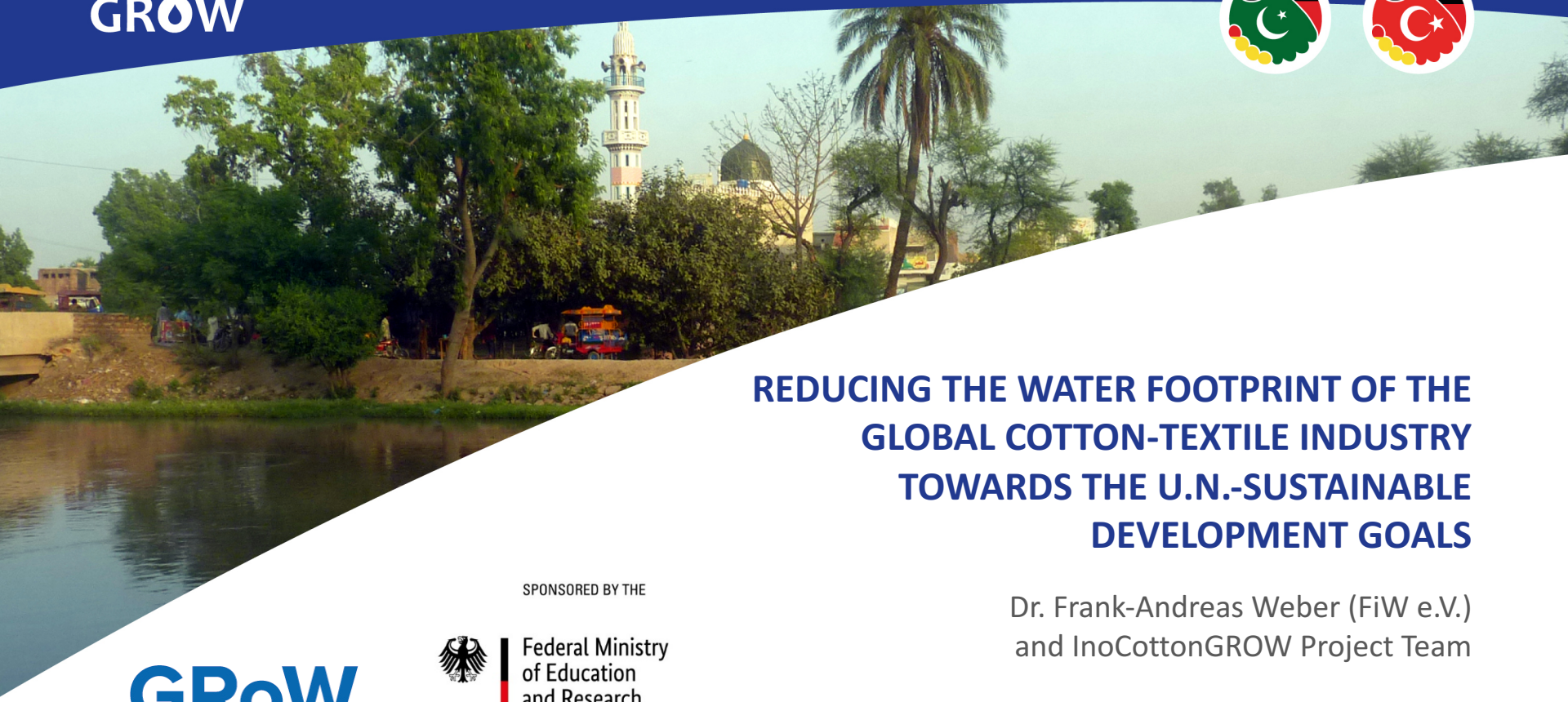
InoCotton GROW



REDUCING THE WATER FOOTPRINT OF THE GLOBAL COTTON-TEXTILE INDUSTRY TOWARDS THE U.N.-SUSTAINABLE DEVELOPMENT GOALS

Dr. Frank-Andreas Weber (FiW e.V.)
and InoCottonGROW Project Team

Final Conference in Berlin, 20 October 2020

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Main Project Aims

1. **Make the water footprint a meaningful steering indicator:**
   from volumetric water footprint to impact assessment
2. **How water-intensive is the cotton-textile value chain:**
   from cotton fields to textile industry and wastewater treatment
3. **How to improve:**
   From five demonstration projects to consistent policy strategies

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Kick-off at NTU in Faisalabad, Pakistan

Photo © FiW e. V.

More than 400 days of field work in Indus Basin, Pakistan

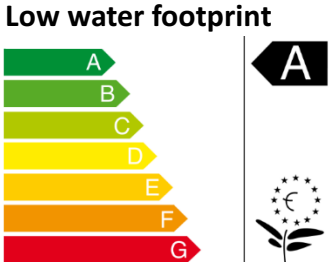
International Comparison: Büyük Menderes Basin, Turkey

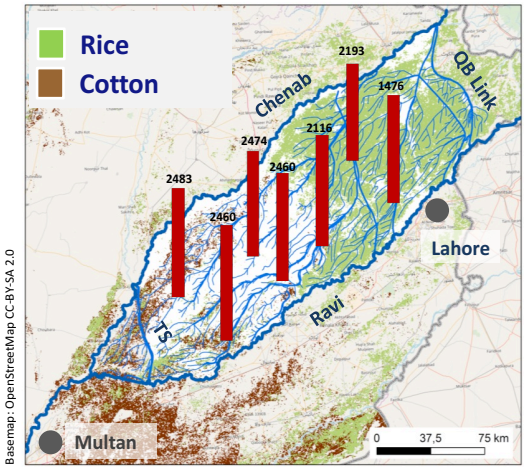
Main Products

1. **Water Footprint Tool online**
   http://wf-tools.see.tu-berlin.de/wf-tools/inoCotton/#/

2. **Awareness rising: brands, retailers, and consumers**
   12-min documentary video
   Water Footprint in textile labelling: efficiency label

3. **Key Findings and Policy Options**
   co-developed with Pakistani and Turkish partners
   Roadmap workshop in Germany (Dec. 2019)
   Policy seminar in Lahore (Feb. 2020)



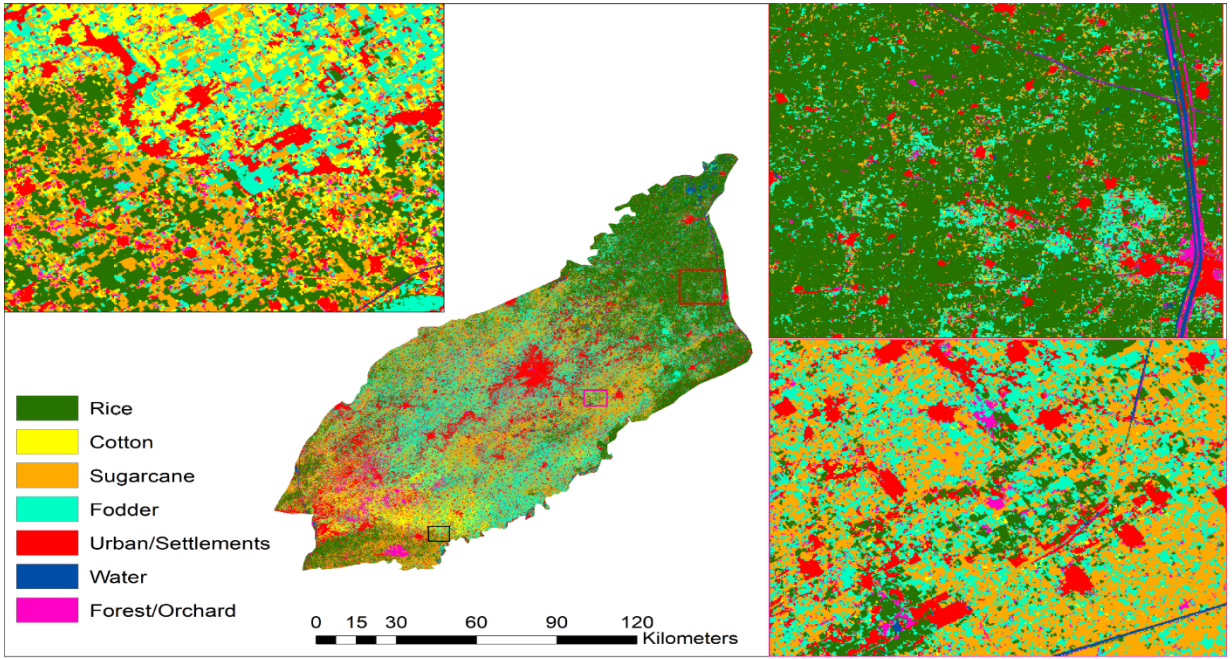


Mikosch et al. (2019): Water scarcity footprint per kg raw cotton
Land use map by Usman et al. (2018)

Cotton Irrigation: Key Findings and Policy Options (selected)

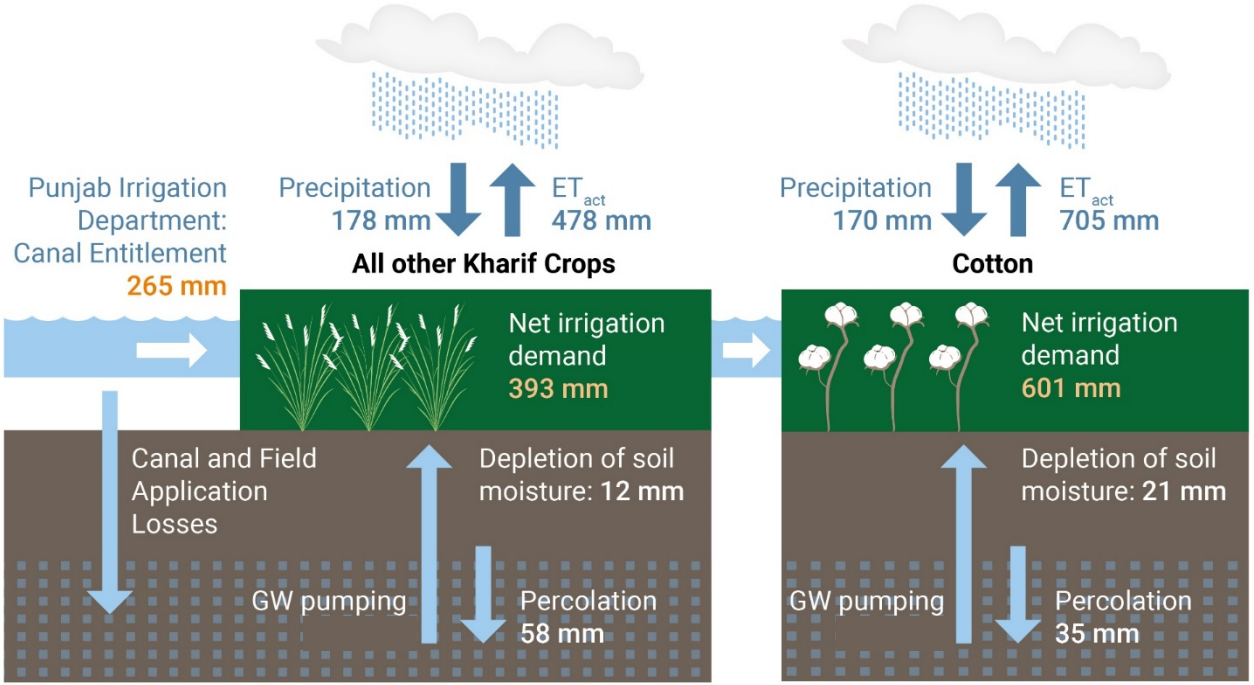
1. Lower Chenab Canal is **undersupplied system:** cotton in competition with food crops
2. **Groundwater is seasonal/decadal storage:**
   Irrigation canal leakage recharges aquifer. Lining of wastewater drains mandatory.
3. **Minimize unproductive evaporation losses:**
   Besides irrigation technology, famer training and irrigation scheduling is key.
4. …

1. LCC is undersupplied system: Cotton in competition with food crops



Talha et al. (2019): Satellite Remote Sensing for LCC area in Kharif season

2. LCC is undersupplied system: Groundwater is seasonal/decadal storage



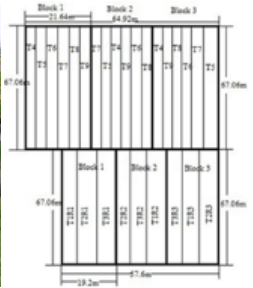
R. Becker et al. (2020): SWAT Plant-Demand Model for Kharif May to Sept. (Mean 2004-2013)

3. Besides irrigation technology, famer training and scheduling is key

	Yield [t/ha]	Efficiency	Productivity [kg raw cotton / m³ gross irrigation]
Furrow full irrigation	2.95	64 %	0.48
Drip irrigation	3.25	90 %	0.68
Furrow 10 % deficit	2.64	71 %	0.48
Furrow 20 % deficit	2.35	80 %	0.48

B. Tischbein, A. Bakhsh et al. (2018): Field trails

Irrigation experiments with UAF at



Area supplied by the Mungi Distributary Canal

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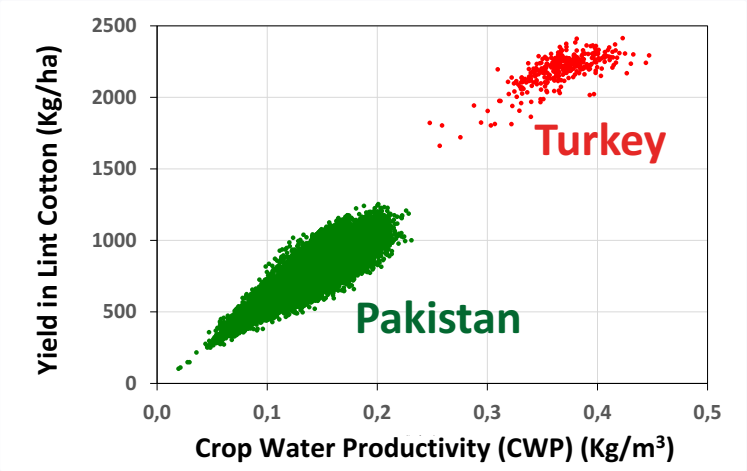
Cotton Irrigation: Key Findings and Policy Options (selected)

1. Lower Chenab Canal is **undersupplied system:** cotton in competition to food crops
2. **Groundwater is seasonal/decadal storage:**
   Irrigation canal leakage recharges aquifer. Lining of wastewater drains mandatory.
3. **Minimize unproductive evaporation losses:**
   Besides irrigation technology, famer training and irrigation scheduling is key.
4. Increasingly variable environment expected in future:
   Flexibility within Warabandi – start at farm-level (e.g. small ponds, 14-d scheduling)
5. **Low cotton yield** only partly due to water stress: high-quality resistant seeds needed
6. **Climate Change impacts:** Heat stress will dominate over water stress
7. **Good water governance is key:** Also groundwater needs governance

5. Low cotton yield in Pakistan vs. Turkey

Likely reasons besides water stress:

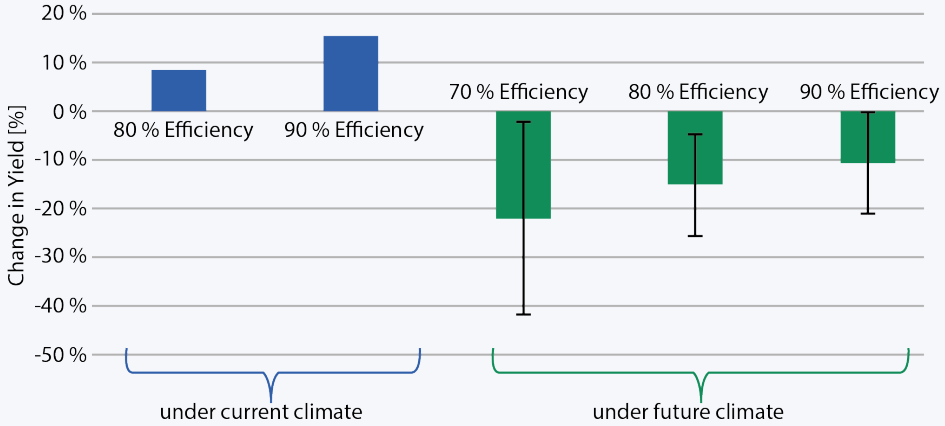
- Lower-income farmers unable to afford quality seeds, quality fertilizer, etc.
- Scattered small-scale farming
- Heat stress



M. Usman, C. Conrad (2020): Results from satellite remote sensing in Rechna Doab, Pakistan (N=44,633) and WUA Söke, Turkey (N=346). Yield in Lint cotton.

6. Climate Change Scenarios in Pakistan (2040-2050)

- Significant **negative effect on yield and water productivity**
- **More water is <u>not</u> the only solution:** heat stress dominates water stress



R. Becker et al. (2020): SWAT model under current and RCP 8.5 climate conditions

Textile Industry: Key Findings and Policy Options (selected)

1. **Process-integrated measures often go along with energy savings,**
   but little effect on water footprint
2. **Installation of effluent treatment is key for reducing grey water footprint:**
   Enforcement of existing regulation
   At textile clusters, common effluent treatment plants easier to control
3. **Low-hanging fruits do exist:**
   Positive amortization of investments in process- and product-integrated measures
4. **Maintenance and training of operation personnel is key:**
   Capacity building for the operational personnel on operation and maintenance in regional centres across the country.

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Low-hanging fruits do exist:

Water-efficient exhaust dyeing, Anaerobic pretreatment of desizing wastewater

Maintenance and training of operation personnel is key

Photos © FiW e. V.

Conclusions and outlook

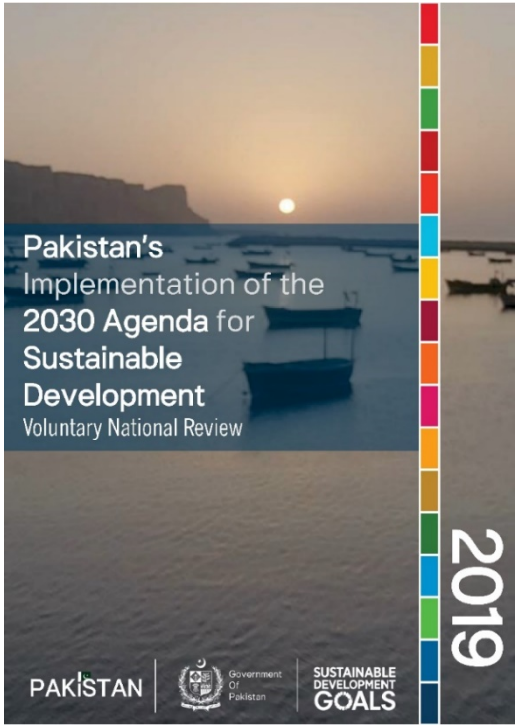
1. **New opportunities for science-based water policy**

   Water Footprint promotes Integrated Water Resources Management across different sectors (agriculture, textile, water, trade) and UN-SDGs into coherent policy strategies

2. **Corona pandemics devastating for cotton-textile sector**

   No implementation of suggested measures anytime soon

3. **Far more ambitious approaches needed** to set the global framework for sustainable cotton-textile production and consumption



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Das Projekt wird vom Bundesministerium für Bildung und Forschung (BMBF) im Rahmen der Fördermaßnahme „Globale Ressource Wasser (GRoW) gefördert“.

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Forschungsinstitut für Wasser- und Abfallwirtschaft an der RWTH Aachen (FiW) e.V.

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