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# Dealing with variations in access to water: An assessment of challenges and coping strategies in Far-western Nepal

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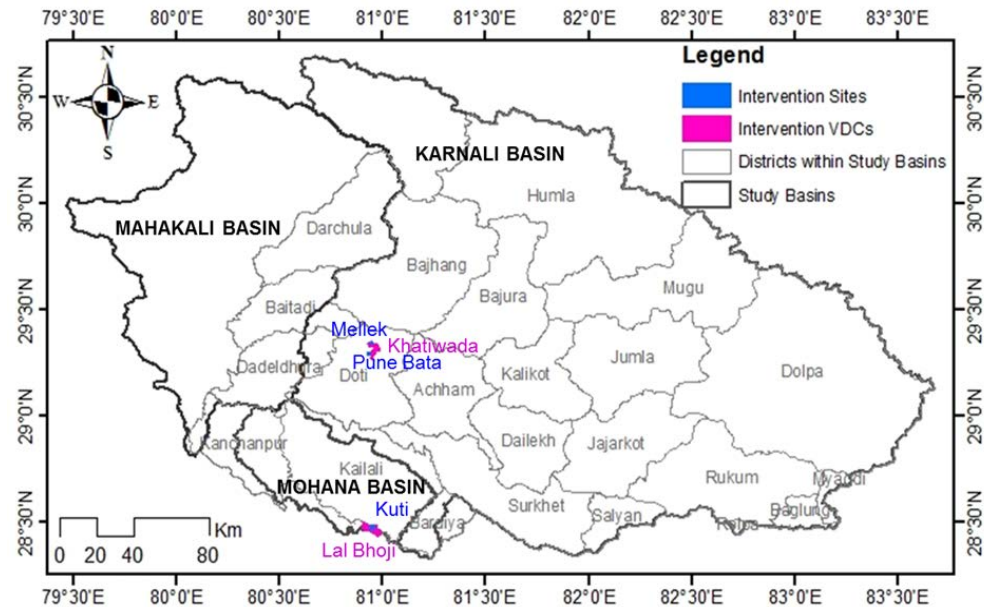


# Context

- Water availability and access varies across Nepal due to:
  - Monsoonal weather patterns that create spatial and temporal variation
  - Monsoon flooding that cause flash floods in the Terai and landslides and heavy erosions in the hills
  - The low average rainfall that Mid-West and Far-West Nepal receives compared to the rest of Nepal
- High numbers of tenant and marginal farmers are unable to exploit water resources available in their villages
- Different identities that include gender and ethnicity as well as the ability to participate in water user association influences water access

# Study area

- Three villages representing agro-ecologic, socio-economic diversity of Far West Nepal:  
Mellekh and Punebata villages of Doti, and Kuti village of Kailali
- 17 indicators covering three criteria: biophysical; socio-economic; and logistical



# Objectives

Explore biophysical environment of water access and availability

Analyze institutional arrangements for water governance at local and community level, and suggested technologies

Assess temporal and spatial availability of water at the selected areas in Karnali and Mohana Basins

Identify approaches to increase farm productivity and improve livelihoods

Plan approaches to alleviate current challenges



# Methods

- Household surveys (644 households)
- Climate trend analysis (Three stations; 1980-2015; Precipitation, Temperature)
- Participatory methods
  - Focus Group Discussions,
  - Key Informant Interviews,
  - Field Observations

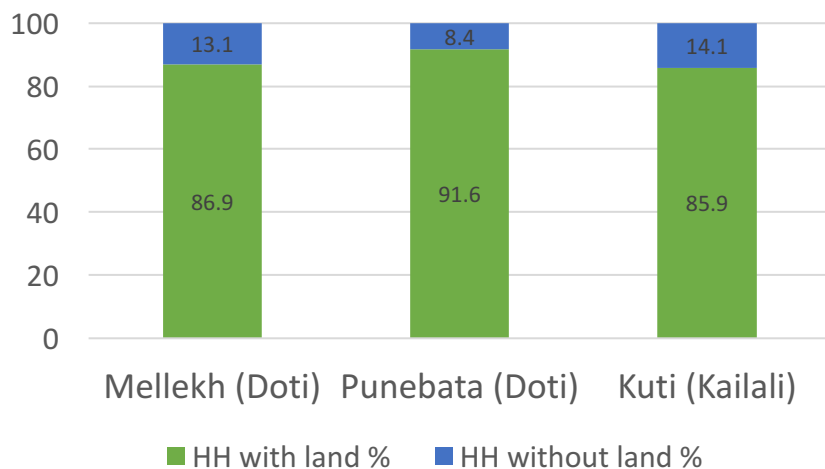


# Land ownership and tenancy

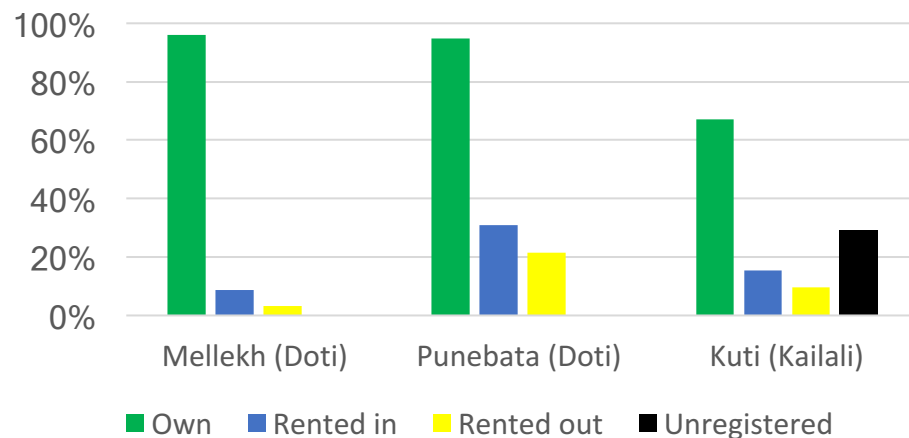
- About 12.1% households landless, highest in Kuti village
- Average landholding 0.47 ha, highest in Kuti compared to other two villages – average cultivable land slightly less – 0.44 ha

- Tenancy common in all sites, 15.2% of households rented land for cultivation whereas 14.8% households rented out land to others
- Small holders, Landless, tenant marginalized farmers

Farmer Typology



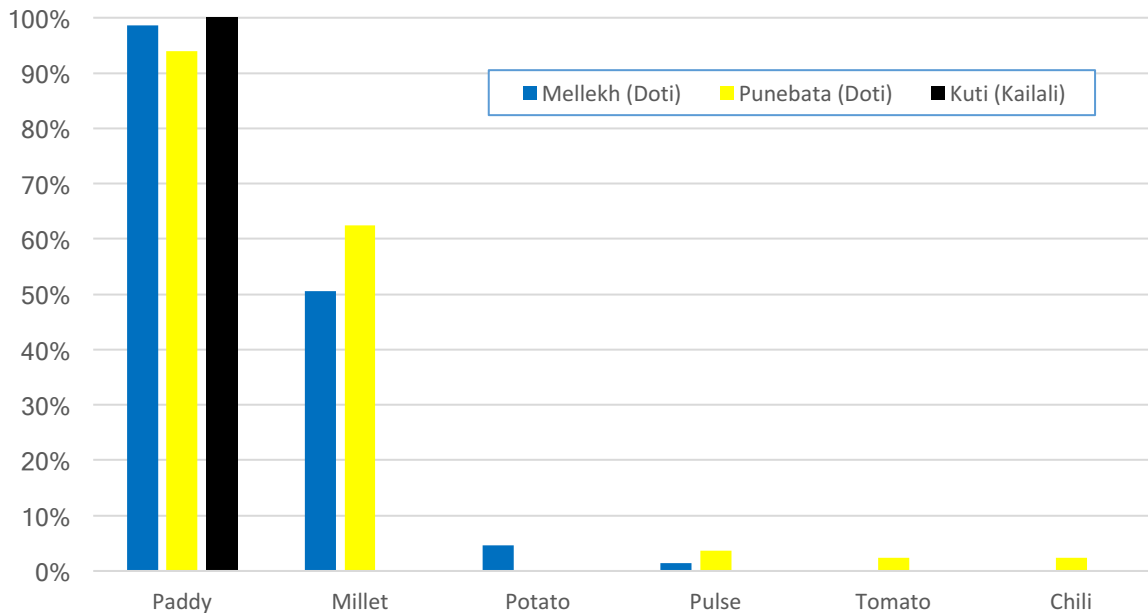
Types of Land Ownership



# Cropping patterns

- During monsoon season, paddy is commonly grown in all three sites. In Doti villages, millet and vegetables are also grown.

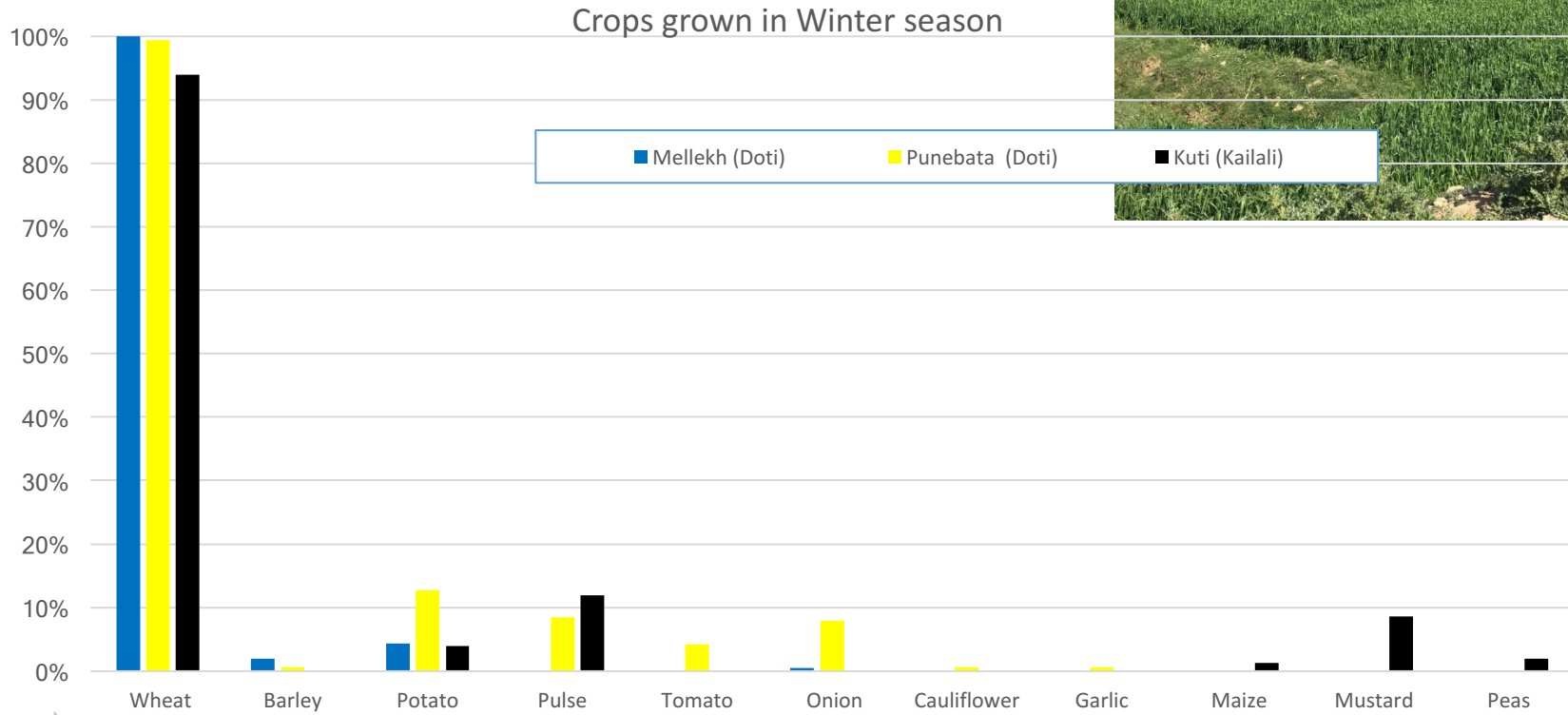
Crops grown in Monsoon season





# Cropping patterns

- Winter season, wheat is common in all sites. Vegetables mostly in Punebata, pulses grown in Punebata and Kuti





# Climate trends – Precipitation indices

- No. of consecutive wet days (CWD) and consecutive dry days (CDD) are slightly increasing for all the three stations except slightly decreasing CWD in Kailai (Terai)
- Hills, total annual precipitation (PRCPTOT) slightly decreasing in trend with CWD and CDD increasing - implying the increased occurrence of floods and droughts
- Terai, total annual precipitation is slightly decreasing with decrease in CWD and increase in CDD, getting dryer with risk of drought

# Climate Trends – Temperature indices

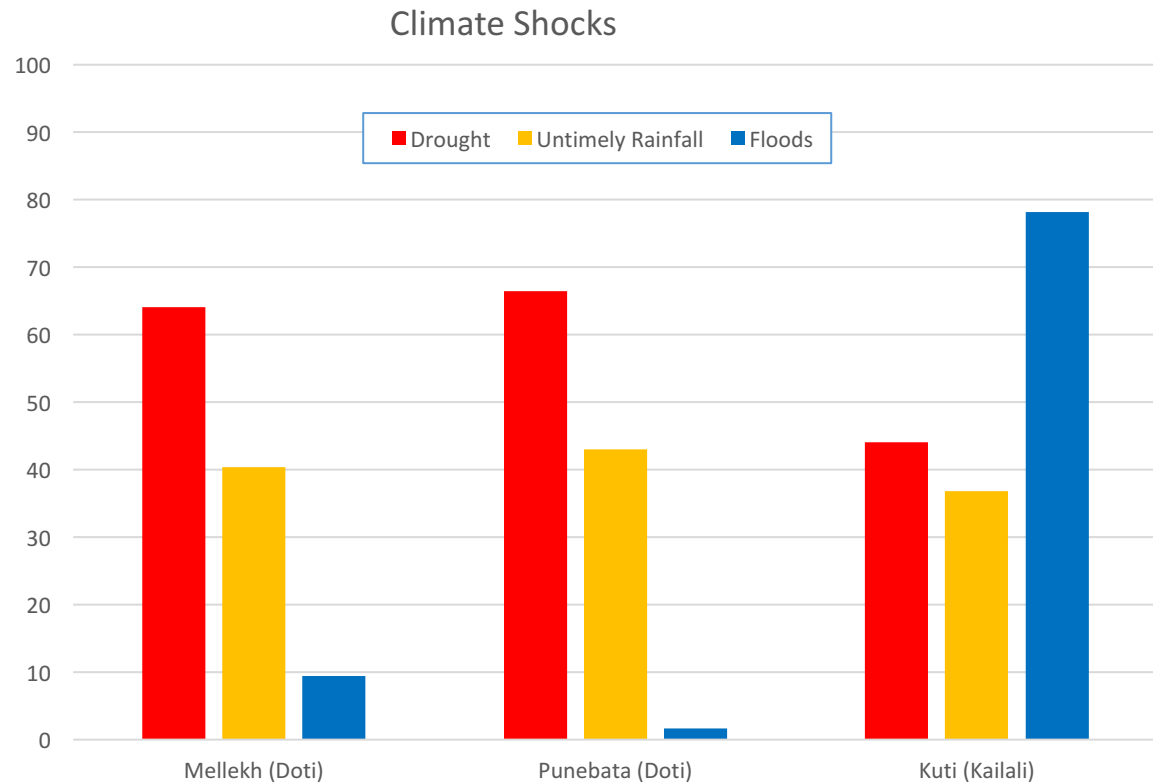
- Monthly maximum of daily maximum temperatures (TXx) and the monthly maximum of daily minimum temperatures (TNx) slightly increasing in all three stations statistically insignificant.
- Monthly minimum of daily maximum temperatures (TNx) and monthly minimum of daily minimum (TNn) temperatures is slightly increasing trend in two stations (Hill and Mountain) except station in Terai statistically insignificant.
- Variability range of both maximum and minimum temperature are widening

# Perceptions on spatial and temporal variations in water availability

Key issues	Mellekh	Punebata	Kuti
Climate Shocks	Progression of land erosion, flash floods and reduced rainfall events.	Landslide events resulted in displacement of several households	Floods have become a more common and intense occurrence
Precipitation Variability	Shifts in rainfall dates and higher rainfall intensities. No snow in the last 4 years.	Variability of start and end dates of rains with increased intensity. No significant reduction in rainfall	Prone to flooding during monsoon and waterlogging for two to three months after the monsoon
Temperature Variability	Warming temperatures in the village	Warming temperatures in the village	Warming temperatures in the village
River Bank Erosion			Kandra river channel has undergone severe bank erosion due to deforestation.

# Climate Shocks – droughts, untimely rain and floods

- Droughts, untimely rain and floods are most common shocks dealt by farmers in all three sites.
- Drought is common in all three sites with Punebta and Mellekh experiencing moderate affect
- Mellekh experiences highest income loss due to drought followed by Punebata and Kuti.

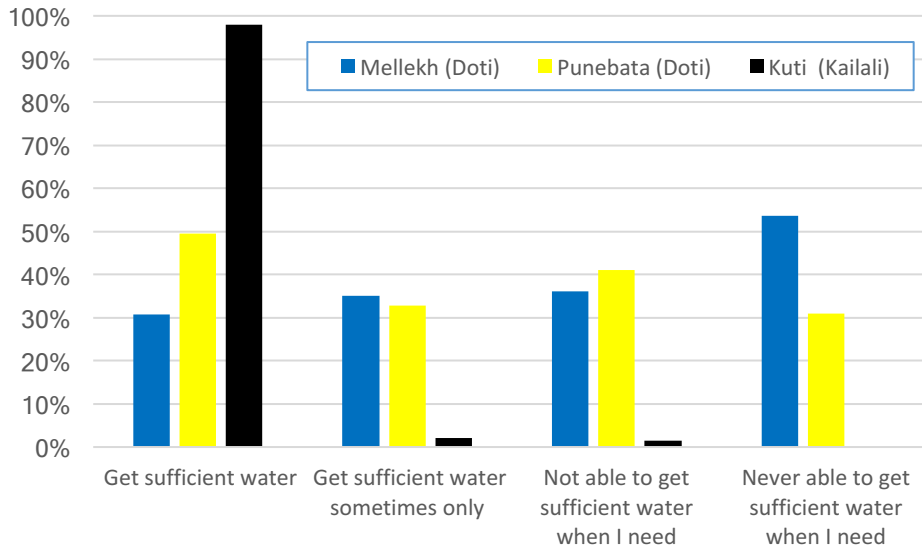




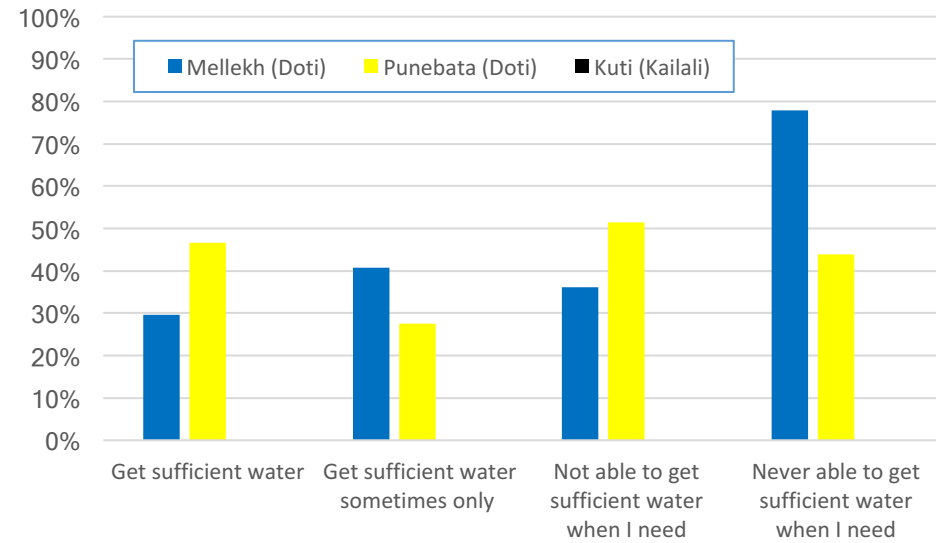
# Water constraints

- Mellekh reported high water insufficiency in both monsoon and winter seasons
- Diverse range of water sufficiency in Punebata due to imbalance in accessing water from ponds

Water Sufficiency - Paddy



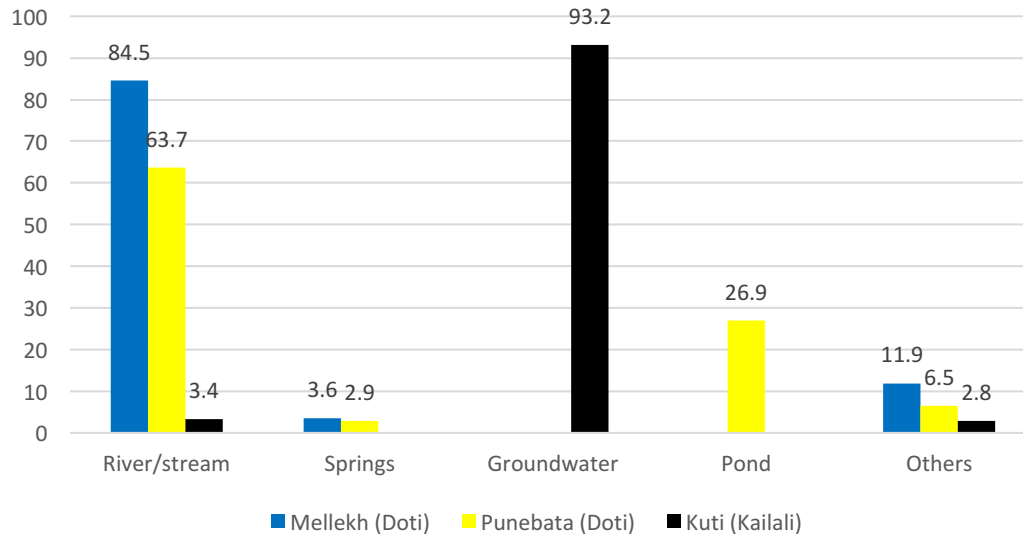
Water Sufficiency - Wheat



# Water access and management

- Heavy reliance on rainwater in all three sites except Terai village.
- In hill/mountain villages mainly stream/spring contributed but in terai village groundwater was main source of irrigation
- In Punebata surface pond is also an important source of irrigation
- In Kuti, only 30% tube well ownership; out of which 77% STW

Irrigation Sources



# Water access and management



- Even though most of the land (88.7%) had access to irrigation sources but limited to monsoon/early winter
- In hill/mountain, water availability declines in stream/springs

- In Kuti, access to groundwater constrained by energy cost/availability and fragmented land size
- Tubewell and pump ownership very low in Kuti village – dependency on rental market



# Water access and management

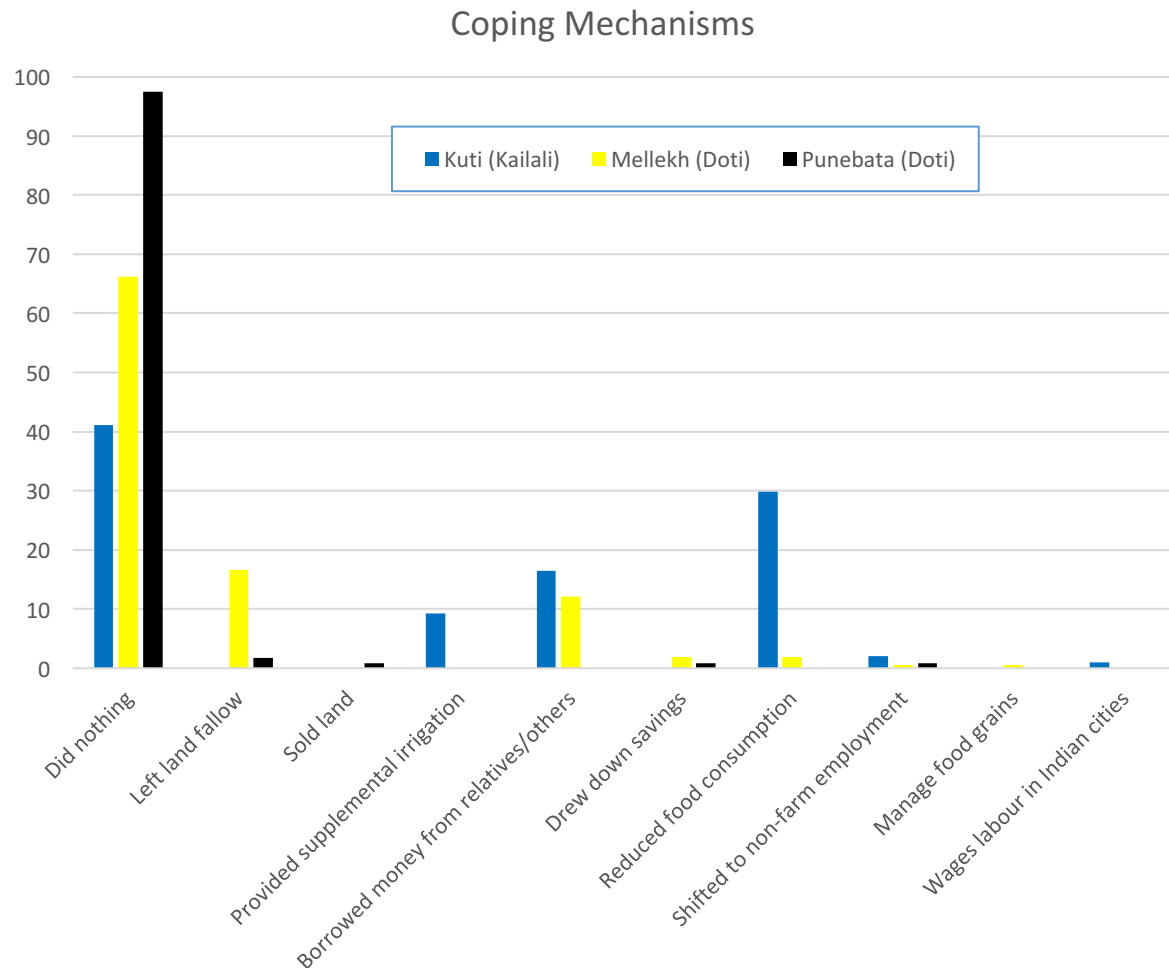
- Water users group to allocate and manage irrigation use in all three villages
- Issues of repair and management of existing water infrastructure high in Mellekh and Punebata
- Heavy reliance on developmental projects to repair existing infrastructure leading to lack of ownership





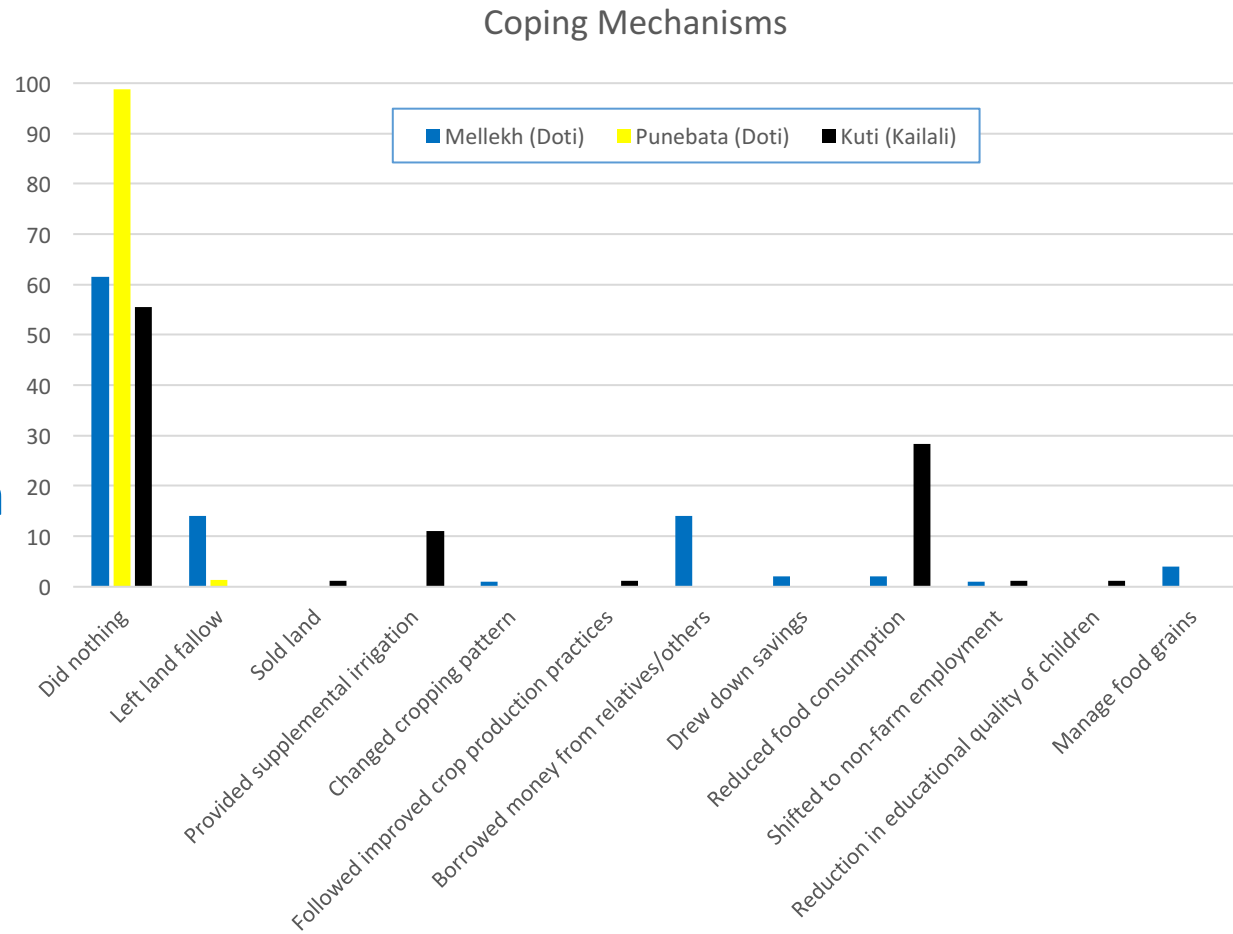
# Coping mechanism - Drought

- Majority farmers in all three sites responded to doing nothing in the event of drought
- Mellekh experiences the highest income loss due to drought followed by Punebata and Kuti
- Farmers in Mellekh reported to leaving land fallow while farmers in Kuti either borrowed money or reduced overall food consumption



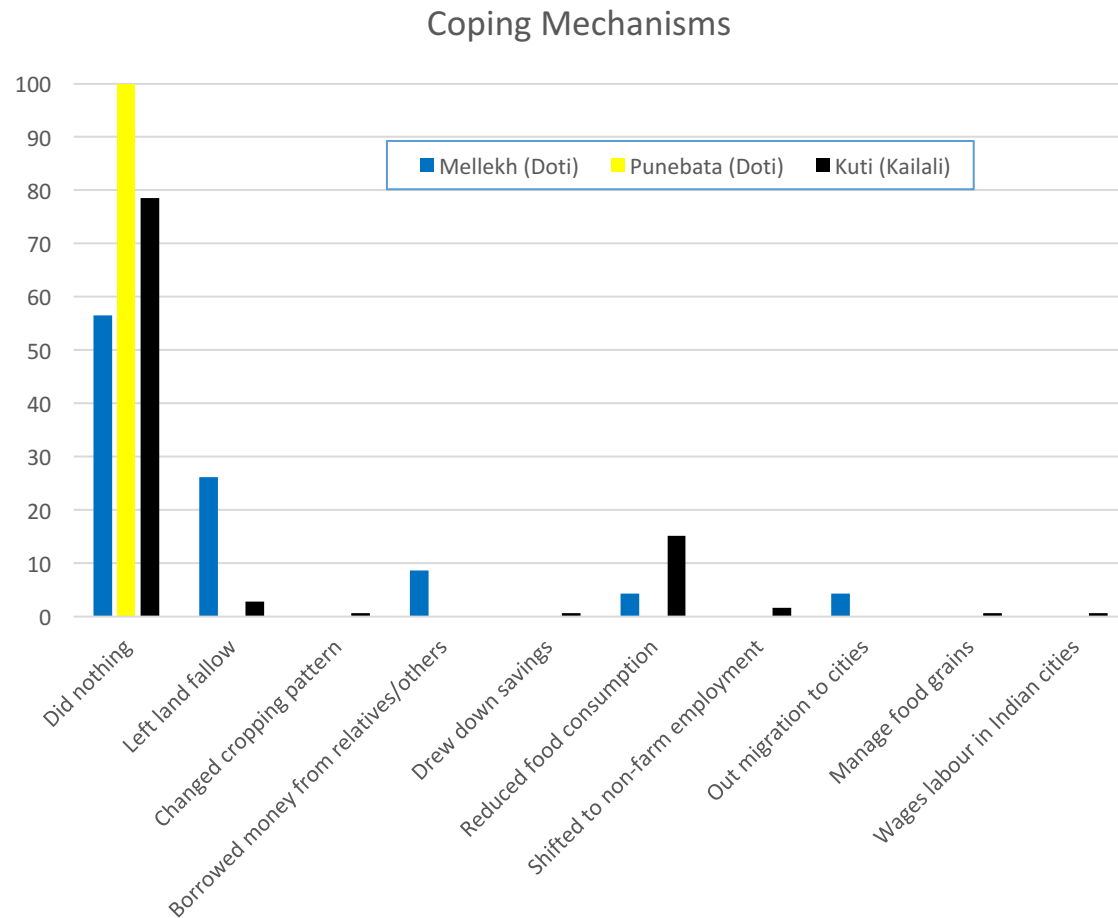
# Coping mechanism – Untimely rainfall

- Majority farmers reported to doing nothing in response to untimely rainfall
- Reducing food consumption, and supplemental irrigation as a strategy in Kuti
- Farmers in Mellkeh left land fallow or borrowed money in response



# Coping mechanism – Floods

- Severe floods in Kuti cause significant damage to farmers' income source.
- Reducing food consumption and providing supplemental irrigation was used as a strategy in Kuti
- Farmers in Mellekh left land fallow or borrowed money



# Conclusions

- Spatial distribution and varying access in mountains/hills – need for water storage and distribution structure >> equitable distribution
- Promoting and implementing water efficient irrigation methods and practices along with improved on-farm water management –increase water productivity and profit margin
- Promote collective approaches – benefit marginal and small farmers





# Policy implications

- Integrated spring source protection and development combined with efficient water management practices
- Community capacity building for rainwater harvesting, flood control ...
- Broader stakeholders engagement and dialogues at various levels of technical and management structure

