

# **Household Level Farmers' Flood Adaptation Measures in Nowshera Pakistan**

## **SANDEE Study**

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# Floods in Pakistan

- From a rare event to a catastrophe
- More intense, frequent, and abrupt
- Numerous areas are at serious risk
- Losses – agriculture, livestock, houses & lives



# Areas Affected

<b>Year</b>	<b>Place</b>
<b>2003</b>	<b>Sindh (Thatha &amp; Karachi)</b>
<b>2007</b>	<b>Khyber-Pakhtunkhwa, Sindh Baluchistan</b>
<b>2010</b>	<b>Khyber-Pakhtunkhwa</b>
<b>2011</b>	<b>Sindh</b>
<b>2012</b>	<b>Khyber Pukhtunkhwa, Southern Punjab and Upper Sindh</b>

Source: Pakistan Metrological Department, Federal Flood Commission

# Damages & Losses

Year	Losses/Damages
2003	484 deaths, 4,476 villages
2007	967 deaths & arable land affected
2010	1800 deaths 20 million+ affected
2011	500+ deaths, 5.3 million people affected, arable land
2012	100+ died, 1000 plus homes destroyed, huge arable land affected

Source: Pakistan Metrological Department, Federal Flood Commission

# Study Context

- **Problem?-----floods**
- **Consequences?---losses/damages**
- **Solution/what need to be done??**
- **Need appropriate response**
- **Existing response??**
  - **Emergency relief**
  - **Compensations**
  - **Assessment research**

# Adaptation Context

- **Gap/missing link?-Appropriate response**
- **Flood adaptations**
  - **Planned adaptations (government)**
  - **Autonomous adaptations (community, household & individual)**
- **We focus household level flood adaptations**
- **Why?-indigenous, effective, easy, & socially acceptable**

# Cont...

- **Existing HH flood adaptations**
  - Shelter belt/Tree plantation
  - Grains storage
  - Short duration crops
  - Building modifications
- **Research question?**
  - What factors determine household level farmers flood adaptation measures?

# Study Objectives

- **Objectives:**
  - To analyze the factors determining farmers household level flood adaptation measures
  - To conduct the cost assessment of the farmers' flood adaptations



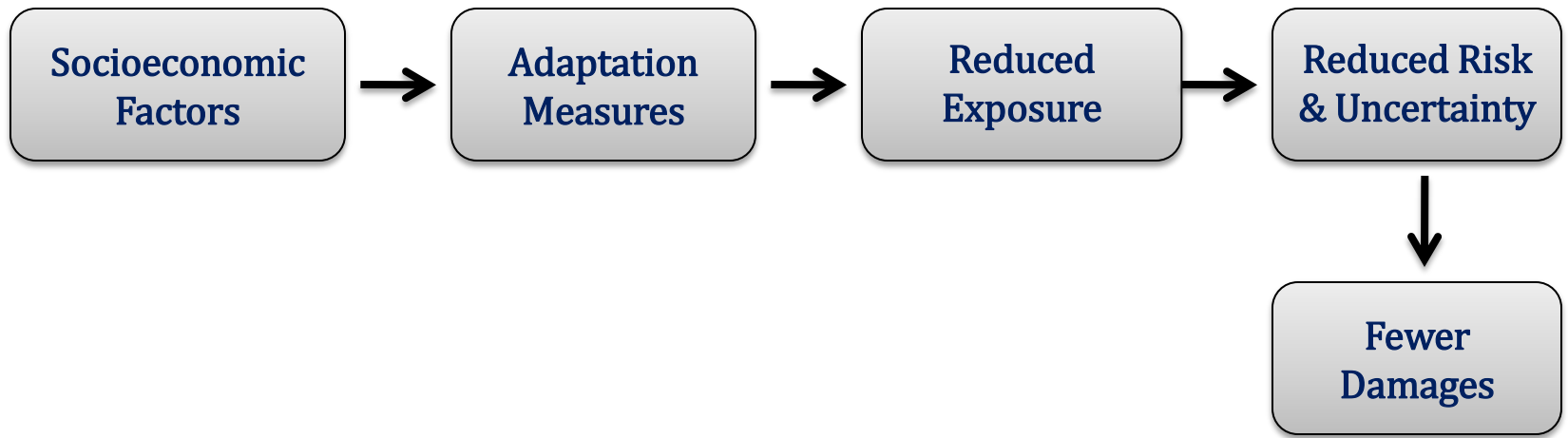
# Policy Relevance

- **National policies**
  - Climate Change Policy
  - National Disaster Management Policy
  - District Disaster Management Plan ✓
- **Gap/contribution?**
  - Flood specific strategies & action plans/NAPA & LAPA
- **Stakeholders**
  - National & provincial disaster management authorities
  - Federal Flood Commission
  - Climate Change Division

# Literature Review

Authors, Year & Place	Review
Bryan et al. (2013) Kenya	<ul style="list-style-type: none"><li>•Agriculture adaptation to climate change</li><li>•Examined farmers' perceptions of climate change &amp; ongoing adaptation measures</li><li>•Factors influencing farmers' decisions to adapt</li><li>•Farmers are adapting though feel the need of support.</li></ul>
Below et al. (2013) Tanzania	<ul style="list-style-type: none"><li>•Determinants of adaptations</li><li>•Explore the relationship between socioeconomic variables and farmers' adaptation behavior</li><li>•Availability inputs, good education system, social capital, agricultural extension, and microcredit services are the best means of improving the adaptation</li></ul>
Motsholapheko et al. (2011) Botswana	<ul style="list-style-type: none"><li>•Studied rural livelihoods and household adaptation to flooding</li><li>•Households mainly relied on farm-based livelihood activities and their coping strategies are off-farm works, non-agricultural skills, temporary relocation, and changes in harvesting timing.</li></ul>

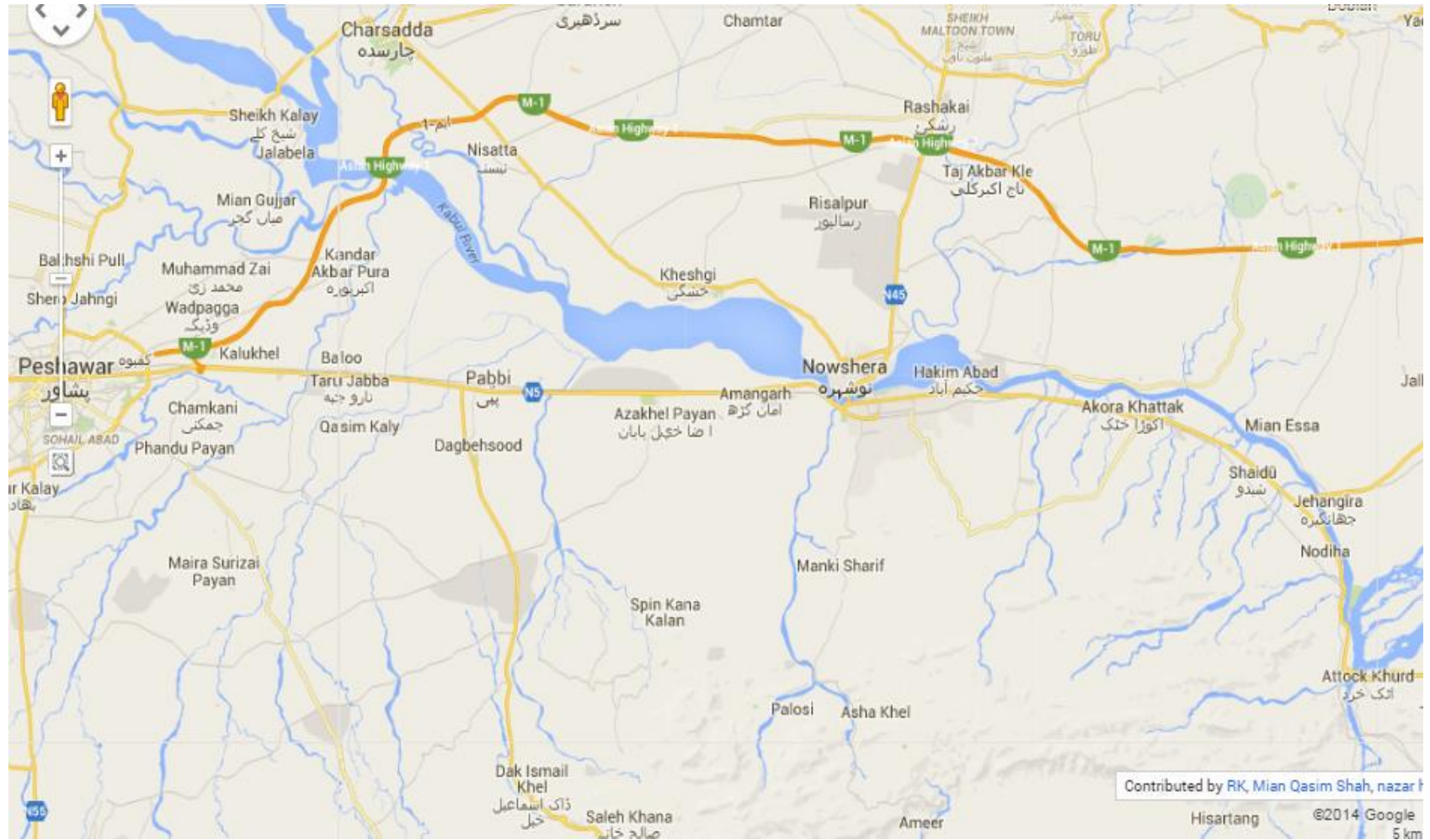
# Theoretical Framework



# Study Area

- District Nowshera
- Two Tehsils (Nowshera & Pabbi) and 47 UCs
- Total area: 1748 Sq Km – Cultivated: 24798 hec.
- Total Population: 874373-1988 Census
- Distribution: 26% urban & 74% rural
- Average HH size: 7.7 persons
- Crops: Maize, wheat, rice, sugarcane, barley, tobacco
- River Kabul

# Study Area Map



# Study Area Map



# Econometric Analysis

$$A = X\alpha + \epsilon \text{ ————— (i)}$$

- **A** denotes the adaptation options
- **X** represents the set of factors affecting adaptations

# Adaptation Measures/Dependents

<b>Literature Based/Before Field Visit</b>	<b>After Field Visit</b>
<b>Livestock changes</b>	<b>Short Duration Crops</b>
<b>Livelihood diversification</b>	<b>Shelter Belt/Tree Plantation</b>
<b>Agro-forestry</b>	<b>Grains storage</b>
<b>Social capital</b>	<b>Housing structure</b>
<b>Cash crops</b>	<b>Flood preparedness</b>
<b>Crop timings</b>	<b>Temporary/seasonal migration</b>
<b>Crop changes</b>	

Dependents are measured in binary numbers (0,1). 1= if the mentioned adaptation is being taken and 0 otherwise=0



# Explanatory Variables/Factors

Variables Name	Explanation
Age	Age of HHH Age of the household head
Household income	Total monthly income of the household
Education of the HH	Maximum no. of years of schooling in a household
Household size	No. of persons living in one household
Male to female ratio	Male to female ratio in a household
HHH gender	Gender of the household head
Basic services	Access to basic services e.g. electricity, water, road, hospital
Aid received	Monetary value of aid received in cash or kind
Extension services	Availability of extension services
Credit	Credit availability to farmers
Climate perception	Farmers perceived any change in climate or not
Farming experience	Household farming experience (no. of years)

# Data & Sampling Strategy

- **Data**
  - Primary data through household survey
  - Pre – tested questionnaire will be used
- **Sampling**
  - Population – 47 UCs
  - 27 affected+20 not affected
  - 2 most vulnerable UCs selected

# Sampling Technique & Size

- Purposive & stratified random sampling
- Sample size-500 HH

# **Economics of Adaptations**

- **Cost assessment of adaptation options**
- **Review of methodologies**

# Expected Outcomes

- **First research of its kind in the area**
- **Successful HH flood adaptation practices**
- **Insights for communities and government**
- **Input for flood specific strategies**
- **Contribution to the literature**

**THANK YOU**

**Comments & Questions**