

Chapter 5

Re-Conceptualising the ‘Technology– Development’ Nexus: Linking Water, Energy, People and Governance in India

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ABSTRACT

*This book chapter re-conceptualises the relationships between technology and **development**. It focuses on rural economic development and examines how water- and energy-related technologies interact with human-nature relationships. Drawing on case studies in Rajasthan, India, this chapter argues that people’s preferences for livelihoods can be incompatible with technological design. The unintended consequences of water and energy interventions can bring uncertainty to policy-making which affects long-term economic development and ecological **sustainability**. Changing governance structures in challenging caste and gender inequalities also require strong leadership. It proposes a ‘people-centred’ technological intervention framework which links the macro technical system and the micro process of people’s daily practices and subjectivities. In achieving this, it calls for a different approach to understanding human motivations, power dynamics and gender politics.*

INTRODUCTION

This book chapter is different from other chapters in its focus. It does not answer the questions about the relationships between information **technology** and economic development directly. Instead, it will take a wider perspective, intending to re-conceptualise the linkages between technology, poverty

reduction and human-nature relationships. It will cover a wide range of water- and energy-related technologies, from indigenous methods, such as rain-water harvesting, to cutting-edged innovations, such as reverse osmosis plants (ie. turning grey-water to drinking water by breaking down the membranes of water molecules). While this paper will place more emphasis on rural development, it will expand the concept of sustainable economic development, from simply continuous economic

DOI: 10.4018/978-1-61520-709-1.ch005

growth to a wider socio-political-environmental perspective, including poverty alleviation, empowerment and environmental sustainability. This paper will, therefore, explore the impact of technology, not only on economic well-being, but also on social relations, **governance** structures and ecosystems.

The role of technology in achieving human development is multiple. It helps alleviate poverty by reducing mortality rates, improving hygiene, finding new drugs to tackle previously incurable diseases, and raising agricultural productivities (Chataway and Smith, 2007; Robins, 2005). The current climate change debates have further ascertained the role of technology in offering solutions to environmental changes (Wong, 2009). As the UNEP (2008) suggests:

Mobilizing and re-focusing the global economy towards investments in clean technologies and natural infrastructure such as forests and soils is the best bet for real growth, combating climate change and triggering an employment boom in the 21st century (p.2).

Some evidence has shown that technology can play a significant role in improving the living conditions of a large number of people living in extreme poverty who lack basic services, such as water, health services, housing and energy (Pauli, 1999). The study by de Janvry and Sadoulet (2002) shows that improving agricultural technology is effective in alleviating **poverty** by raising productivity and lowering production costs. Richards (2005) also highlights the usefulness of technology in mitigating the impact of climate change, and helping poor countries adapt to changing rainfall and agricultural patterns (Richards 2005).

The outcomes of the technological interventions are, however, not always positive. The celebratory account of technology can be misplaced. For instance, the research by Wong and Sharp (2009) suggests that the failure of the UK's first combined rain-water and grey-water

systems in Liverpool does not simply mean that the innovation needed to be abandoned, but that poor implementation has reinforced the negative stereotypes that the elderly are anti-technology. Schumacher (1974) has long campaigned for the appropriateness of technology. Adger *et al.* (2003) also takes a governance perspective, suggesting that it is crucial to understand the role of public participation in influencing what technologies are seen as 'public-friendly'.

Literature offers a number of explanations for the limited success of some technological interventions. Firstly, there are questions as to whether long-term planning about repair, maintenance and capacity building is adequate and ready to support new technologies (Roy and Venema, 2002). Secondly, some critics argue that the existing (sustainable) technological interventions are not all 'pro-poor' in nature. The distribution of costs and benefits by (sustainable) technology can be so uneven that poor people in many cases often bear disproportionately high costs while local **elites** capture most benefits (Dikito-Wachtmeister, 2000). Thirdly, the interventions tend to underestimate the structural constraints, such as caste, class, gender and race. These factors can hinder poor people from gaining access to technology in their everyday lives (Feenberg, 1999). Fourthly, the discourse of sustainable technology pays insufficient attention to power dynamics within communities which can reinforce social and environmental inequalities (Cleaver and Frank, 2005). Lastly, from a **gender** perspective, Denton (2002) argues that powerful men often control technology, and make decisions for their community members.

This book chapter will build on these critiques, and argue that the success of technological interventions in rural economic development lies in our understanding of the complex interactions between water, energy, technology and human-nature relationships. It will draw upon an Indian project as a case study. The project aims to explore the feasibility of using brackish underground water

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