



SMART VILLAGES
New thinking for off-grid communities worldwide



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SMART VILLAGES APPROACH TO THE WATER-ENERGY-FOOD NEXUS

Dr Muhammad Tayyab Safdar

Affiliated Lecturer, Centre of Development Studies, University of Cambridge and Post-Doctoral Researcher, Smart Villages Initiative

THE RURAL DEVELOPMENT CHALLENGE

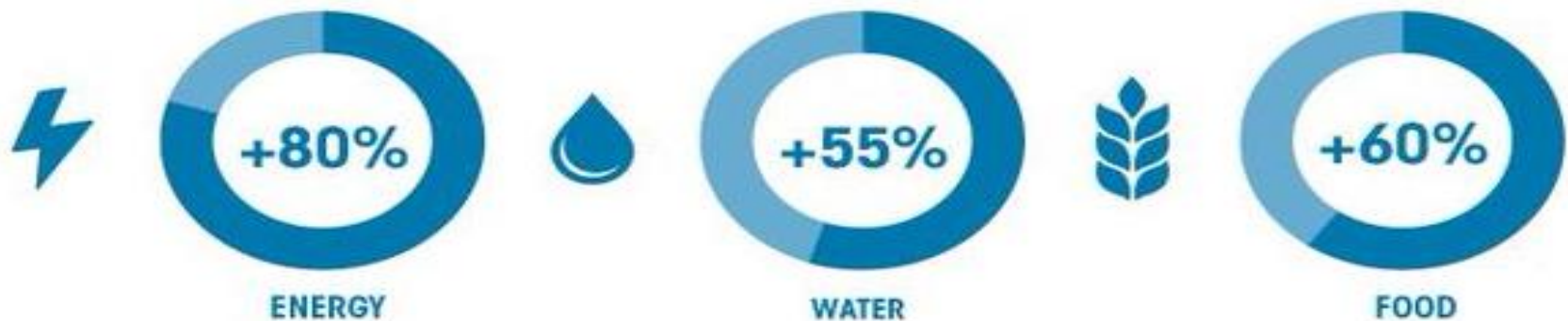


- More than 1 billion people do not have access to electricity
- Almost 3 billion use traditional biomass to meet basic heating and cooking needs
- Extreme poverty remains primarily a rural phenomenon (Almost 70%)
- Considerable overlap between those that do not have adequate access to water (1.1 billion); those that are under-nourished (circa 1 billion) and those without access to electricity (Hoff, 2011)

WATER-ENERGY-FOOD (WEF) NEXUS

- Sustainability of the natural resource base is under threat due to: Economic growth, over-exploitation of natural resources and ecosystems, urbanisation, climate change and rising population

Estimated increase in Energy, Water and Food Demand by 2050 (IRENA, 2015)



Source: IRENA 2015

WATER-ENERGY-FOOD (WEF) NEXUS AND CHALLENGES FOR DEVELOPMENT

- Nexus thinking dictates an interdisciplinary approach that brings to the fore inter-linkages between water, energy and food systems
- Can be used as a conceptual tool to achieve sustainable development
- A nexus approach helps understand the potential trade-offs and synergies in the utilisation of resources

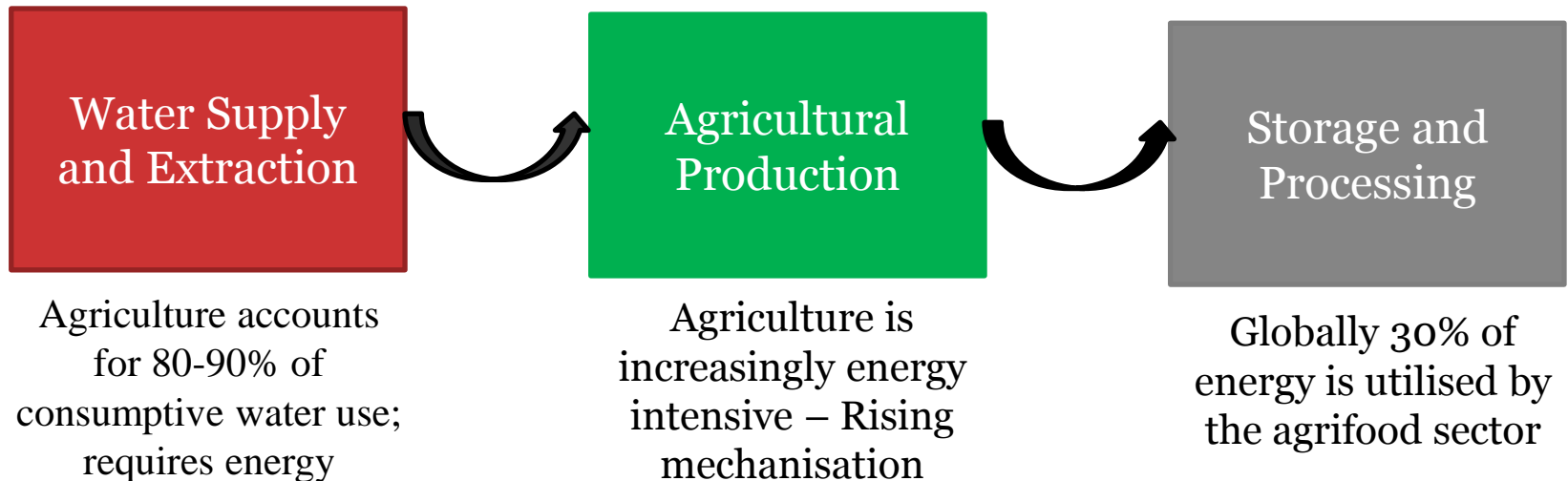
FOOD AND ITS LINK TO WATER AND ENERGY

- Demand for food will increase as population continues to rise: 9 billion people by 2050
- Impact of intensive agriculture: Dealing with negative externalities including release of greenhouse gases (GHGs), pollution due to nutrient run-off, soil degradation and loss of biodiversity/ecosystem disruption (Godfray et al., 2010)
- More energy and water-intensive diets (Kearney, 2010)

FOOD AND ITS LINK TO WATER AND ENERGY

- Price volatility has a negative impact on food access:
 - Disproportionate affect on the most vulnerable sections of society – Estimates suggest that the poorest households spend almost 70% of their incomes on food
- Competition for land use due to urbanisation and industrial development
- Expansion of biofuel production: Increasing evidence of food-energy nexus (Caputi, 2013)

AGRICULTURAL VALUE CHAINS



Small holder farmers who account for a majority of food production across the developing world do not have access to energy constraining productivity

LOSSES IN THE FOOD SYSTEM

- Weaknesses in the agrifood system: Almost 30 – 50% of global food production is wasted annually
- This represents a wastage of:
 - 1.3 billion tonnes of food worth US\$ 1 trillion; 1.47 – 1.96 Gha. of arable land; 0.75 – 1.25 trillion m³ of water and 1 to 1.5% of global energy (Aulakh and Regmi, 2014)
 - In developing countries, much of the wastage in food can be attributed to the absence of infrastructure and lack of knowledge/investment in on-farm storage technologies

Lack of access to energy is often an inhibiting factor in reducing food losses and improving rural incomes

SMART VILLAGES APPROACH TO RURAL DEVELOPMENT

- Similar to the WEF nexus, the central premise of the Smart Villages Initiative advocates an integrated approach to rural development:
 - Focus is on decentralised, off-grid solutions
 - Decentralised renewable energy solutions can act as a catalyst for rural development
 - In the presence of appropriate enabling conditions instead of focusing on costly grid extension promoting decentralised solutions can improve energy access in rural areas

SMART VILLAGES APPROACH TO RURAL DEVELOPMENT

- Improving energy access can strengthen synergies between water-energy-food systems
- Energy provision can improve access to Information and Communication Technologies (ICTs)
 - ICT solutions have the potential to contribute to improved sustainability, food security, increased incomes and reduced vulnerability
 - ‘Awaaj Othao’ campaign in Gujrat State, India: Toll-free access to mobile phone based technology allows farmers to receive timely and up-to-date agricultural information from agronomists and peers (Cole and Fernando, 2012)

SMART VILLAGES APPROACH TO RURAL DEVELOPMENT

- Access to energy can help reduce losses in agricultural value chains
- Developing decentralised processing and storage infrastructure can increase incomes and contribute to improving food security:
 - In Terrat Village located in the Manyara region of Tanzania, access to off-grid electricity has enabled the establishment of local businesses: Maize-threshing, welding and computer training (Van Gevelt, Safdar et al., forthcoming)

SMART VILLAGES APPROACH TO RURAL DEVELOPMENT

- Micro and mini-hydro plants can provide off-grid energy solutions to remote communities and help improve food security as well as incomes
- Successful examples in Northern Pakistan:
 - Implementation of such projects for the last three decades by actors like the Aga Khan Rural Support Programme (AKRSP) and the Sarhad Rural Support Programme (SRSP)
 - Linking improved energy access to productive use is extremely important to generate sustainable livelihood – PEACE project Swat

SMART VILLAGES: SOME KEY FEATURES



Education and health services

- ICT connectivity: distance learning and world's knowledge base
- Modern health services and tele-medicine

Foster entrepreneurship in provision and use of energy services



- Capture more of the agricultural value chain
- Reduce post-harvest food losses
- Create new businesses

Through ICT connectivity, participate in governance processes



- At local, regional and national levels
- Creating communities with strong rural/urban linkages

Building more resilient communities better able to respond to shocks



- Clean water and sanitation
- Affordable and nutritious food

All enabled by access
to ENERGY



SMART VILLAGES

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Thank you for your attention

www.e4sv.org | info@e4sv.org | [@e4SmartVillages](https://www.instagram.com/e4SmartVillages)