/Getty Images



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Mechanized micro-water harvesting

- Tractor plow (laser guided) -> fast & cheap implementation along the contour
- Deep-ripping of degraded soil -> fostering deep infiltration
- Water harvesting pits collect water, sediments and seeds -> boost vegetation-patches development





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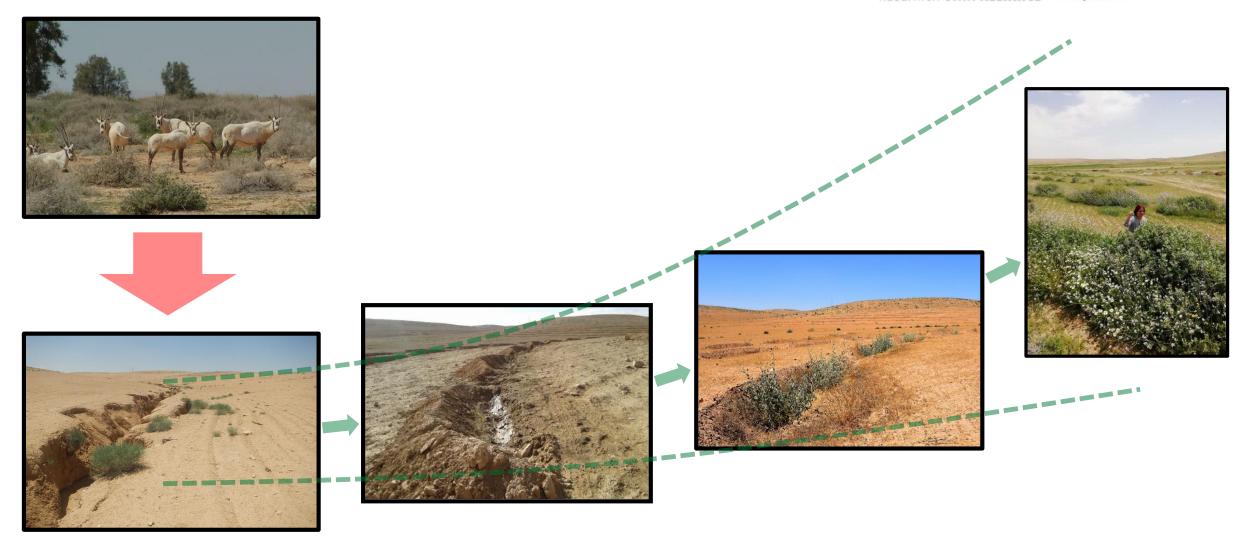
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Hypothesis: ecosystem transition



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May 25 – 29, 2020 Degradation (red) and rehabilitation (green) of marginal drylands RDA/IGAD Virtual Meeting

'Restored'

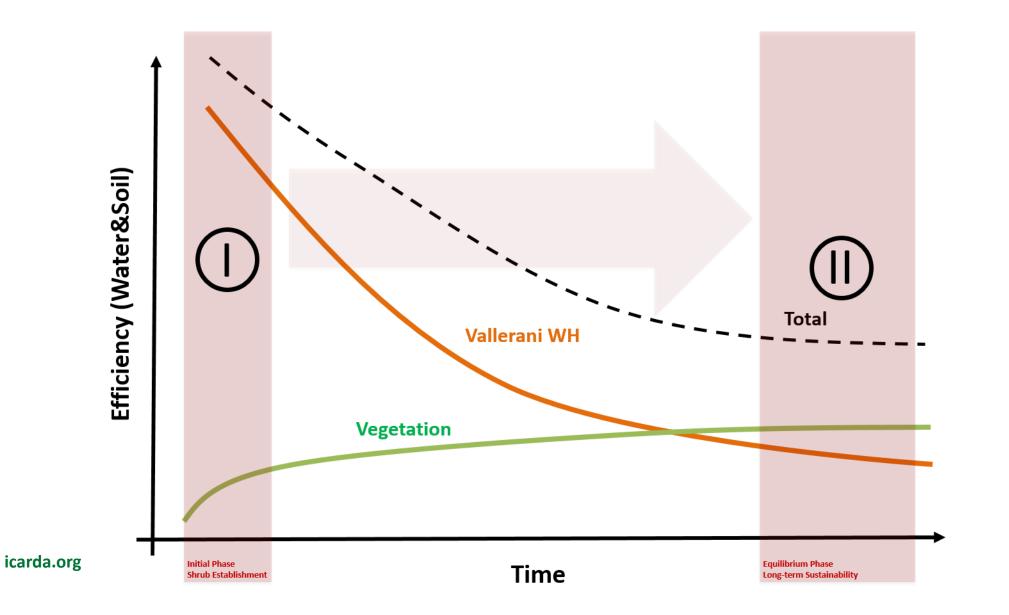
VS.

'Degraded'





Effectivity over time: transition states



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Out-scaling the practice



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Scientific sound vs. Common language and guidance



Out-scaling the practice



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Scientific suitability

- Advanced experiments and monitoring
- GIS
- Computing (e.g. dynamic processes)
- ...



Mainstreamed message and guidance

- Robust experiments and monitoring
- Merging local knowledge with standards
- Common language
- ...

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expenses on agricultural ensued	Relative input (input with respect to yield) has to reduced
farm income decreased workload	reduced
workload increased	
workload increased	
	decreased
	Due to possible maintenance
Socio-cultural impacts	
food security/ self-sufficiency reduced	
SLW land degradation reduced	/ improved
knowledge	
Ecological impacts	
harvesting/ collection of water reduced reduced (runoff, dew. snow, etc)	/ improved
	Z ingrated
	/ improved
	/ improved / decreased
	/ decreased
	/ mbad
	Z rebord
ground C	· ····································
	/ increased
biomass/ above ground C decreased	/ increased
flood impacts increased	/ decreased
	Z decreased
Off-site impacts	
downstream flooding increased	
(undesired)	Reduced downstream flooding is desired
downstream siltation increased	decreased Reduced downstream siltation is desired

Monitoring



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Merger, share & harmonization of data

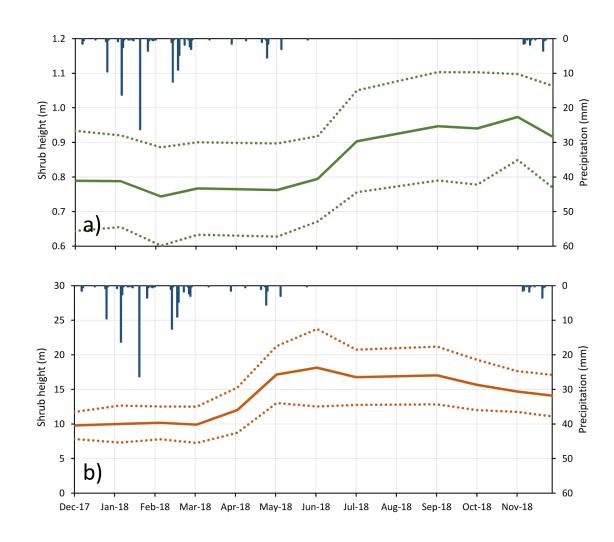


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Merger, share & harmonization of data

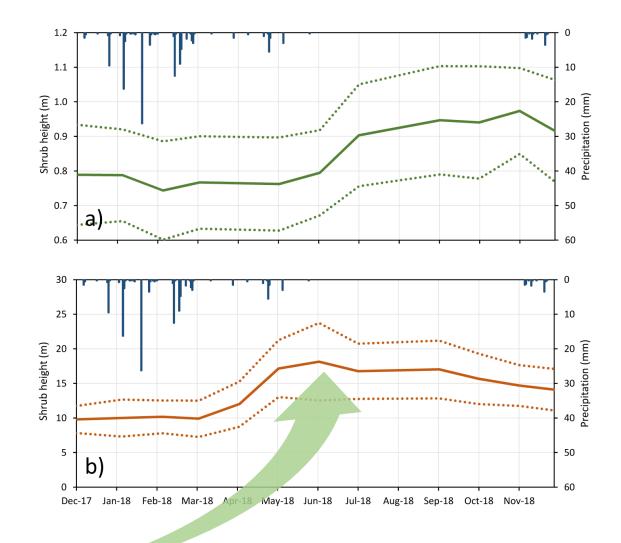


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0.6 Precipitation Mean WH Mean interspace 0.5 10 Uncertainty WH Uncertainty interspace Measurement WH Measurement Interspace ---- Linear (FC) --- Linear (PWP) 0.1 50 а 0.0 60 0.6 0.5 10 0.1 50 b 0.0 60 Jul-18 Aug-18 Sep-18 Oct-18 Nov-18 Dec-17 Jan-18 Feb-18 Mar-18 Apr-18 May-18 Jun-18



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Data for out-scaling the practice



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Remote science approaches

- Advanced biophysical assessment methods
 - Modeling tools
 - Statistics

Target & advantages

- Detailed biophysical processes
- Harmonized, availability, costs,
- Scalability to (very) large scales (ex-ante)

Limits

- Unknown underlying processes
- Values often not directly usable

Local & robust approaches

- Local knowledge and processes
 - Verification tools
 - Robust assessment methods & memory
- ...

Target & advantages

- Local input and verification of complex processes
- Back-up data (e.g. no access, covid-19)
- Buy-in from locals

Limits

- Uncertainty/translation issues
- Limited (techy) detail
- Labor intensive

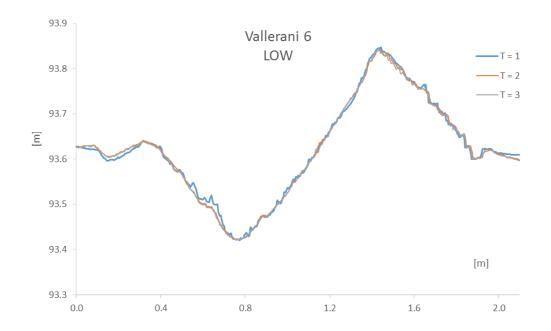
Robust data ... where science meets the local process

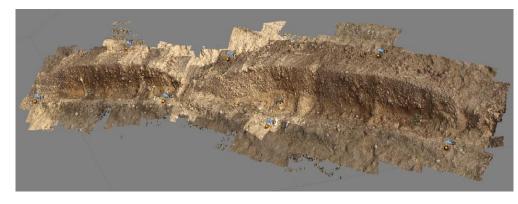


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Robust data ... where science meets the local process

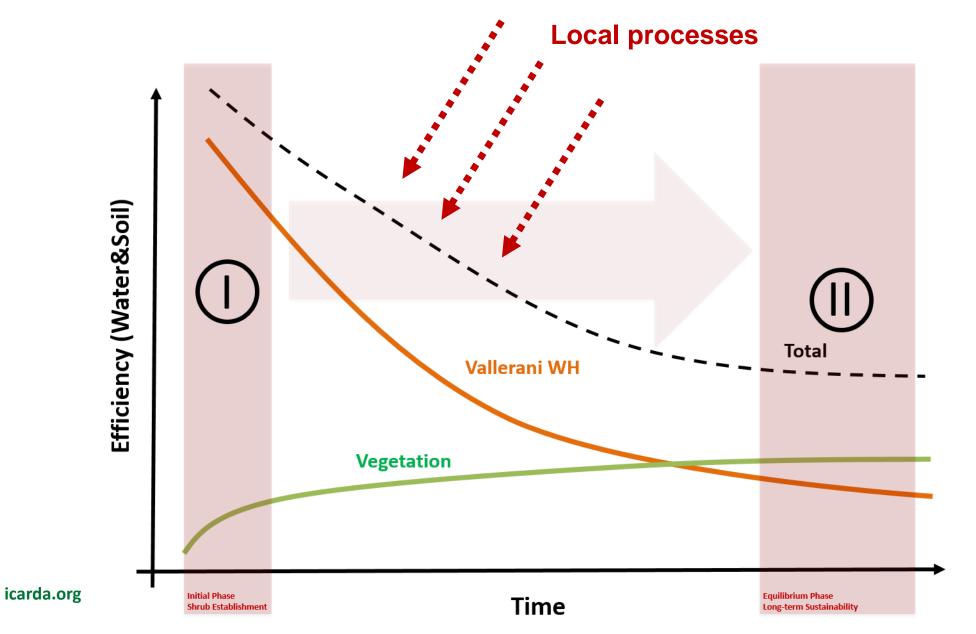


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Transition states



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Local inputs and back-up



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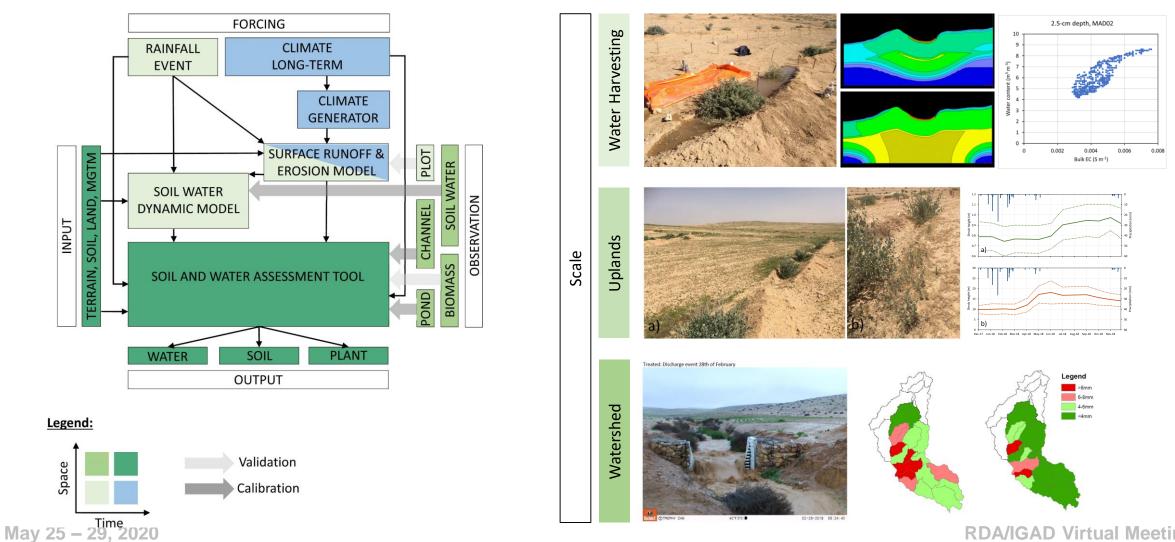


Robust science tools and data



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Common language products

Platforms and proven approaches for e.g. decision support Community engagement, feedback and local awareness





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Area used per household Scale Land ownership Land use rights state medium-scale ommunal (organized) 1-2 ha leased individual 2-5 ha group individual, not titled ✓ 5-15 ha Water use rights individual, titled open access (unorganized NA > 10,000 ha Access to services and infrastructure poor 🧹 📃 good health poor 🖌 📃 good education poor 🖌 📃 good technical assistance poor 🖌 📃 good employment (e.g. off-farm) markets poor 🧹 📃 good energy poor 📕 🖌 🛛 good roads and transport poor 🛛 🥒 good poor 🧹 👘 good drinking water and sanitation poor 🧹 👘 good financial services Socio-economic impacts Quantity before SLM: 80kg.ha fodder production ecreased / increased Quantity after SLM: 5ton/ha fodder quality reased decreased vincreased animal production production area (new land decreased 🖌 🖌 increased under cultivation/ use) Due to the dikes (but very limited) decreased increased water availability for livestock expenses on agricultural increased decreased Relative input (Input with respect to yield) has been inputs reduced decreased 🖌 🖌 increased farm income workload increased 🧹 decreased Due to possible maintenance Socio-cultural impacts reduced improved reduced improved food security/ self-sufficiency SLM/ land degradation knowledge Ecological impacts reduced vimproved harvesting/ collection of water (runoff, dew, snow, etc) soil moisture soil cover reduced vimproved ✓ decreased soil loss increased fecreased V increased soil accumulation increased reduced soil crusting/ sealing ecreased / increased soil organic matter/ below ground C vegetation cover decreased biomass/ above ground C ncreased decreased flood impacts eased decrease drought impacts Off-site impacts downstream flooding increased reduced (undesired) Reduced downstream flooding is desired increased decreased downstream siltation Reduced downstream siltation is desired

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Lessons learnt and shared



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Non-local experts (incl. students)

- Understanding local processes
- Uncertainty and reliability of data
- Framing and targeting a research question
- Value of scenarios
- Interest & awareness

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Local partners

- Awareness of local knowledge and value
- Awareness of processes
- Technologies (e.g. monitoring)
- Administration (e.g. data)
- Communication
- Openness and exchange
-

Thank you



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