

# **Designing Adaptation Plans**

## ***Local Experiences from the Hindu Kush Himalayas***

ICIMOD

***Dhrupad Choudhury***  
***Adaptation to Change Regional Programme***

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International Centre for Integrated Mountain Development

Kathmandu, Nepal

***Regional Training Workshop on adaptation for Asian LDCs***  
Siam Reap, Cambodia  
20-24<sup>th</sup> August, 2013

FOR MOUNTAINS AND PEOPLE

# Hindu Kush Himalayas: Diverse resources, growing vulnerabilities

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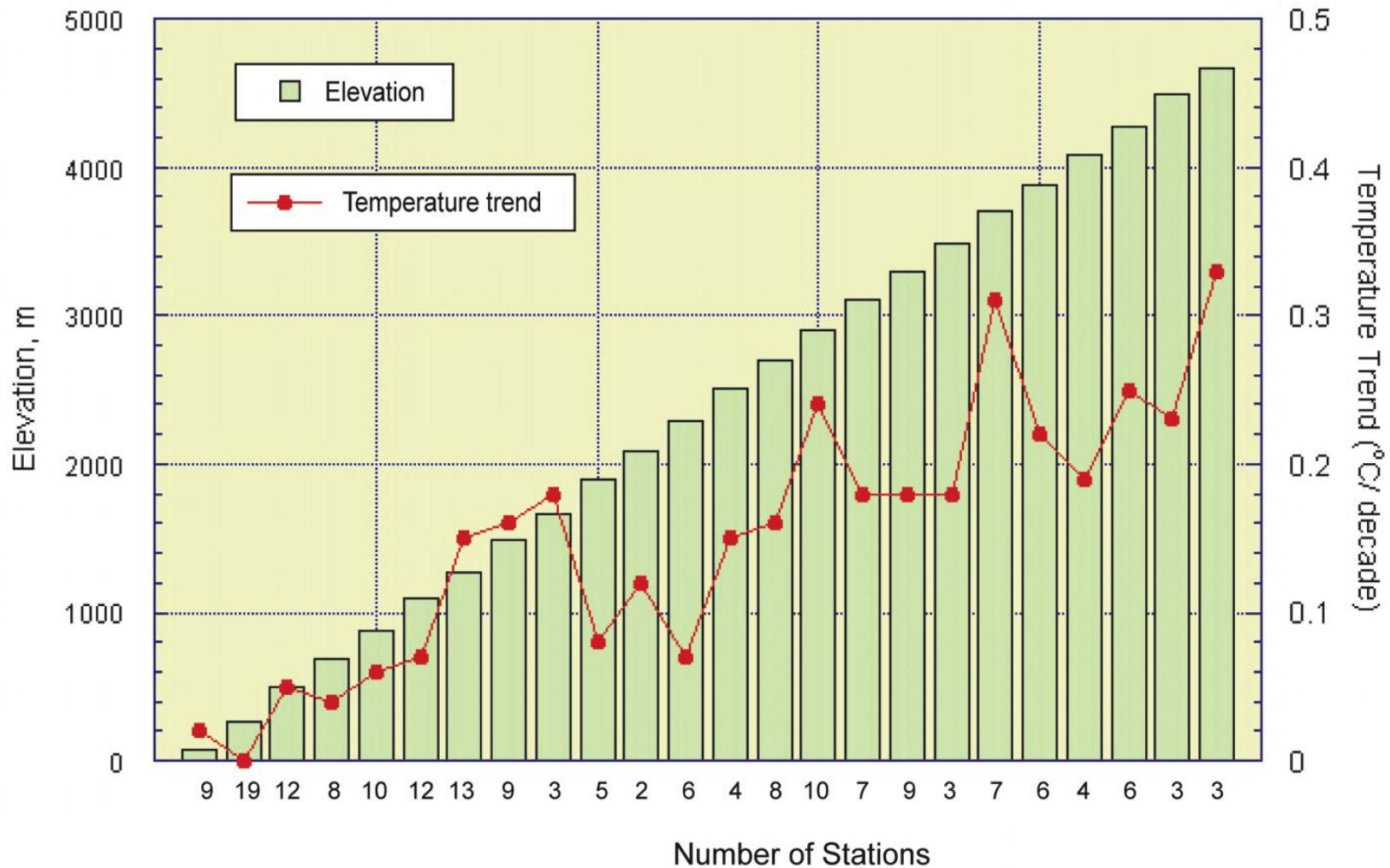
Ecological buffer between the Tibetan Plateau and South Asia; diverse resources, exceptionally high biological and cultural diversity

***The Third pole :***  
largest repository of freshwater outside the Poles  
- ***Asia's 'Water Towers'***

Himalayan glaciers:  
Source of ***freshwater reserves*** providing ***headwaters for 10 major river systems*** in Asia – a lifeline for ***almost one third*** of humanity



# Temperature increasing more at higher elevations



**Snow cover over parts of the Himalaya has been decreasing...**



**1973**  
**(photo ICIMOD archive)**



**2011**  
**(photo Panday)**

**Mt. Machhapuchhare, Nepal, 6993 meters**

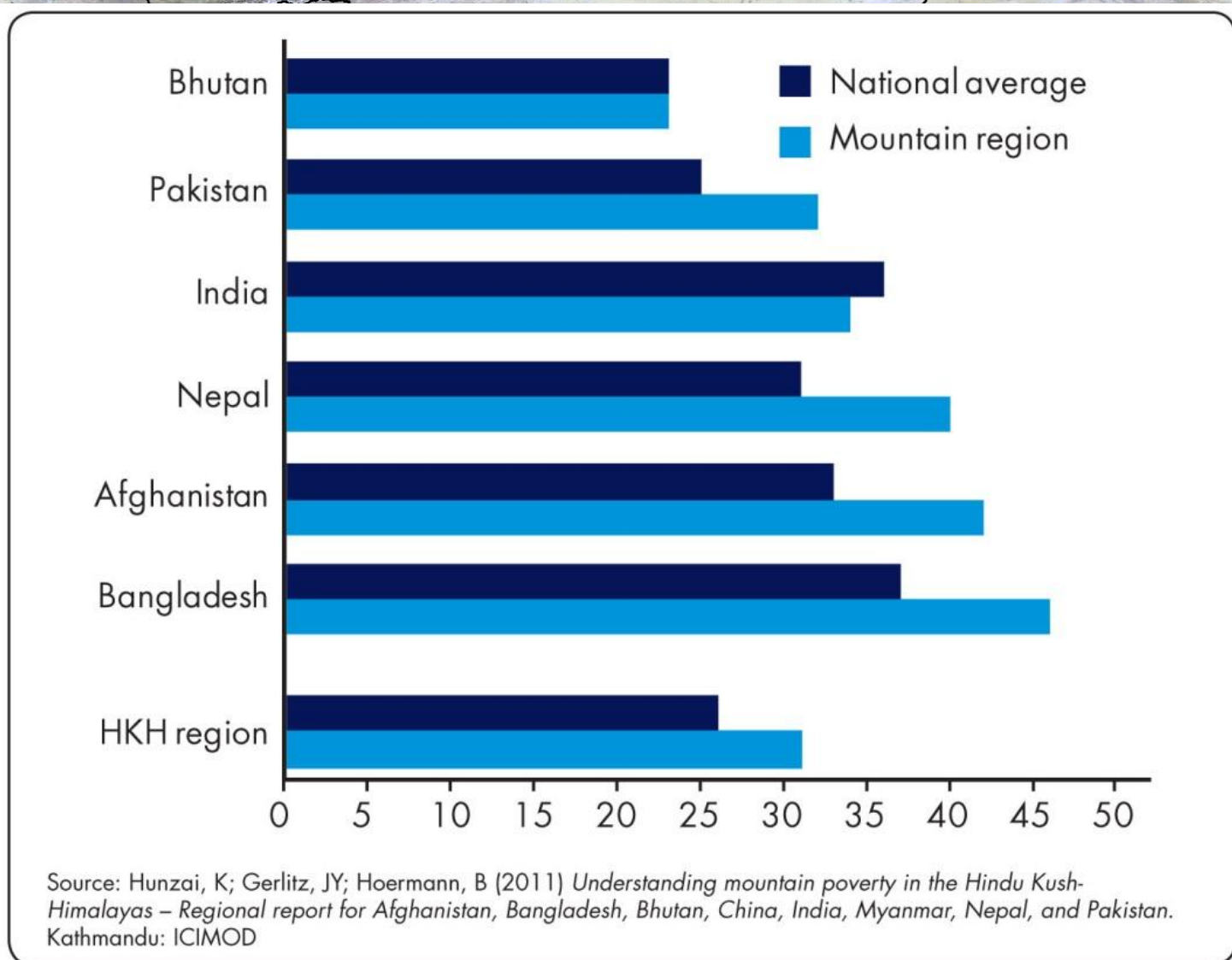
Monsoon patterns are changing...

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**Changes in rainfall intensity, water availability;  
Increasing frequency of disasters**

# How do we adapt to the changing environment?



Source: Hunzai, K; Gerlitz, JY; Hoermann, B (2011) *Understanding mountain poverty in the Hindu Kush-Himalayas – Regional report for Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan.* Kathmandu: ICIMOD



**Legend**

- Glac
- Basi
- HKH

# Who (and where) are the vulnerable? Effective targeting

- Mountain, coastal, island communities
- The poor and the marginalised..women, elderly, children...



Generalisations....

Governments require tangible and accurate information for action.....

# Serving the eight countries of the Hindu Kush Himalayas (5 LDCs)

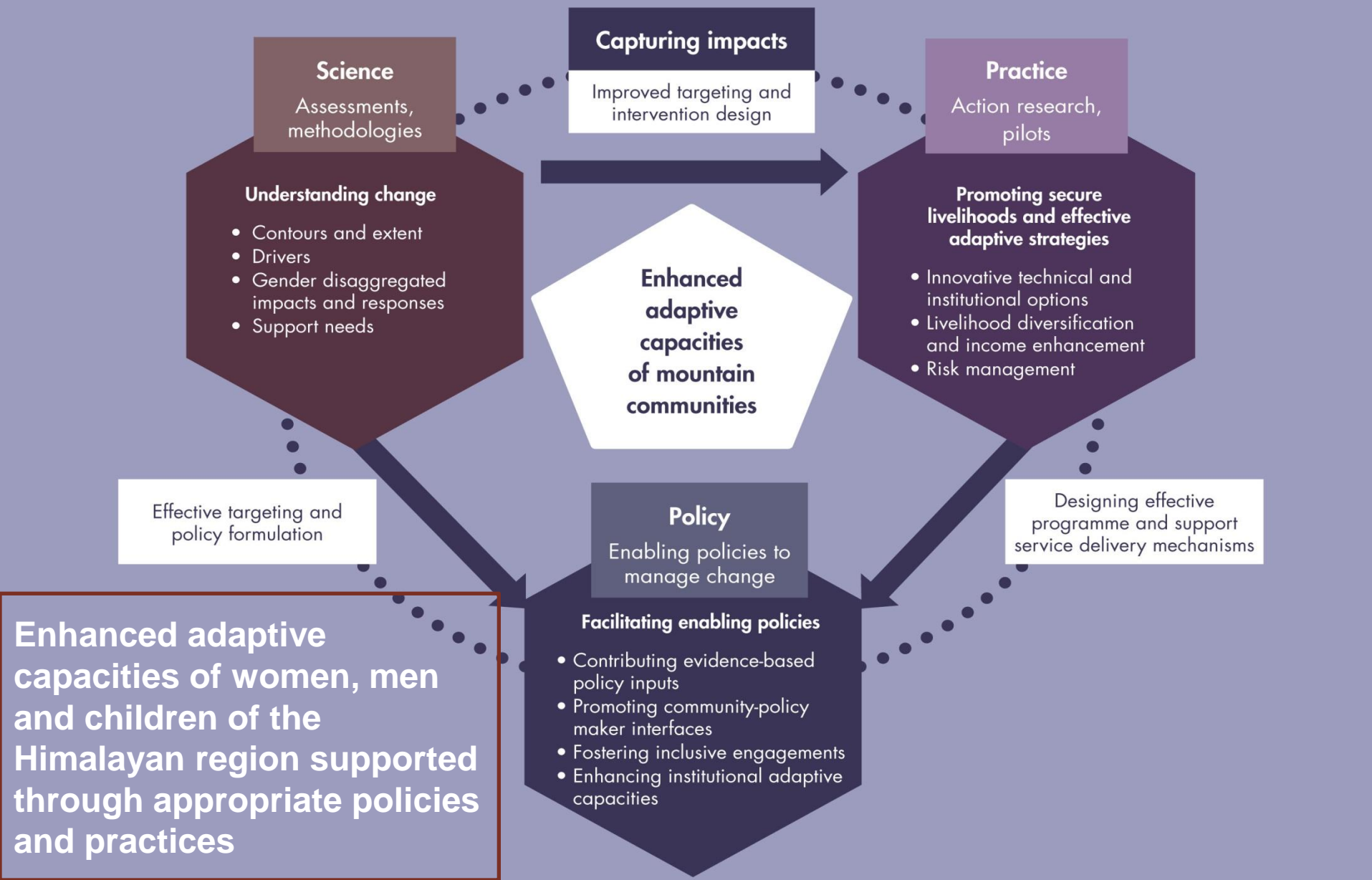
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Regional Inter-governmental Learning and Knowledge Centre



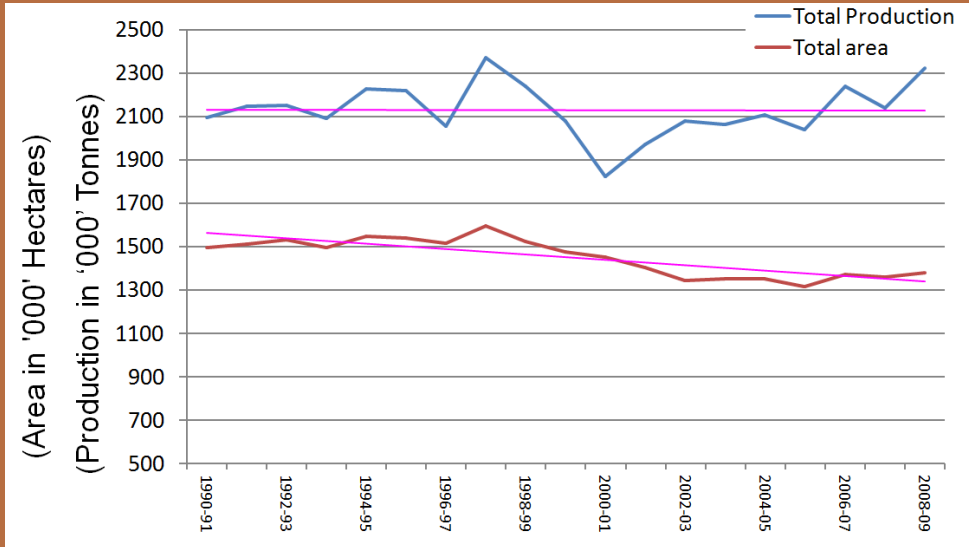


# Regional Programme on Adaptation to Change

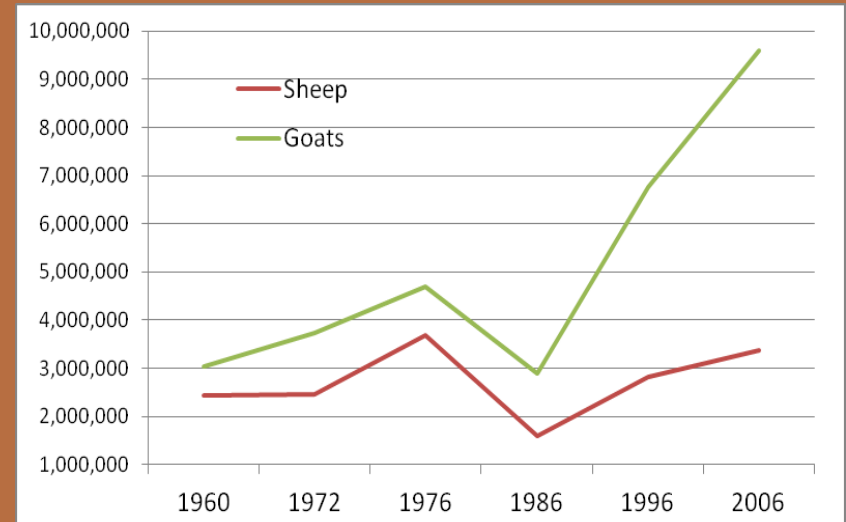


# Quantitative Approaches: Agro-pastoral trends in Upper Indus Basin

Decreasing agriculture area



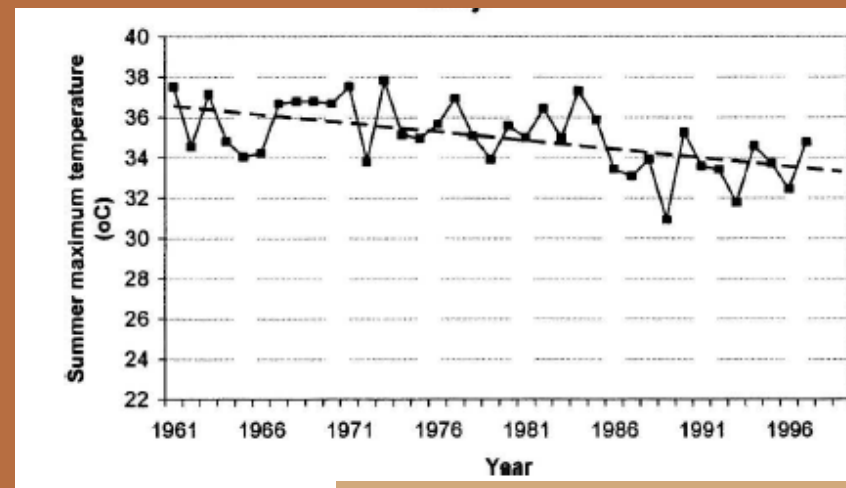
Increasing livestock



GDP contribution (%age)

	1990-91	1995-96	2002-3
<i>Over all agro-ecosystem</i>	23.6	21.8	20.6
major crops	8.4	6.6	4.7
minor crops	3.7	3.3	1.8
<b>livestock</b>	<b>10.8</b>	<b>11.5</b>	<b>12.5</b>

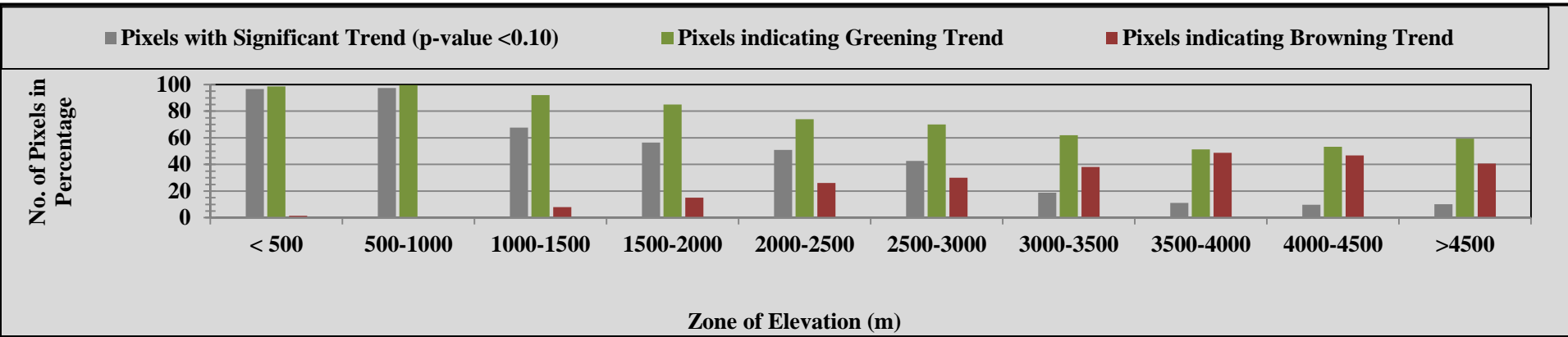
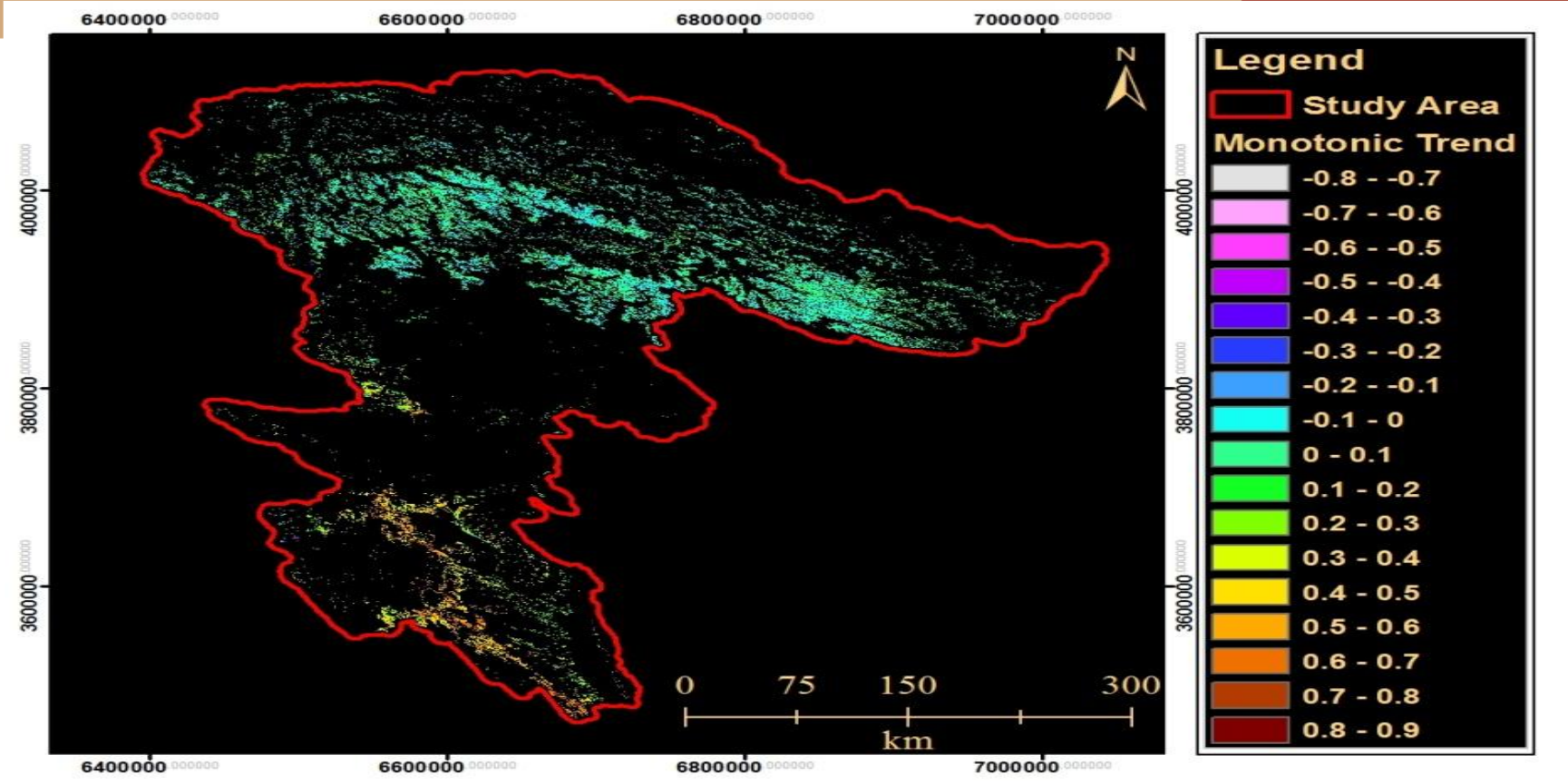
Anomalous climate trends



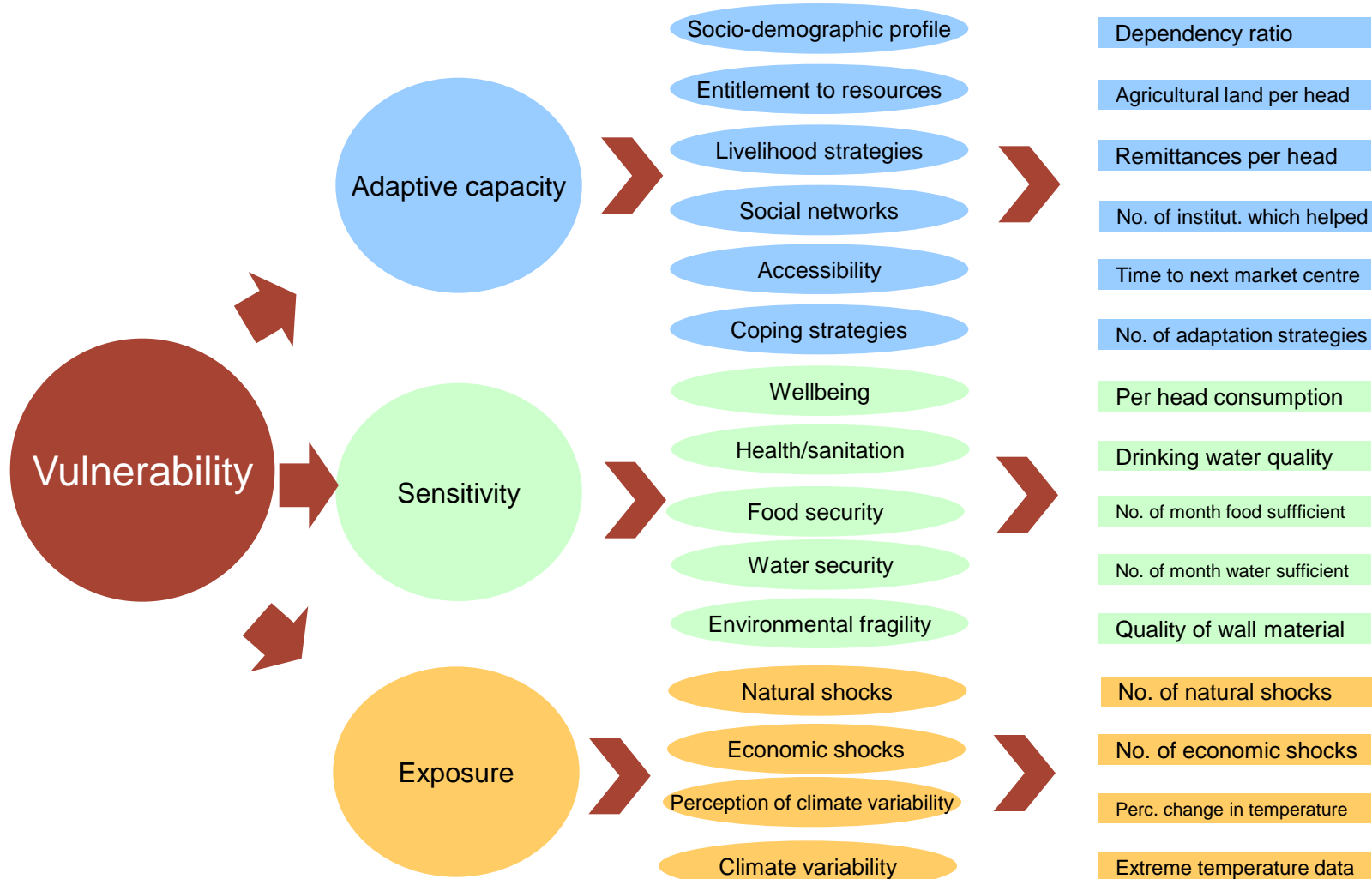
(Source: KPK Census data)

(Fowler & Archer 2005)

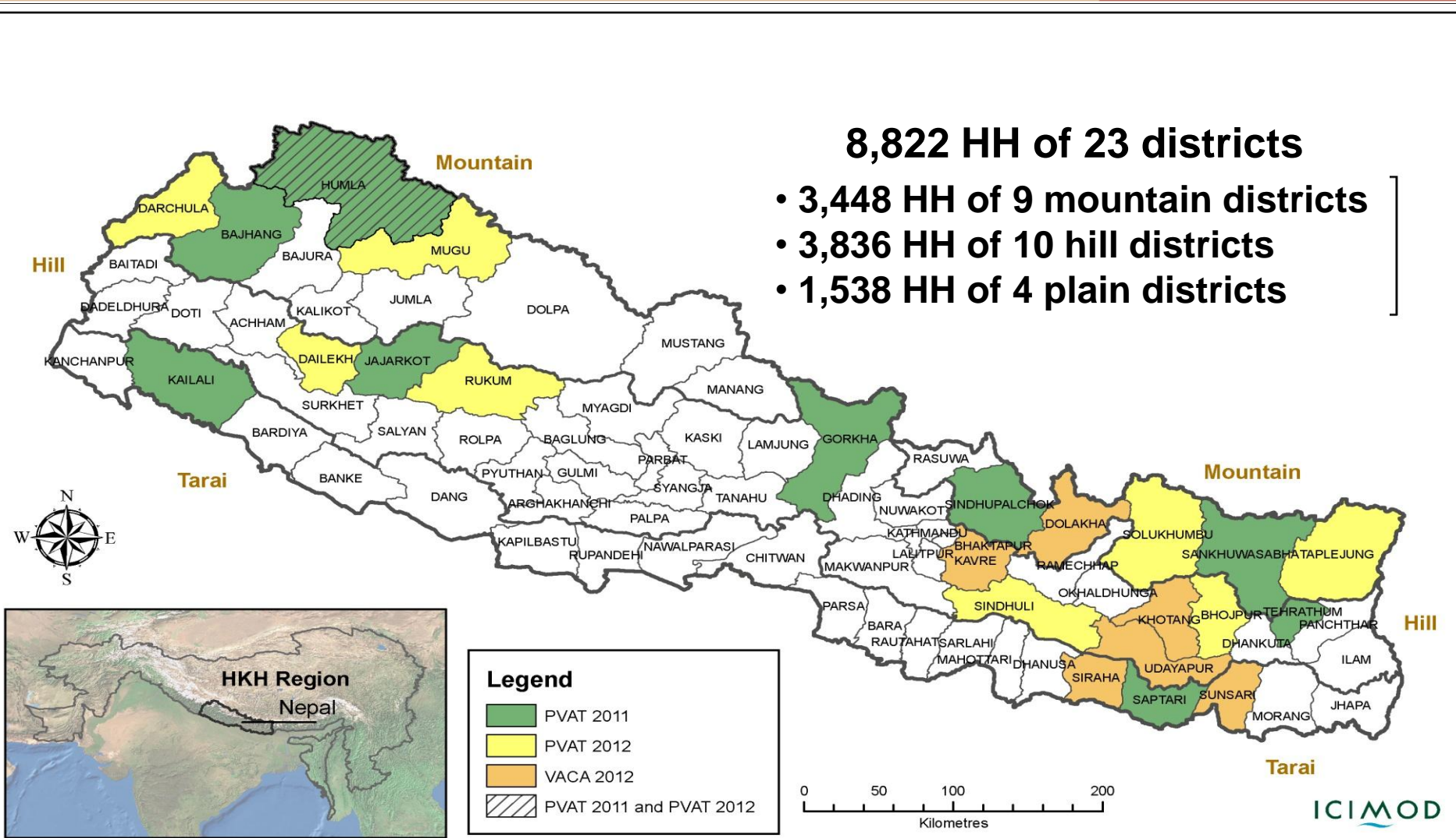
# Greening / Browning of rangelands – challenges...and opportunities?



# Quantitative approaches: PVA Operationalization of Vulnerability

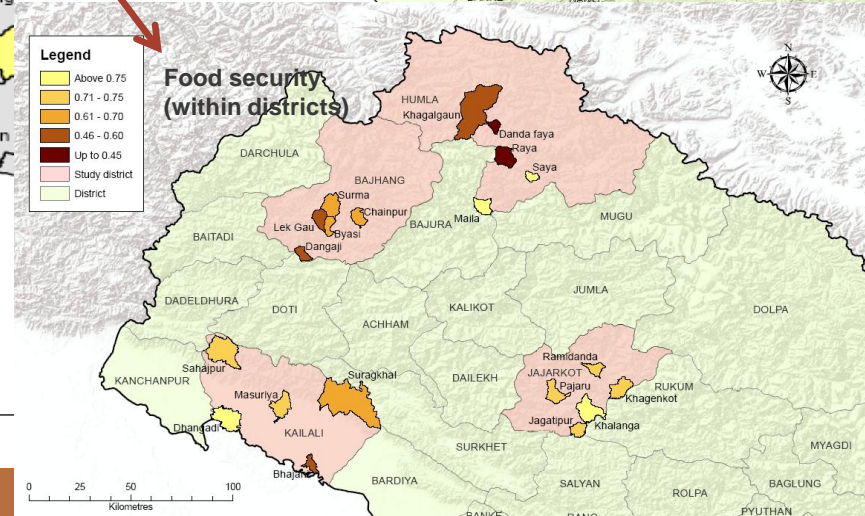
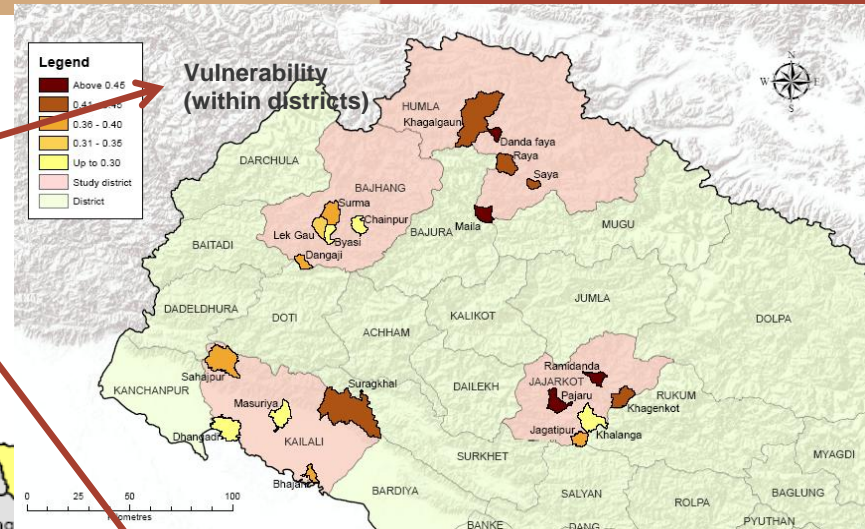
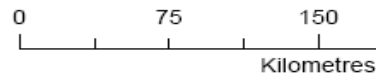
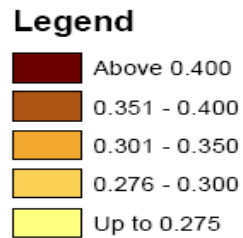
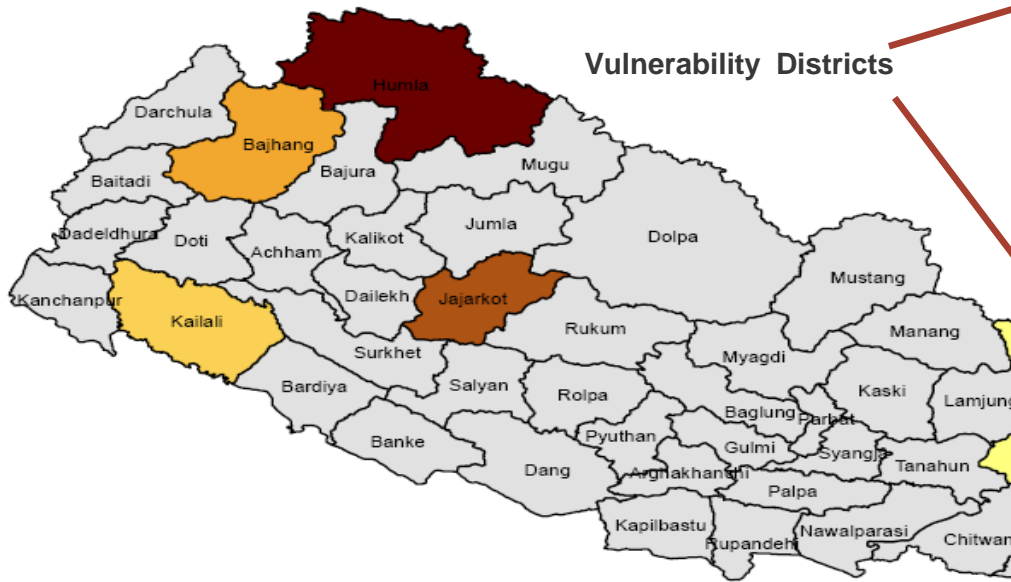


# Nepal: Surveyed Districts & Sample size (IFAD, MFA-Norway)



# System to delineate pockets of poverty & vulnerability : Improving targeting & shaping adaptation & development interventions

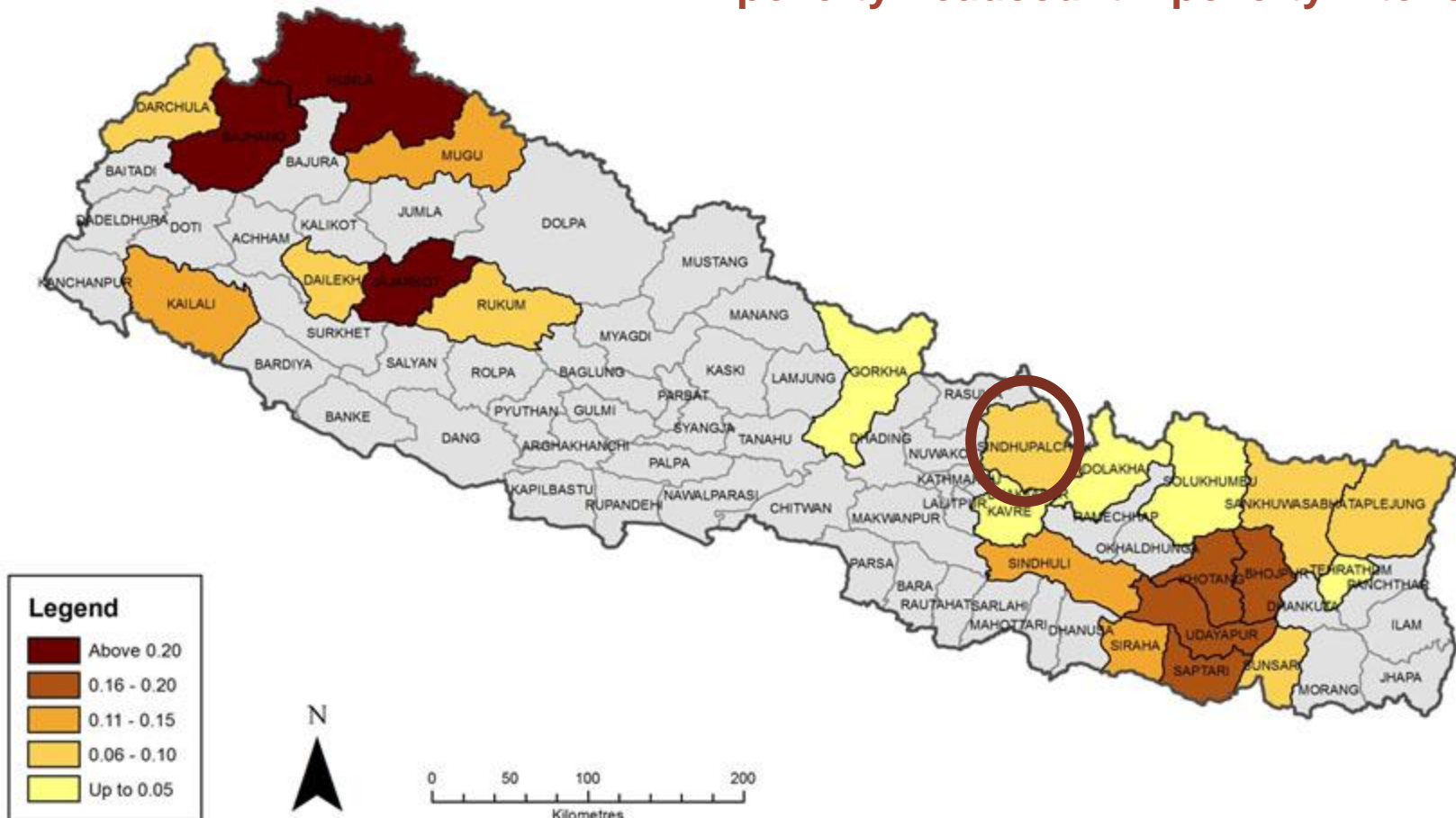
**Nepal - 9 districts: 4 mtns; 3 hills; 2 terai; 3600 households**



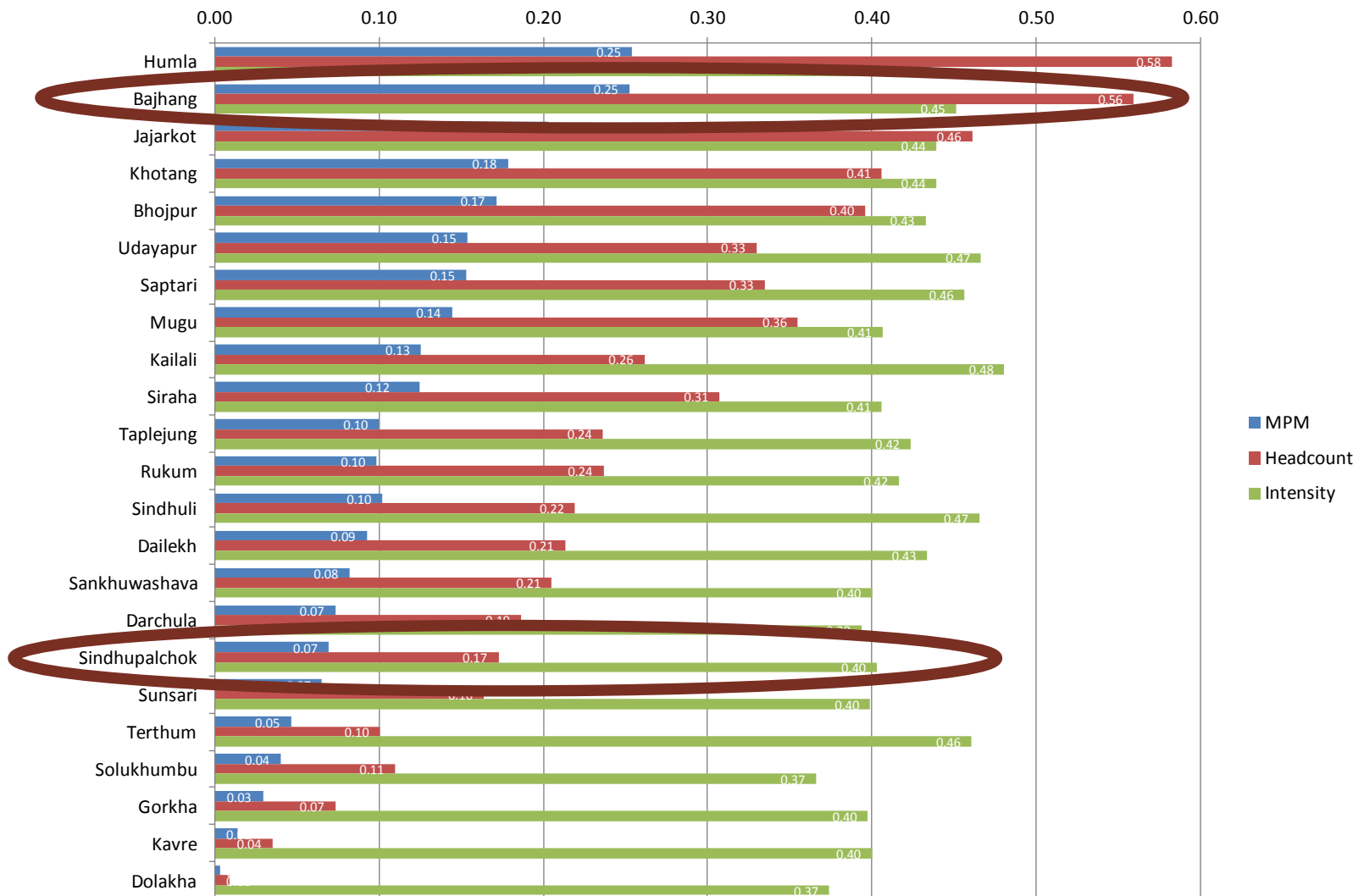
**Multiple dimensions for determining pockets of poverty and vulnerability**

# Mainstreaming Adaptation into Development: Linking vulnerability to Multi-dimensional Poverty Measures

**MPM = poverty headcount x poverty intensity**



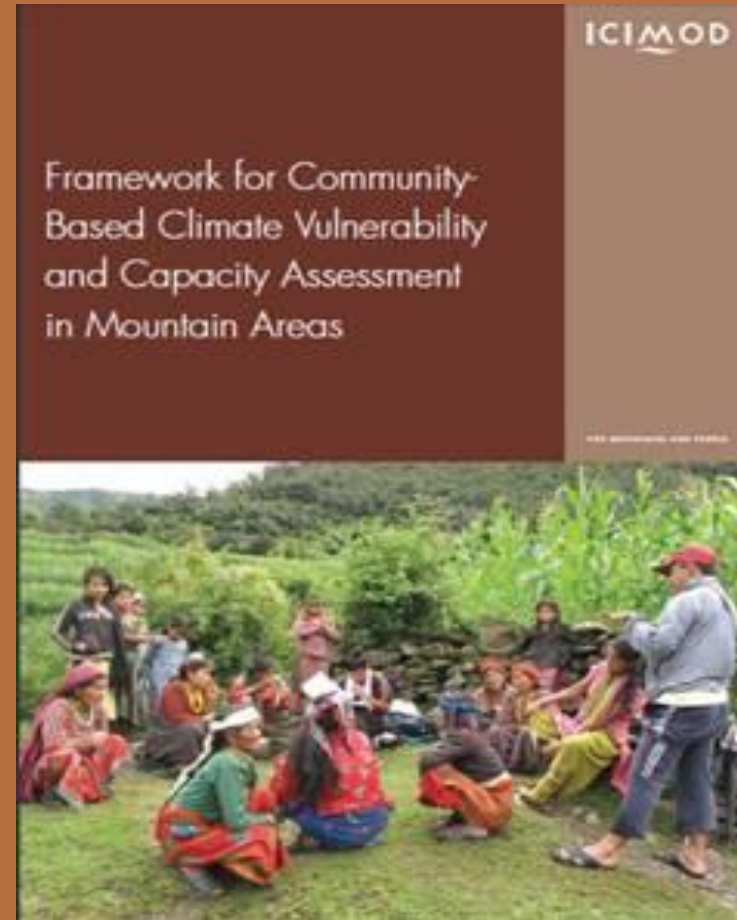
# Understanding Multi-dimensionality: Characteristics & Attributes..... Towards better targeting & effective mainstreaming



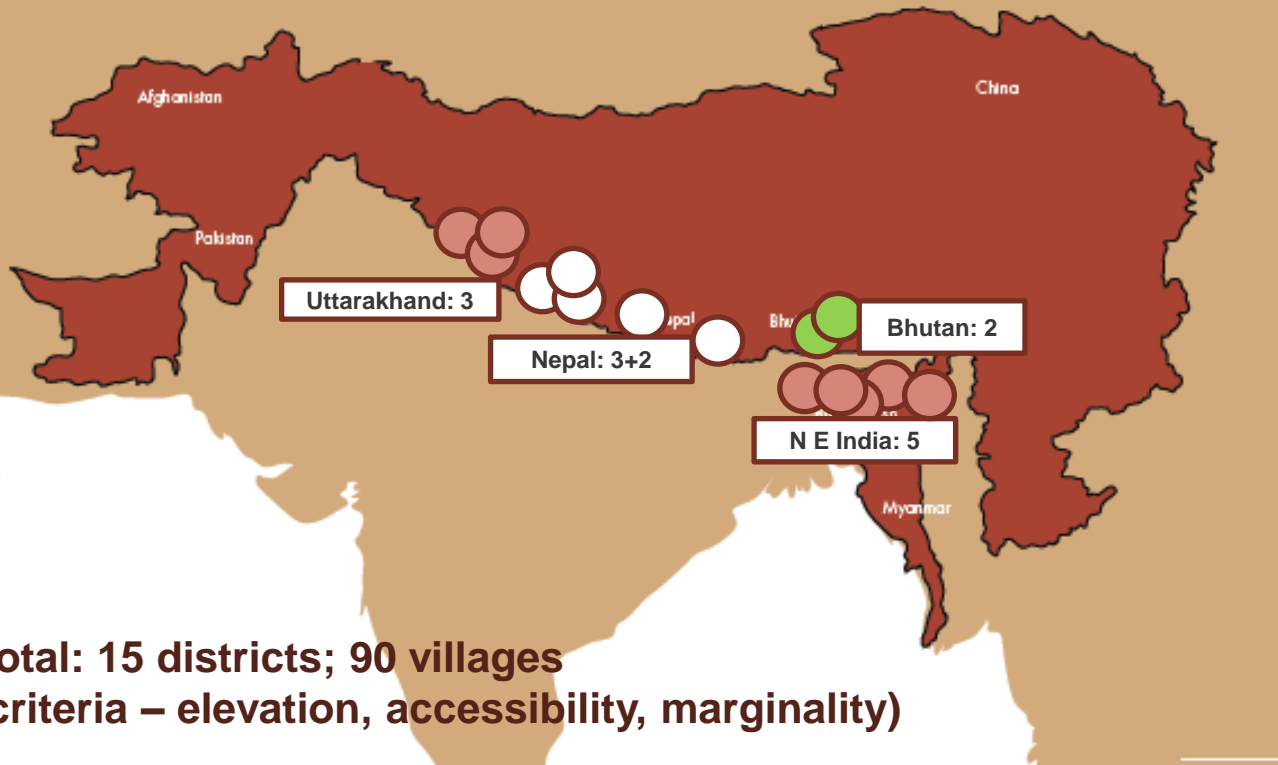


# Reality Checks: Assessing Community Needs and Capacities (Qualitative)

- Participatory assessments of vulnerability and local adaptive capacities – PRA approach (with subsequent quantifications)
  - Community perceptions on change
  - Impacts of change, community responses to overcome change
  - Identify community concerns, areas for institutional support



# Participatory assessments....(where and with whom)



## Survey districts

**Bhutan**  
*Pemagatshel*  
*Trashigang*

**India**  
*Uttarakhand*  
*Almora*  
*Bageshwar*  
*Tehri*

**NE India**  
*W Garo Hills*  
*E Garo Hills*  
*Ri Bhoi*  
*Karbi Anglong*  
*Ukhrul*

**Nepal**  
*(Mid-west)*  
*Humla*  
*Bajhang*  
*Dailekh*  
*(West & East)*  
*Tanahu*  
*Terathum*

**Total: 15 districts; 90 villages**  
**(criteria – elevation, accessibility, marginality)**

**Elevation range: 50-3,500 m**

**6 IFAD Projects:**

**Bhutan: AMEPP**

**India: Aajeevika, MRDS & NERCORMP**

**Nepal: WUPAP & LFLP**

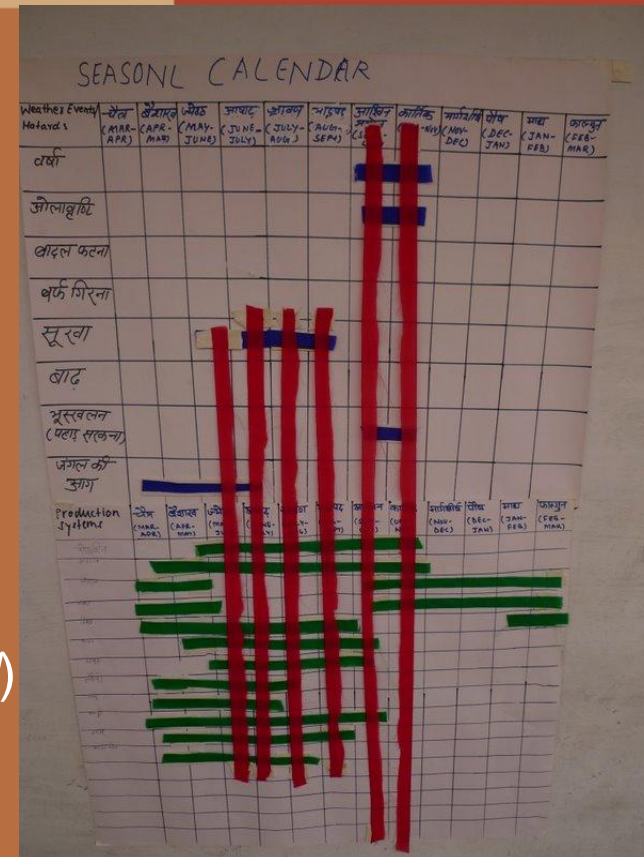
# Participatory assessments: Approach and methodology

## Approach: *Participatory Rural Appraisal*

- *Based on Community based Vulnerability and Capacity Assessment Framework*

## Methodology: *PRA Toolkit*

- *Weather perceptions (Seasonality, duration, change)*
- *Hazard Ranking (Weather & weather induced)*
- *Seasonal Dependency (Support systems, Resource diversity & availability)*
- *Seasonal Calendar (Seasonal activities)*
- *Venn diagram (Institutional dependency)*



*Participatory interpretation of PRA results :  
Impacts, coping/adaptive mechanisms*

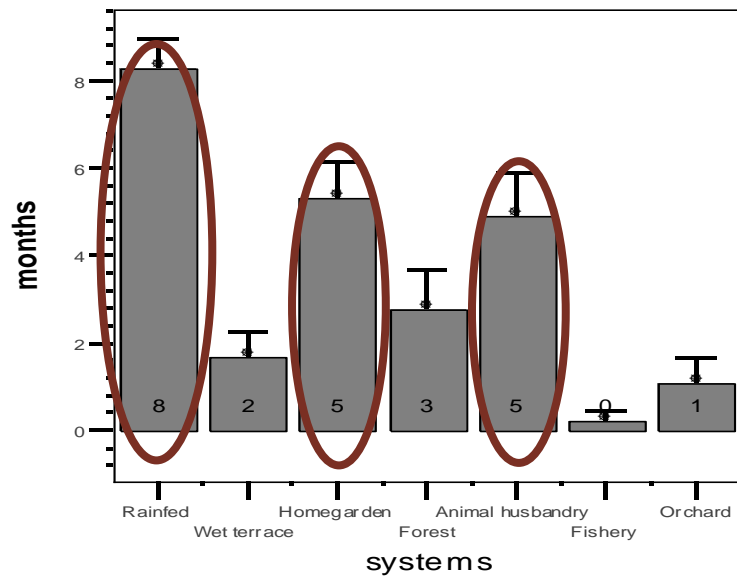
# Identifying vulnerable communities: Sensitivity to exposures (% villages reporting high hazards)

Exposure	Uttarakhand			Nepal					Bhutan		NE India				
	Tehri	Bageshwar	Almora	Bajhang	Humla	Dailekh	Tanahu	Terhathum	Pemagatshel	Yangtse	West Garo Hills	East Garo Hills	Ri-Bhoi	Karbi Anglong	Ukhrul
Hot	***	**	**				*				*	**	***	***	**
Rain		*							*	**	**		**	**	***
Dry	***	***	**	***	***	***	***	***		**	**	***	***	***	***
Hail						**	*	*	*	**	*		***		
Storm						***	*	*	***	**	*		***		
Pest	***	**		*		***		**			***	***	***	**	
S/E	3/3	1/4	0/2	1/2	1/1	3/4	1/4	1/4	1/3	0/4	1/6	2/3	5/6	2/4	2/3

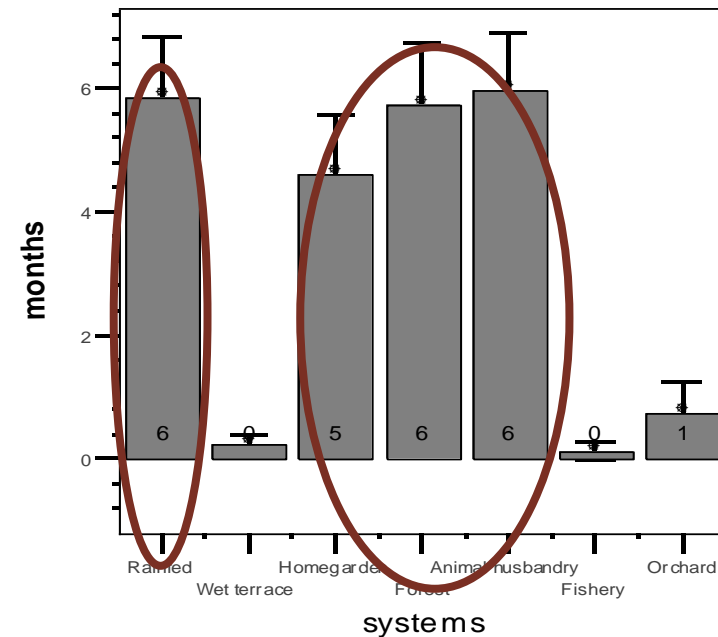
Notations: \* <33%, \*\* 33-66%, \*\*\*>66% of surveyed villages (= indicates degree of sensitivity to the exposure)

# Reality Check: Adaptive Capacities... Support Systems for food & income (dependencies)

Food resource availability (months)



Income resources availability (months)



**Rainfed agriculture, homegardens, animal husbandry & forests critical support systems for rural communities in the mountains,  
despite the strong policy focus on irrigated systems and plantations.**

# Rainfed systems: Food & Income Availability

## Duration of food resource availability:

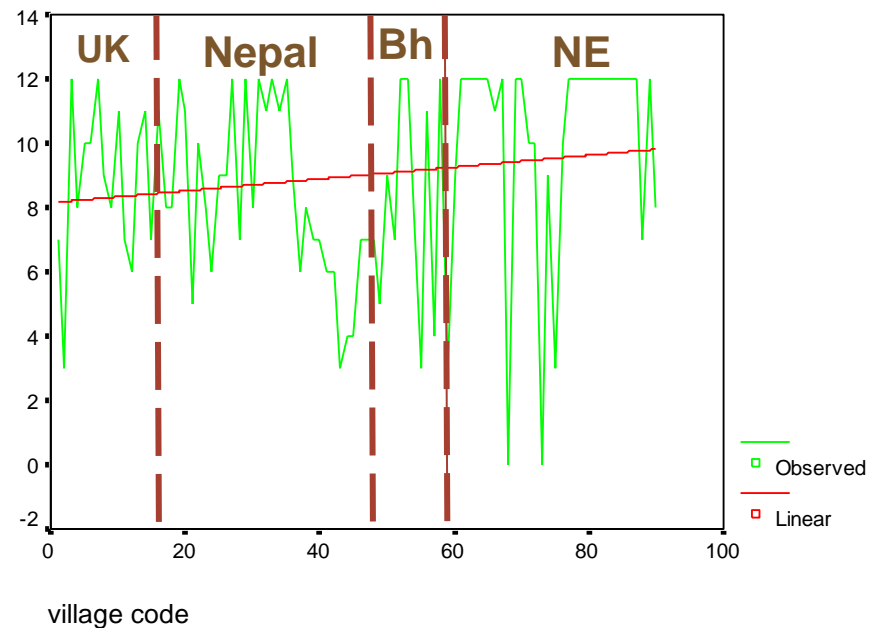
Duration of food resource availability shows inter-village variations

Trends suggest longer duration of resource availability in eastern locations

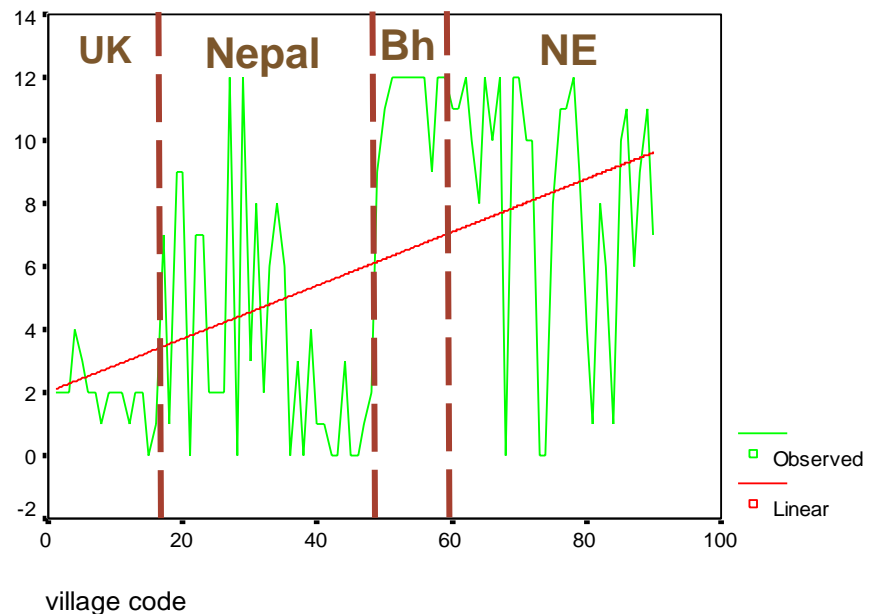
## Duration of income resources availability:

Duration of income resource availability significantly longer in eastern locations, despite inter-village variations; very limited duration in Uttarakhand

duration(months) of food- rainfed agri



duration(months) of income- rainfed agri



# Understanding capacities: Adaptive responses (anticipatory, preventive, long-term measures)

Responses			% of villages in locations				
			Uttarakhand	Nepal	Bhutan	NE India	
Adaptive	Maturation (Duration)	Early (short)	6	3			
		Late (long)	6				
	Varietal replacement	new	28	3	17	11	
		Resistant (traditional)		3	50	23	
	crop replacement	food crop	22	27		22	
		cash crop	39	10		6	
	Shifts	system	Livestock			8	
			agriculture				6
		resource	forest resources		3		6
			Livestock				6
			Agriculture diversification	17	13	17	6
			Occupation (migration)	17			

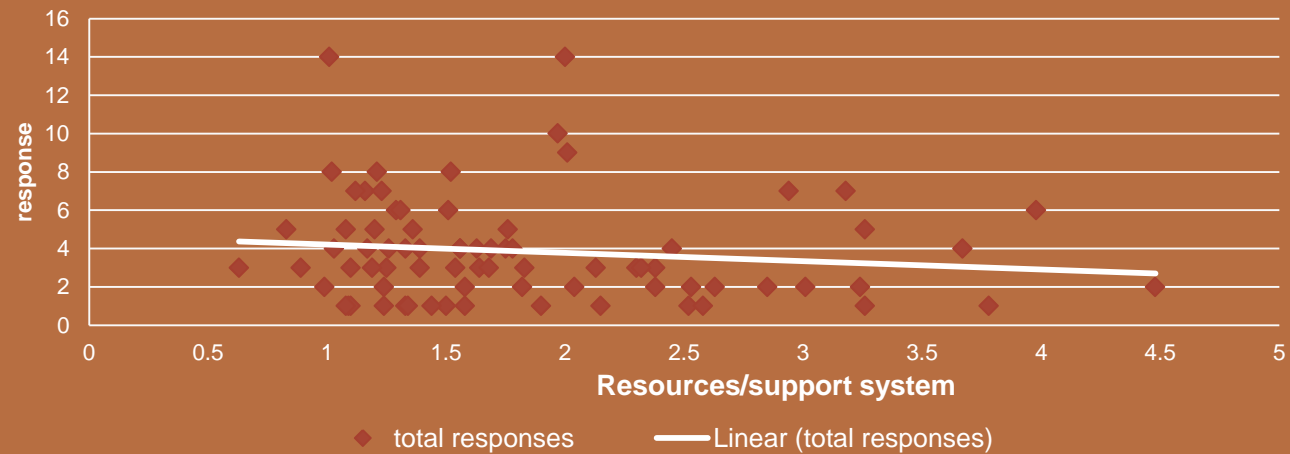
# Assessing adaptive capacities: Correlating responses with resource & support system diversity

More diverse the  
'portfolios' – more  
effective the risk  
management

*High diversity  
increases  
resilience*

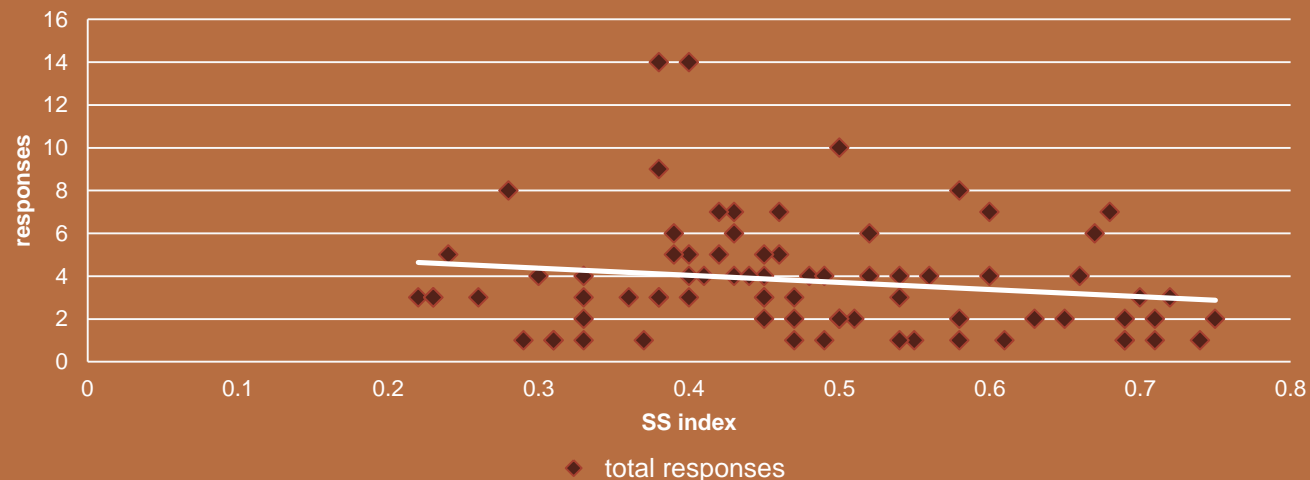
Correlating response with resource base

$$y = -0.4349x + 4.6517$$
$$R^2 = 0.0166$$



Correlating SS index with responses

$$y = -3.3358x + 5.3804$$
$$R^2 = 0.0288$$





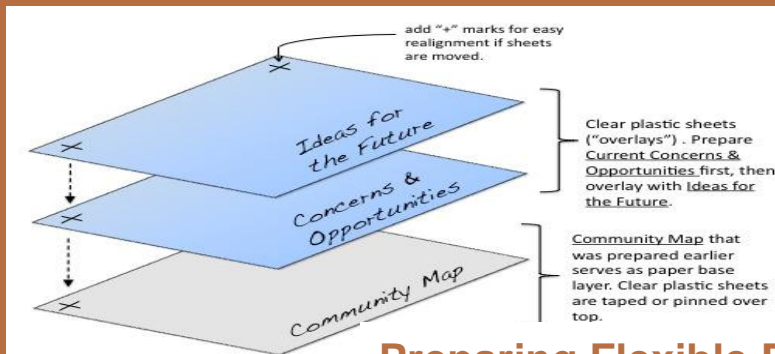
# Participatory Flexible Planning: Envisioning Future Risks to enhance adaptive capacity and resilience of rural communities



Community Risk Mapping

Preparing communities to monitor rainfall and temperature

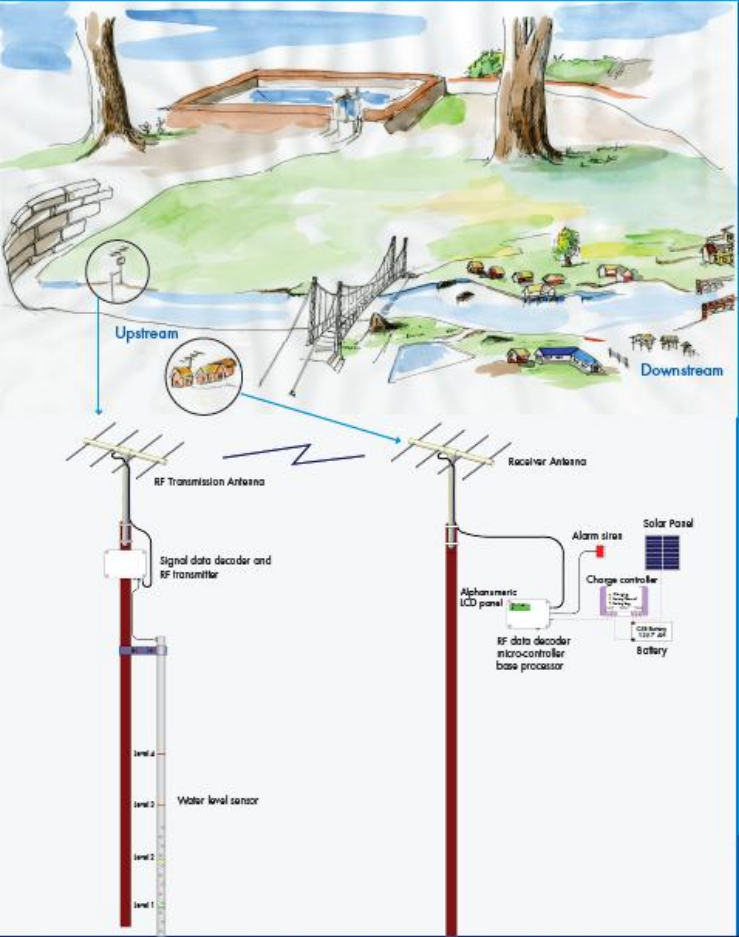
Envisioning the future: Close your eyes.... and wake up in the year 2033



Preparing Flexible Flood Map

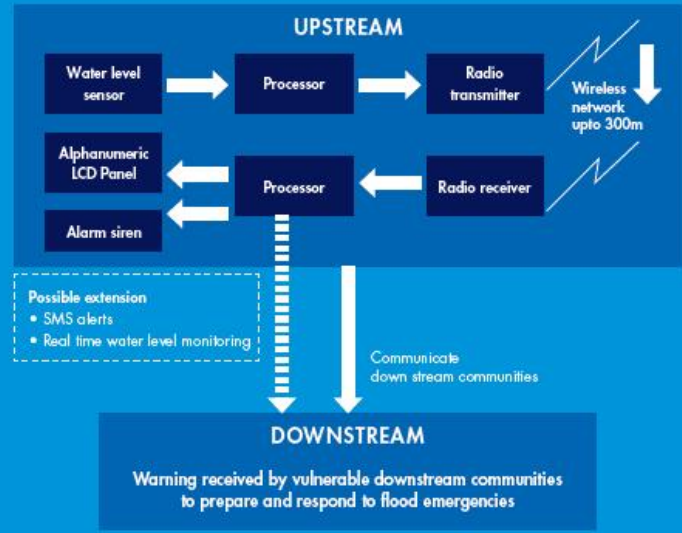
# Disaster Risk Reduction: Preparedness and capacity enhancement of communities

## Community-Based Flood Early Warning System



### Community-Based Flood Early Warning System (FEWS)

A community-Based FEWS is an integrated system of tools and plans that are prepared and managed by the communities to detect and respond to flood emergencies. The flood signal is transmitted to the receiver using wireless technology and communicated to all those at risk in vulnerable downstream communities. A properly designed and implemented system can save lives and reduce property damage by increasing the time to prepare and respond to the threat of flood.



Manufactured by: Sustainable Eco-Engineering, Patan (Mahendra M Shukya, 9849406171) with design and guidance from ICIMOD  
 Supported by: Himalayan Climate Change Adaptation Programme (HICAP), funded by Norway, for installation in flood prone sites in Assam and Arunachal Pradesh of the Eastern Brahmaputra sub-basin, India



# Building capacities to manage risks: Flood Preparedness - Early Warning Systems

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- Participatory early warning system
- WiFi link for relay warning downstream – communities, DRR system
- Complimented with Flexible Planning for enhancing adaptation to flood-related hazard management



# Institutional dependencies

Institutions					Uttarakhand	Nepal	Bhutan	NE India
Civic	Informal	Social groups	Individual	W	**	**	*	***
				O		*		*
				W	**			***
		Kinship		O				
				W				*
				O				
	Peer group		W					
			O					
			W			*	***	
	Customary	Traditional		O				*
				W				***
	Formal	Affinity group		W	**	***		***
			O	**	*		*	
			W	**	**		*	
NGO/Donors			O	**	***		***	
			W			**	*	
			O			*	*	
Religious body		W				**	*	
		O				*	*	
Public	Government		W		***	***	*	
			O	***	***	***	***	
	Statutory		W	***	***		**	
			O		***		*	
Private	Financial		W		*			
			O	***	*	***	*	
	Market		W	*	**	*	*	
			O		*		*	

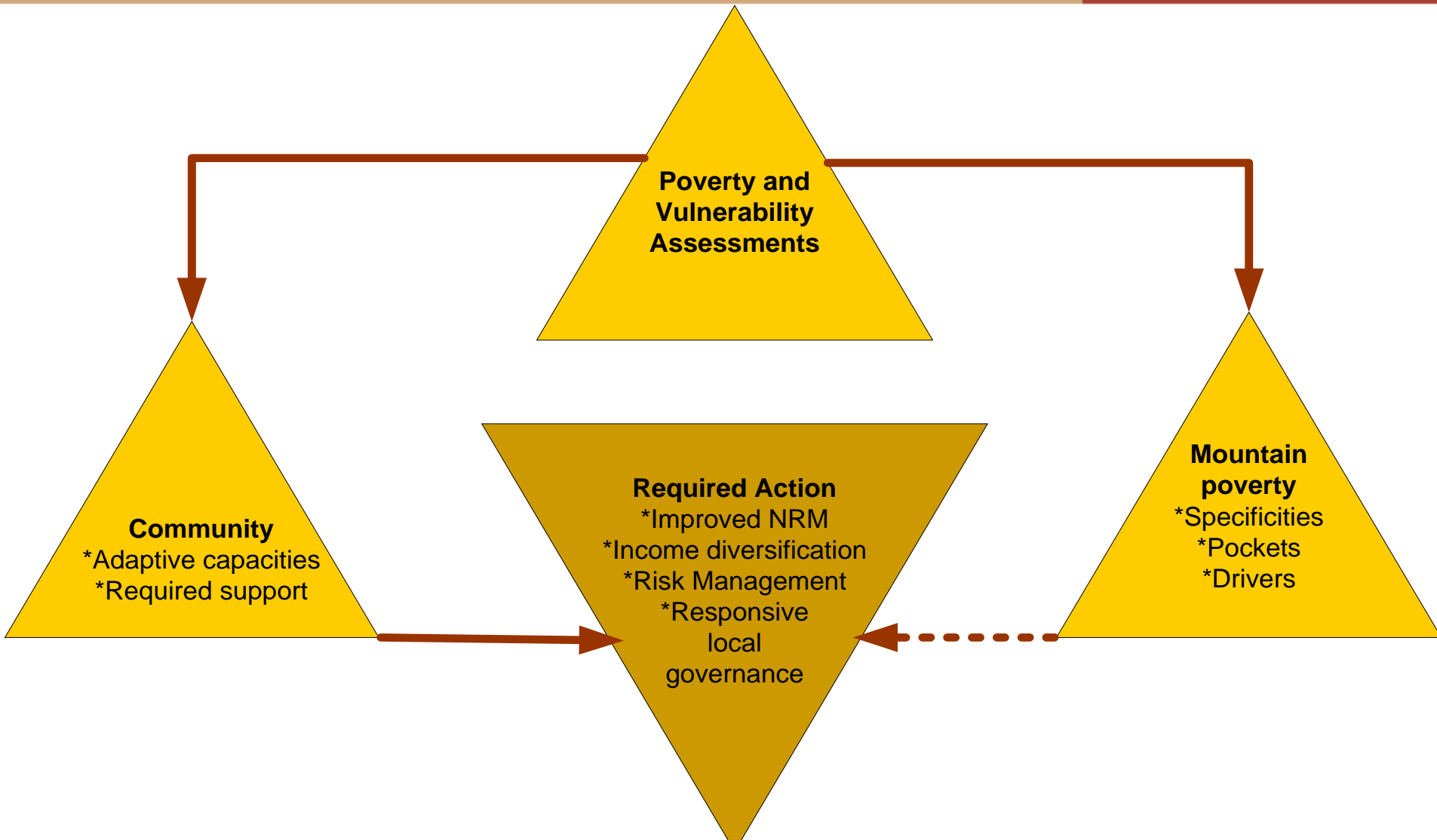
Notation : \* < 33%, \*\* 33-66%, \*\*\* > 66% of villages, W-within village, O-Outside village

# Community dependency on institutions: purposes & accessibility

Purposes	Locations	Institutions				
		Civic		Public	Private	
		Informal		Formal		
		Social groups	Customary			
Basic needs	Uttarakhand	**			**	*
	Nepal	*		*	*	**
	Bhutan				***	*
	NE India	**	*	*	*	*
Access to resources	Uttarakhand			**		**
	Nepal	*		**		*
	Bhutan	*			*	**
	NE India	*	*	**		*
Support services	Uttarakhand			**	**	
	Nepal			**	**	*
	Bhutan		*		***	
	NE India		*	**	**	*
Social capital/ support	Uttarakhand	**		**		
	Nepal			*	***	
	Bhutan	*		**	**	
	NE India	*	*	**	*	

Notations: \* <33% , \*\* 33-66% , \*\*\* >66% of villages

# Knowledge to Practice: Shaping interventions (mainstreaming adaptation into development)



# Towards a more inclusive adaptation plan formulation process: The Adaptation Learning Highway

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