Talha Manzoor

Assistant Professor and Associate Director (Operations)
Centre for Water Informatics and Technology (WIT), LUMS

National Modeling in Practice:
Capacity Building and Collaboration of Pakistan's Modeling Team under the COMMITTED Project

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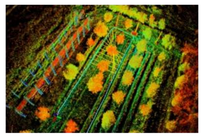

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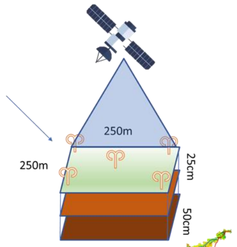

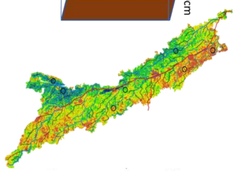

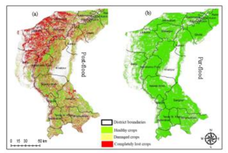

https://wit.lums.edu.pk/

Highlights of Interactions Between IIASA and Pakistan (former member)	
National Member Organization	Pakistan Academy of Sciences
Membership dates	2007-2017
Key research partners	12 Pakistani organizations collaborate with IIASA including: ■ Global Change Impact Studies Centre (GCISC) ■ Institute for Social and Environmental Transitions – Pakistan (ISET Pakistan) ■ Lahore University of Management Sciences (LUMS) ■ Pakistan Academy of Sciences (PAS) ■ Pakistan Institute for Environment-Development Action Research (PIEDAR) ■ Pakistan Institute of Development Economics (PIDE) ■ Pakistan Institute of Engineering and Applied Sciences (PIEAS) ■ Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) ■ Population Council (Pakistan office)
Areas of research collaboration	■ Increasing Pakistan's resilience to natural disasters ■ Improving food security in Pakistan ■ Projecting demographic change in Pakistan ■ Rethinking water management and use for households, agriculture and energy ■ Smart ways to clean up Pakistan's air ■ Assessing the environmental impact of energy use
Capacity building	13 doctoral students from or studying in Pakistan have taken part in the Young Scientists Summer Program or its Southern African version
Publication output	12 publications have resulted from IIASA-Pakistan collaborations
Other interactions	Researchers, advisors, and diplomats have either visited IIASA from Pakistan or visited Pakistan from IIASA over 15 times

Statistics from 2015: https://ar17.iiasa.ac.at/wp-content/uploads/sites/3/2018/05/InfoSheet-Pakistan.pdf

Modeling Ecosystem and Capacity

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Models

- Energy: MESSAGEix-Pakistan
- Land use: FABLE-Pakistan
- Energy-Water: NEST

Team (Current & Past)

Projects (selected)

- Integrated Solutions for Water, Energy and Land (ISWEL) – 2017 - 2020
- Climate Policy Assessment and Mitigation Modeling to Integrate National and Global Transition Pathways for Environmental Friendly Development (COMMITTED) – 2023-2026
- RE-CONNECT: Modelling, Projecting and Tracking Emissions Reduction Pathways – 2024-2027

Stakeholder Engagement

Ministries, Research Institutes, Academia, NGOs, Industry

Trainings (selected)

- Nexus Summit: Harmonizing Energy, Water and Agriculture Systems for a Low Emissions Future, March 2024
- Workshop on Integrated Assessment Modelling for Multi-Sectoral Policy Insights, September 2022
- Fall School on Water Science, Policy and Governance, November 2016

Publications

https://wit.lums.edu.pk/research-publications

Teaching (selected)

- ENV462 – Climate Change Governance: Science, Data & Models [Fall 2025]
- SCI302: Socio-ecological Systems and Sustainability [Spring 2021]
- ENV244: Modelling the Environment [Spring 2024]

Key-outcomes – ISWEL Project (2017 – 2020)

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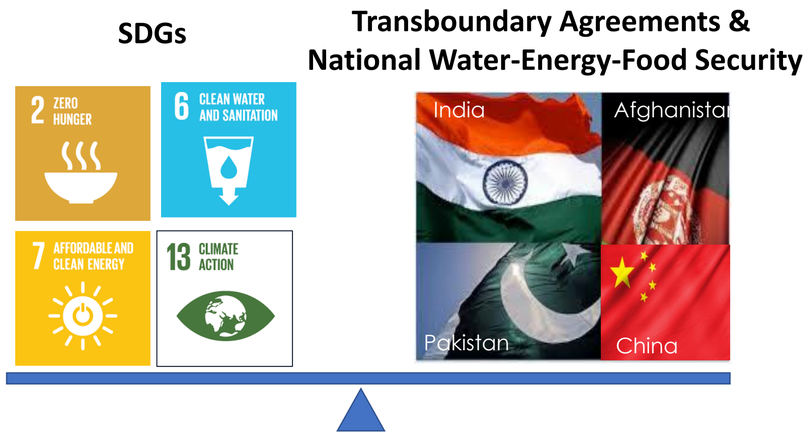
- Integrated Solutions for Water, Energy and Land (ISWEL) – Sub-project on Indus Basin
- IIASA, Global Environment Facility (GEF) and United Nations Development Organization (UNIDO)

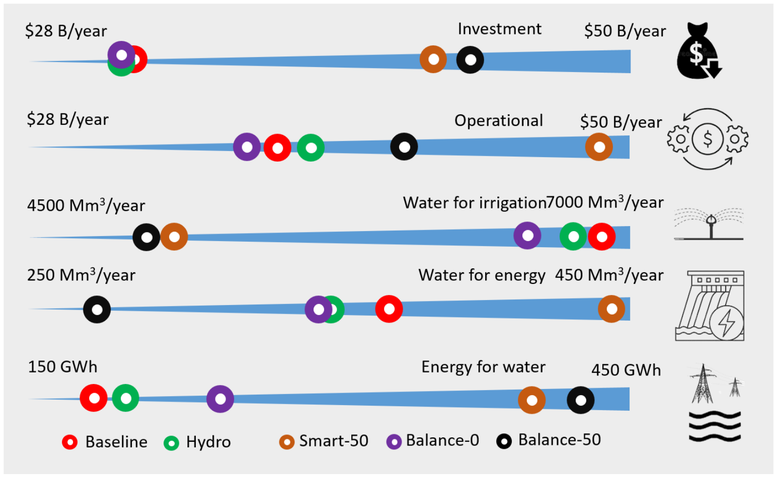


nature sustainability
ARTICLES
https://doi.org/10.1038/s41893-020-00654-7
Check for updates

Transboundary cooperation a potential route to sustainable development in the Indus basin

Adriano Vinca[1,2], Simon Parkinson[1,2], Keywan Riahi[1,2,3], Edward Byers[1], Afreen Siddiqi[4,5], Abubakr Muhammad[6], Ansir Ilyas[6], Nithiyanandam Yogeswaran[7], Barbara Willaarts[1], Piotr Magnuszewski[1], Muhammad Awais[1,2], Andrew Rowe[2] and Ned Djilali[2,8]

Countries in the Indus Basin could lower costs for development and reduce water stress by cooperating on water resources, and electricity and food production



Contents lists available at ScienceDirect
Environmental Science and Policy
journal homepage: www.elsevier.com/locate/envsci
ELSEVIER
Check for updates

Balancing smart irrigation and hydropower investments for sustainable water conservation in the Indus basin

Ansir Ilyas[a,*], Simon Parkinson[b,c], Adriano Vinca[b,c], Edward Byers[b], Talha Manzoor[a], Keywan Riahi[b,c,e], Barbara Willaarts[b], Afreen Siddiqi[d], Abubakr Muhammad[a]

Balancing demand-and-supply based approaches to water conservation in the Indus Basin, reduces expenditure and water withdrawal footprint.

Modeling Efforts Supported by COMMITTED

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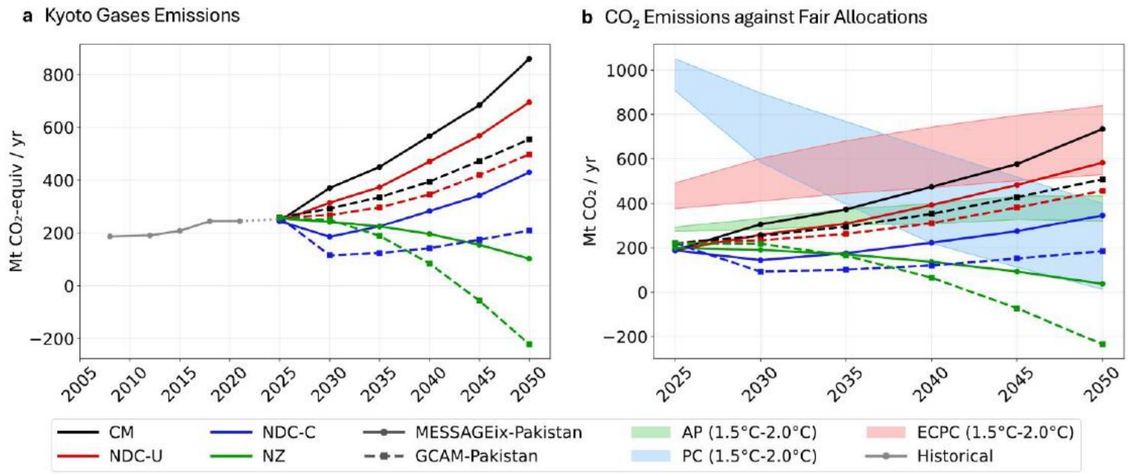
MESSAGEix-Pakistan

- Full National energy supply chain from resource extraction through conversion, transmission, and end-use
- 5-year resolution
- Calibrated over 2015 – 2070
- 4 scenarios to capture BAU, NDC, LTS
- https://github.com/LUMS-WIT/Multi-IAM-Pakistan



Research Exchange at IIASA – Summer 2025

- Troubleshooting errors in historical model data
- National data collection and calibration
- Demand Representation
- Scenario development

Arfa Yaseen

Country Workshop

- Stakeholder engagement and networking
- Data collection on National Priorities
- Scenario co-creation exercises

Modeling Efforts Supported by COMMITTED

LUMS | Centre for Water Informatics and Technology

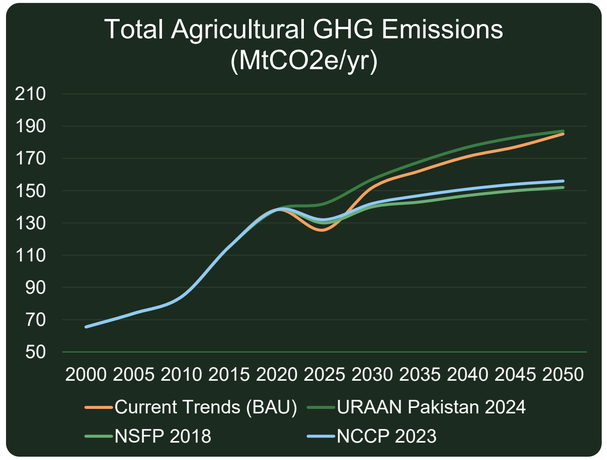
FABLE-Pakistan

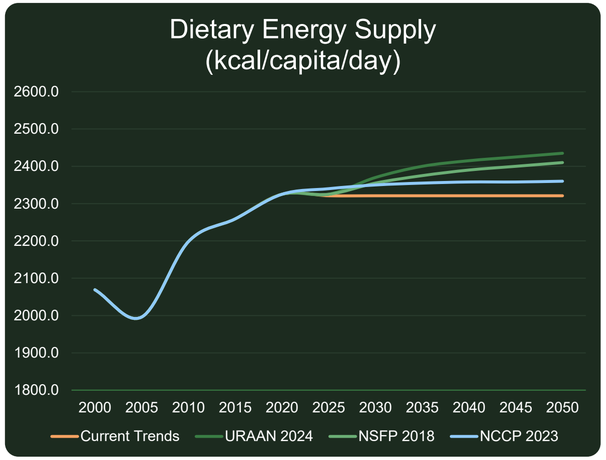
- The FABLE Calculator (Food, Agriculture, Biodiversity, Land-Use, and Energy) is an open-source, Excel-based accounting tool developed by the FABLE Consortium under the Food and Land Use Coalition.
- FABLE-Pakistan Team led by the Centre for Water Informatics & Technology (WIT), LUMS, and the Global Climate-Change Impact Studies Centre (GCISC), Islamabad.

Research Exchange at IIASA – Summer 2025

- Jointly supported by COMMITTED and RECONNECT projects
- Setup of the FABLE calculator for Pakistan
- Training received from FABLE team at IIASA

Kashif Nazir Qureshi





Key Learnings

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Stakeholder Engagement

- Without continuous engagement with policy and decision-makers, we risk chasing the wrong questions, and our modeling frameworks are less likely to be adopted or drive actual change.

Centering Capacity in Academic & Research Institutes

- Stable, isolated environments are needed to build and house long-term, multi-generational capacity in systems modeling.

Specialized Academic Programs

- Knowledge must be institutionalized to truly support and scale this type of modeling nationwide.

International Partnerships

- Strong, active partnerships with the international organizations that host and maintain these frameworks is critical to effectively deploy, understand, and calibrate these tools for our own national context.

Thank You

talha.manzoor@lums.edu.pk