Greening Asia’s irrigation

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Contents

1. Food and water security in Asia: megatrends
2. Environmental impacts irrigation
3. Policy and practice change
4. Next steps
Asian Megatrends: Structural transformation and migration

Farm sizes are decreasing on average.

Farmers will need to diversify income sources for their incomes to keep up with other sectors.

Urbanization is intensifying; particularly in small and medium sized towns.

Urban centers are consumers, competitors, key actors in the food value chain and investors in rural areas.

Projected urban and rural populations: Asia and the Pacific

Billions of people


Beau Damen, FAO
Asian Megatrends: Food security & nutrition

Changes in consumption in Southeast Asia
Food expenditure shares (%)

- Significant reduction in undernourishment
- Achieved through income growth and improved availability and access of food
- Higher per capita consumption of livestock products, fish, fruits and vegetables
- These trends will intensify into the future to match new demand
Asian Megatrends: Resource degradation and scarcity

IIASA, WFaS Initiative
Asian Megatrends: Climate change

Percentage change in rice yields in 2050 compared with situation of no climate change

OECD estimates rice yields could be 16% and 17% lower for non-irrigated and irrigated rice on average with climate change

Source: OECD estimates based on IFPRI IMPACT model (Hadley-Dssat-Agmip climate change scenario)
Impacts: Food production and the environment

Present (2010) and projected (2050) environmental pressures on five environmental domains divided by food group

Increased environmental impact by 50% - 90% by 2050

Source: Springmann et al, 2018
Impacts of irrigated agriculture on the environment: Water quantity, water quality and timing of flows

- 84% water consumption
- Largest producer of wastewater
- Soil erosion of 25-40 billion tonnes per year
- Storages and groundwater extraction disrupt flow patterns

Water stress and intensity of fertilizer use
Outcome: Biodiversity loss and declining ecosystem health

Prevailing patterns of threat to human water security and biodiversity.

81% loss in freshwater dependent species since 1970

Vörösmarty et al, 2018
Policy and practice change: Better water accounting (that includes return flows)

Molden, 2007
Policy and practice change: Designing irrigation systems for multiple uses
Policy and practice change: Green infrastructure (in rural areas)

- Wetland restoration
- Riparian buffers
- Rural-urban integration
A combination of all available solutions is required to drive urgent changes needed.

Options for keeping the food system within environmental limits

Source: Springmann et al, 2018
Innovative financing to drive the rapid changes needed
Approach: Growing emphasis on landscape scale approaches from source to sea.

- Watershed protection
- Increased water productivity
- Agrobiodiversity and healthy fisheries
- Reduced pollution
- GHG reductions