

**Sustainable Well-being and Climate Change in Pakistan-  
The Case of Ketī Bunder's Coastal Ecosystem**

by

Aneel Salman

An Abstract of a Thesis Submitted to the Graduate

Faculty of Rensselaer Polytechnic Institute

in Partial Fulfillment of the

Requirements for the degree of

DOCTOR OF PHILOSOPHY

Major Subject: Ecological Economics

The original of the complete thesis is on file  
In the Rensselaer Polytechnic Institute Library

Examining Committee:

John Gowdy, Thesis Adviser

Steve Breyman, Member

Daniel L Shawhan, Member

Michael J Mascarenhas, Member

Rensselaer Polytechnic Institute  
Troy, New York

August, 2010

## ABSTRACT

Climate change is redefining the concept of development. It has now been established that this global phenomenon will drastically affect marginalized social groups which depend on natural resources for economic sustenance. The impact of this phenomenon on Pakistan is expected to be severe. Two-thirds of the country's poor live in rural, mountainous and coastal areas. Official government documents predict that in the decades to come, most of the coastal regions will be inundated, coastal employment and income will be disrupted, and the country's agriculture and fishing sectors will suffer. However, a review of government environmental documents not only reveals a significant lack of actual field-based climate data, but also a lack of capacity in studying and responding to the country's environmental challenges - in particular to climate change.

This field-based research dissertation fills a knowledge gap by understanding and documenting how communities and institutions on the ground are dealing with environmental and climate changes in the coastal region of Pakistan. The dissertation examines the adaptive capacities of Keti Bunder's coastal communities in the Thatta District, about 200 km south-east of Karachi, Sindh. The study documents past and present household and institutional coping mechanisms using a mixed method approach through the analysis of baseline geophysical data, field surveys, focus group discussions and in-depth interviews.

The data collected reveals that Keti Bunder is experiencing environmental changes such as sea intrusion, increase in salinity, erratic yet increasingly intense surges of tropical and regional storms and cyclones, changes in temperature and rainfall, loss of mangrove cover and reduction in fisheries and fresh water. These negative trends are the result of complex interactions between exogenous physical changes (climate change and the reduced availability of fresh water), state policy failures and changing socio-cultural patterns of resource use within the villages (overfishing and the destruction of mangrove forests). The growing poverty, decreasing incomes and limited means of cooperative risk sharing, communication and credit facilities, have trapped Keti Bunder residents into vicious socio-ecological debt cycles. In the past, the villagers in Keti Bunder had strong

institutions like *Goth Kath* (Village Assemblies/Communities) and knowledge<sup>1</sup>, to deal with environmental disruptions. Recently, these disruptions have been so severe (such as sea intrusion and erratic cyclones) as to overwhelm the ability of these institutions to deal with them (for example certain communities like the Jaats switched from farming to unsustainable fishing). These changes are straining community ties and may lead to greater social instability, security concerns, and an escalation in intra and internal conflicts.

The rapid environmental changes in Keti Bunder compounded by its socio-economic and cultural impacts are putting added pressure on local communities who despite being aware of both the human and natural impacts of climate change are often helpless to take actions to alter their situations. From the qualitative survey findings and detailed interviews with the locals, it can be inferred that the effectiveness, innovation and sustainability of present coping and future adaptive mechanisms in Keti Bunder will depend on local institutional linkages and relationships (like the ones between Keti Bunder communities and the World Wide Fund for Nature) in order to deal with the new realities of climate change. This dissertation, therefore, emphasizes strengthening local institutions; replicating alternative energy, risk insurance and employment diversification initiatives on a broader scale; and harmonizing state water and fishing policies.

---

<sup>1</sup> Like the ability to read the color of clouds or sounds of birds for signs of impending storms.