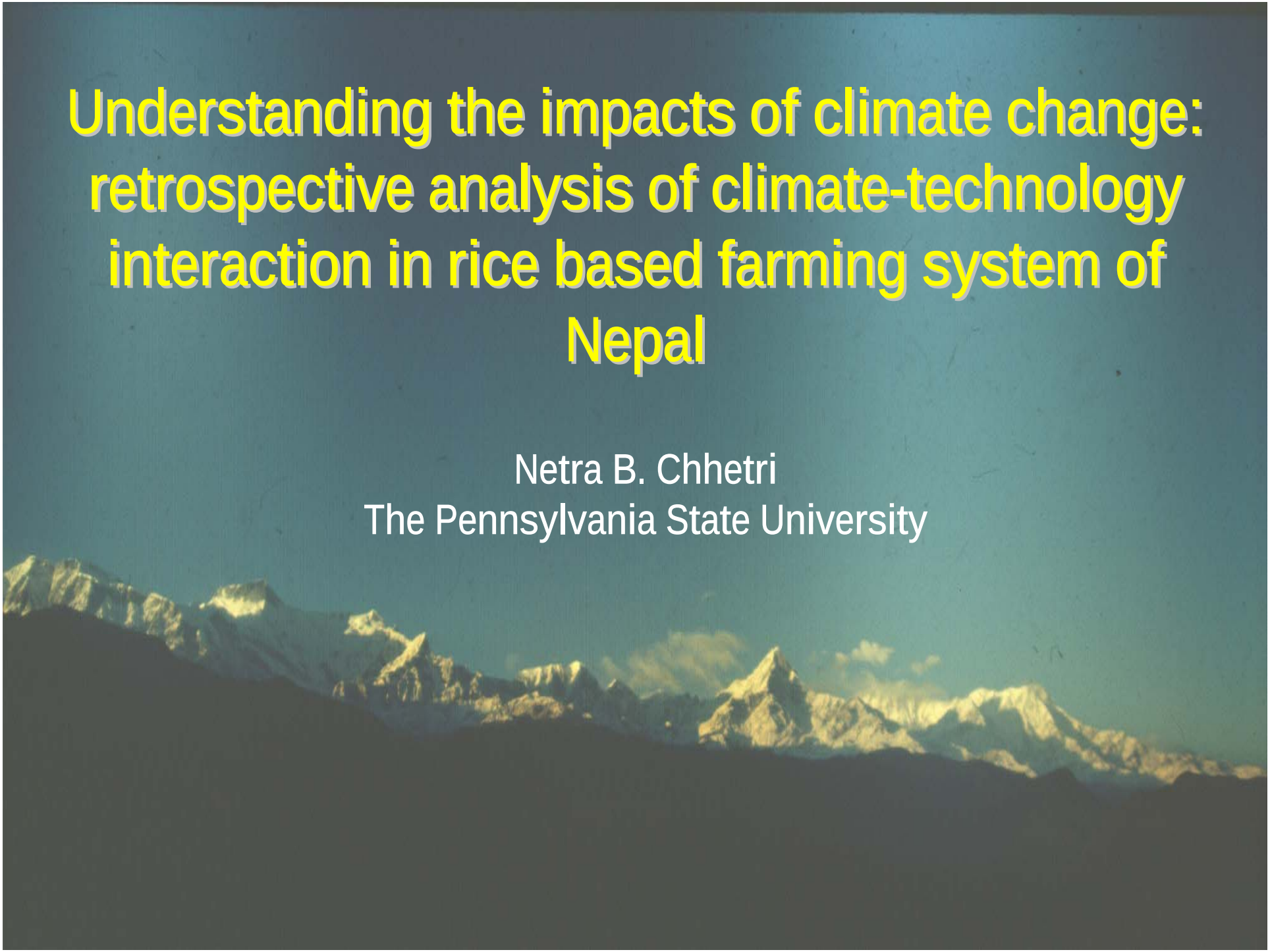


Understanding the impacts of climate change: retrospective analysis of climate-technology interaction in rice based farming system of Nepal

Netra B. Chhetri
The Pennsylvania State University

Outline

- Broader question
- Problem
- Objectives
- Framework
- Justification for choice of Nepal
- Results
- Conclusion

Broader questions

- What are the prospects of adapting agricultural systems to changing climate in developing countries?
- What technological and institutional capabilities exist to respond to climatic variability and change?
- Can the efforts of past to put in place a national agricultural research system be a reasonable guide for adaptation to climate change?

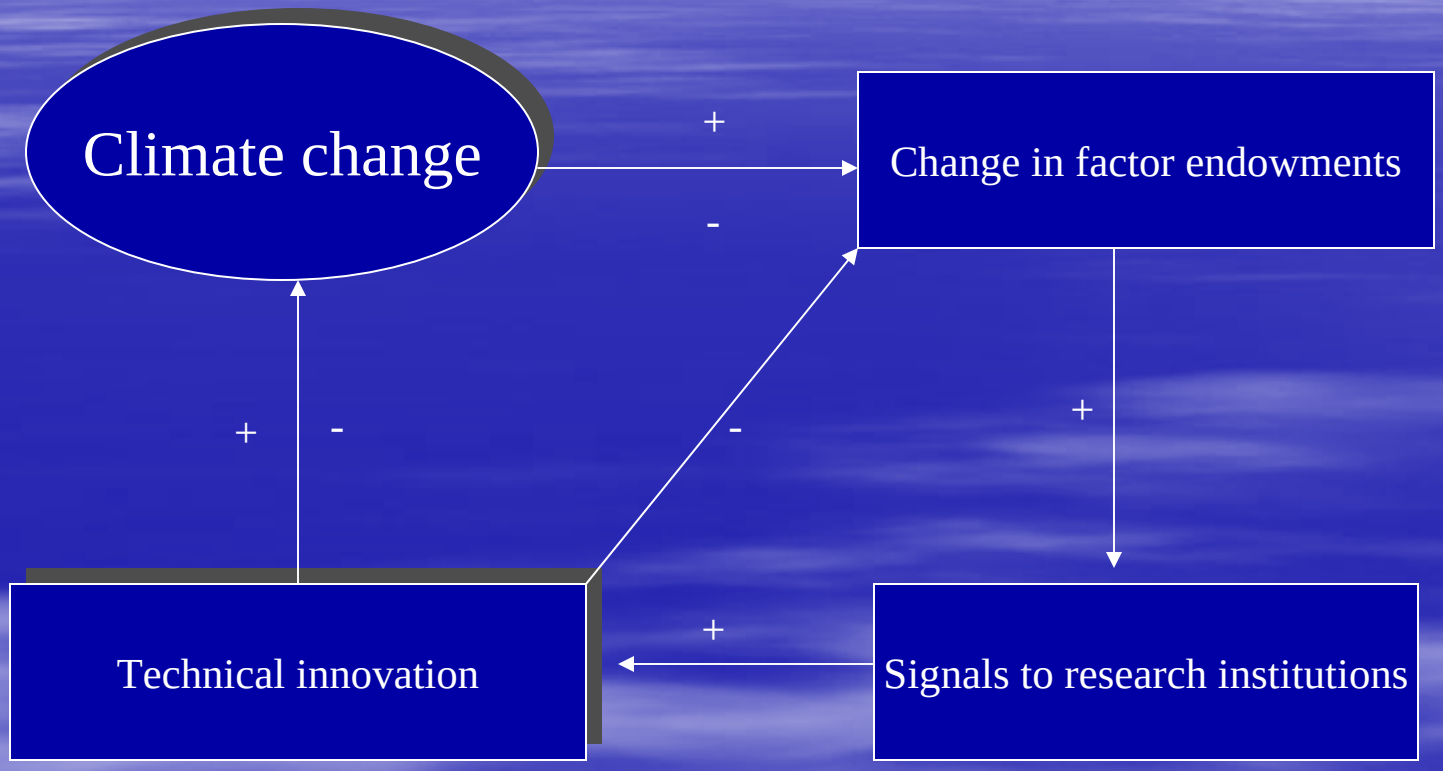
Problem

- Disconnect between accepted notion that technologies are the best strategies for agricultural adaptation to CC and research that incorporates climate-technology interaction.

Objectives

- Develop a conceptual framework that explicitly incorporates role of climatic resource;
- Understand how historically farmers and research institutions have used technologies to address climatic constraints; and,
- Study effect of climate variability in the inducement of technologies as a foundation for understanding potential agricultural adaptation to climate change.

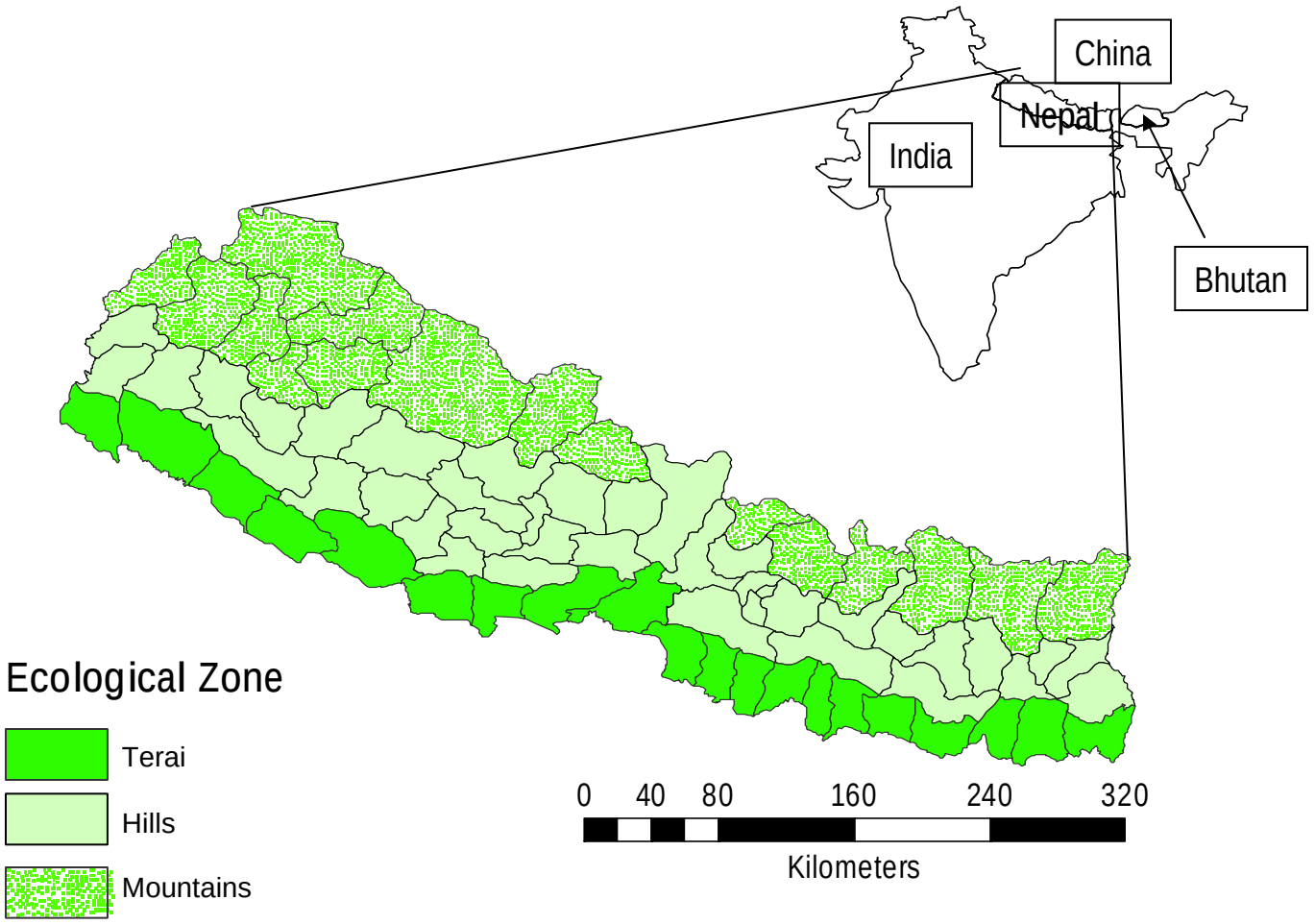
Framework



+ = positive effect

- = negative effect

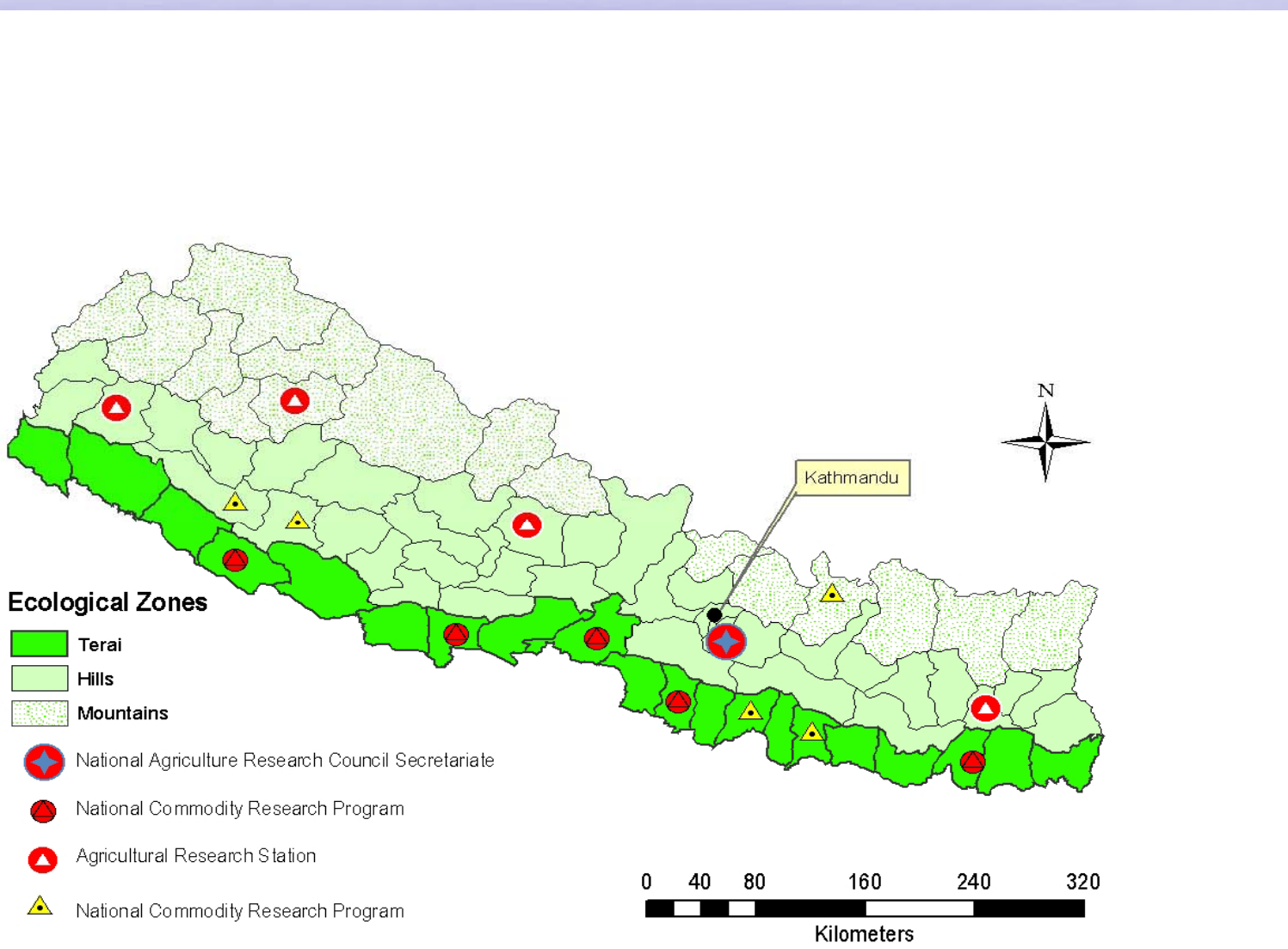
Nepal's three ecological zones



Biophysical factor: slope gradient

Higher the gradient the less likely that farmers will invest on technologies

Nepal's agricultural research centers

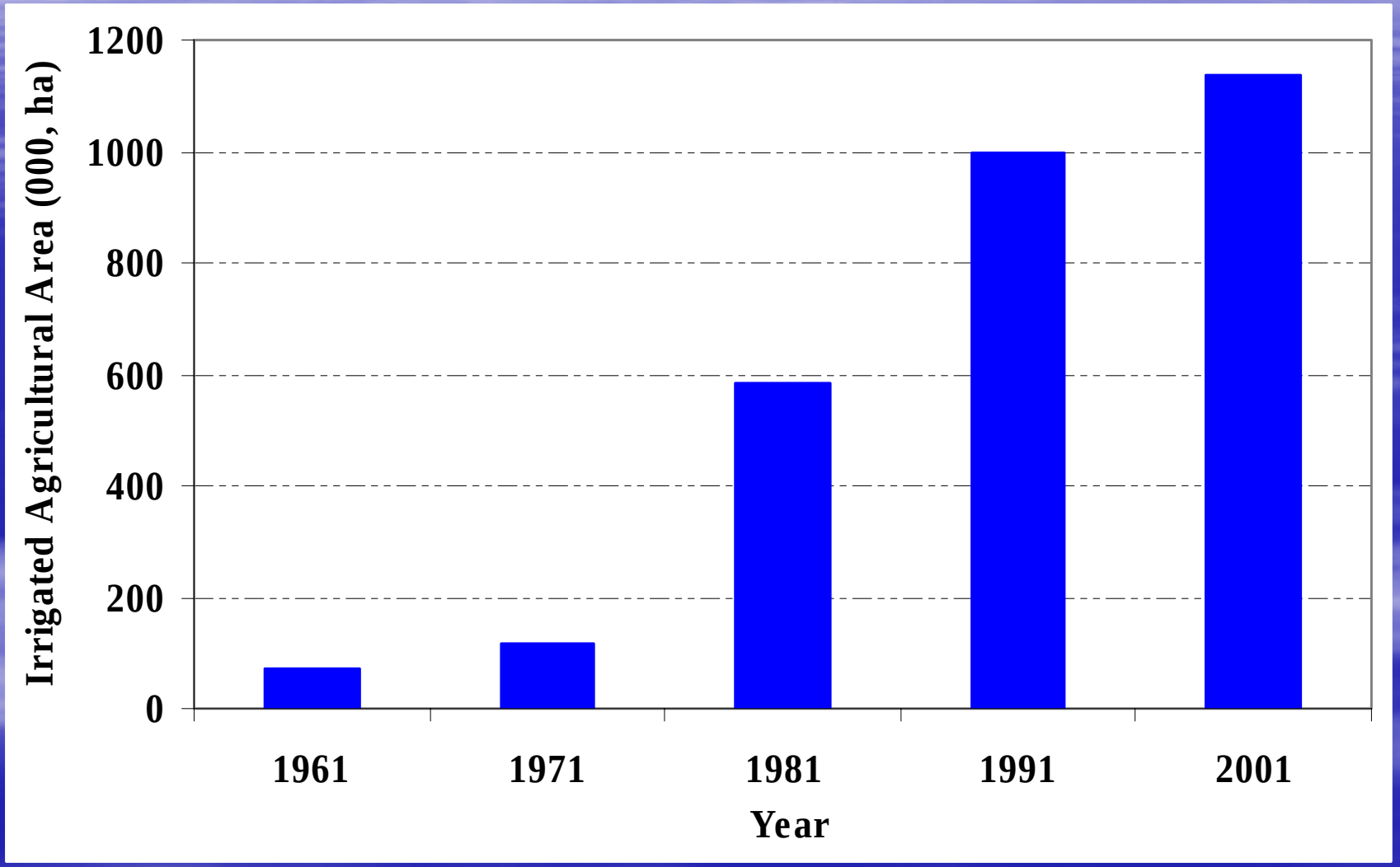


HYVs of rice released in the last 35 year

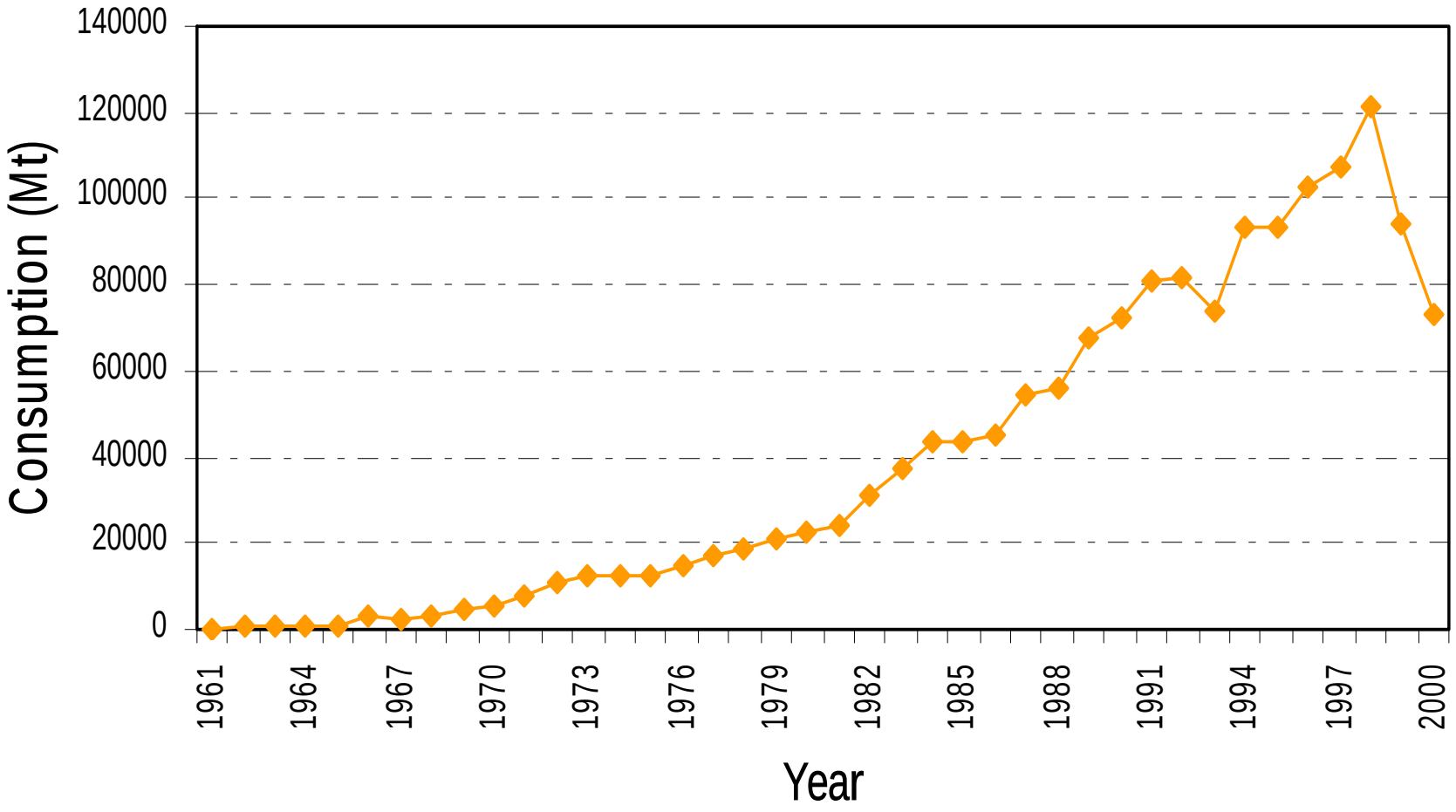
Recommended region	No.	Characteristics	Yield (Mt)
Irrigated	10	Early maturing	3.5-4.8
Mid hills	12	Early to mid maturity	3.5-4.9
Terai	6	Medium maturity	4.0-4.5
Rainfed - hills	5	Medium maturity	4.5-5.6
Rainfed - terai	5	Medium maturity	3.2-4.5
Rainfed - valleys	2	Medium maturity	5.0-5.5
Rainfed - high hills	4	Cold tolerant	4.2-5.0

HYVs tested in farmers field

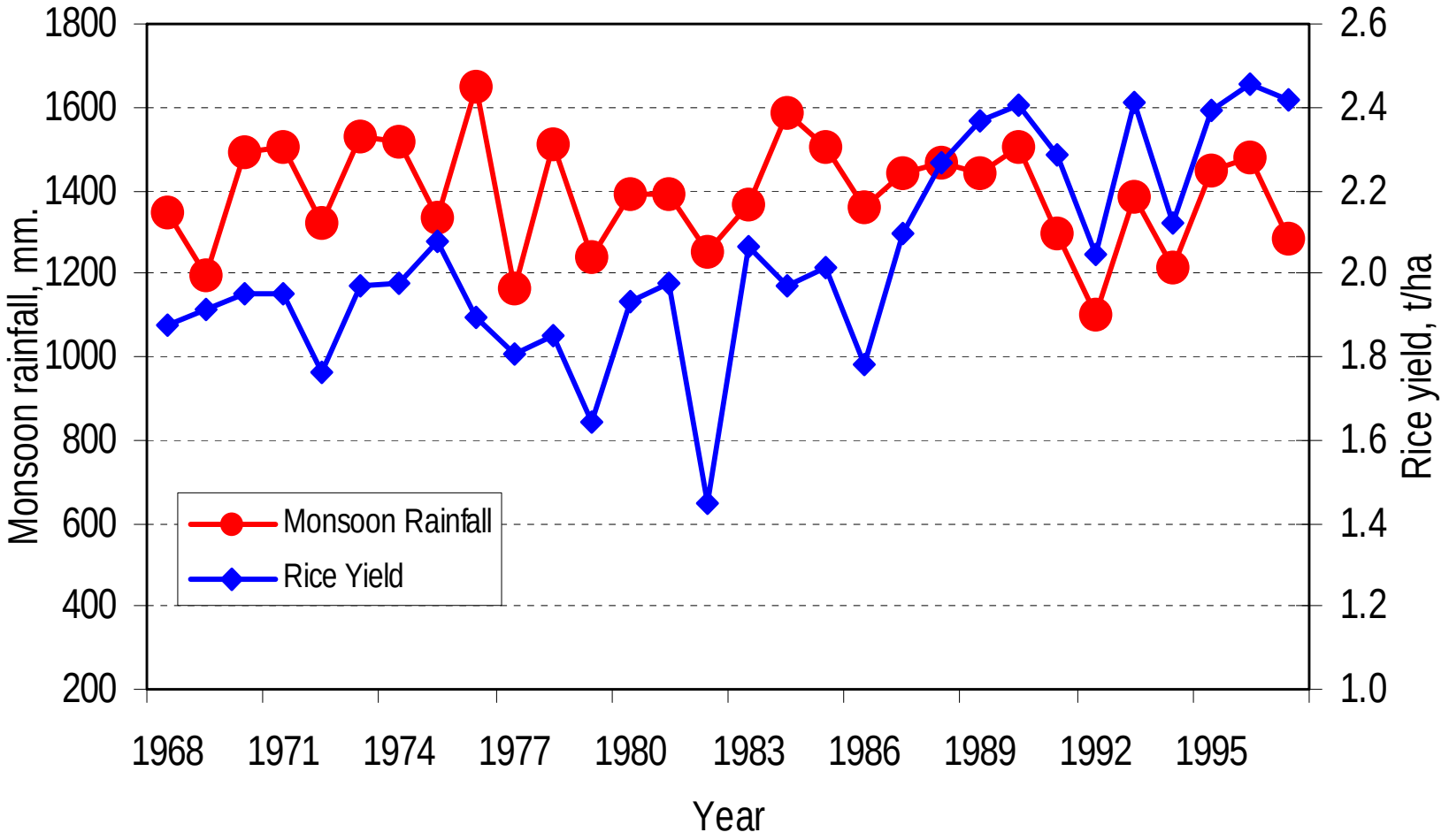
Growth of irrigated area, 1961-2000



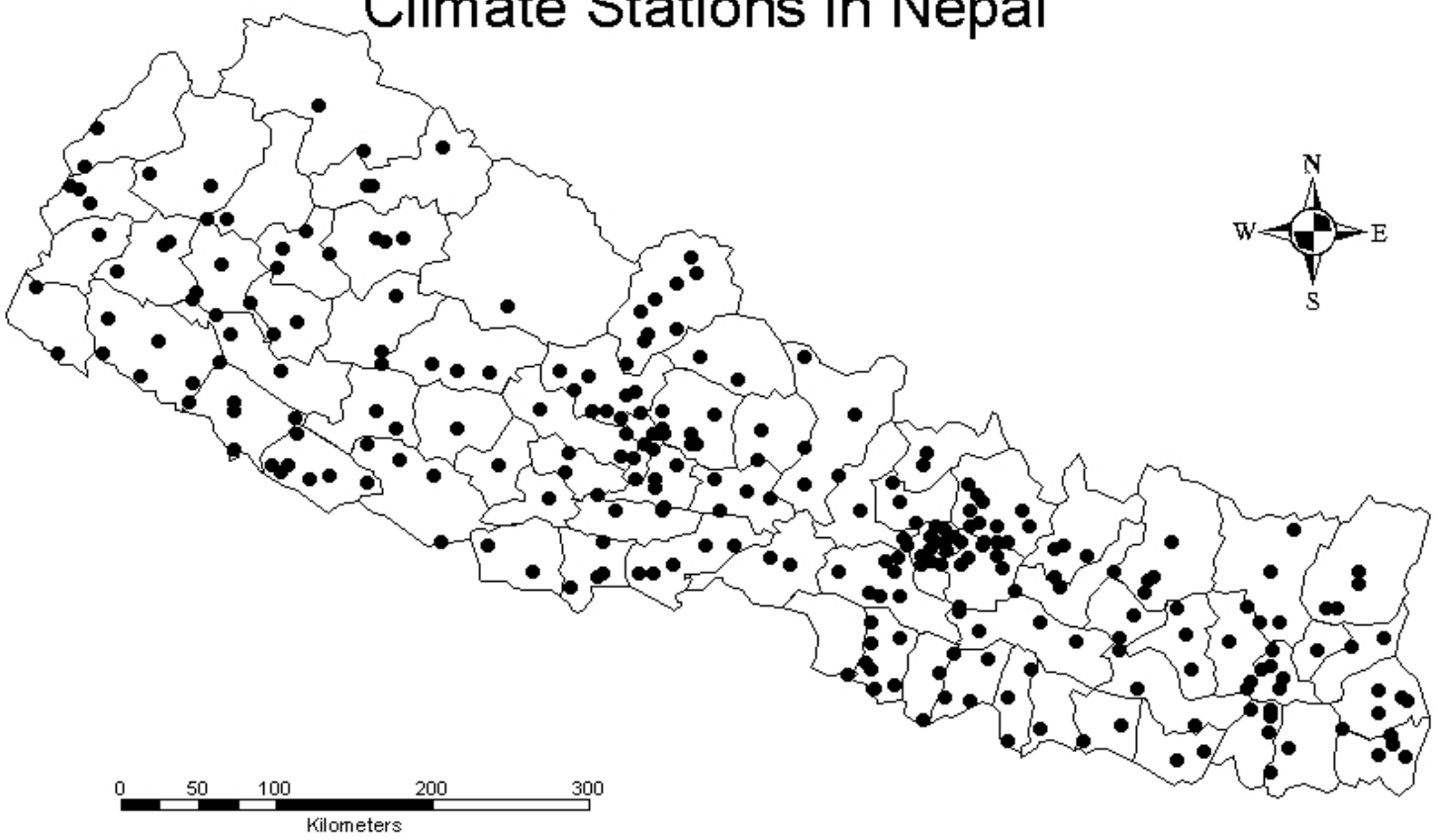
Fertilizer consumption, 1961-2000



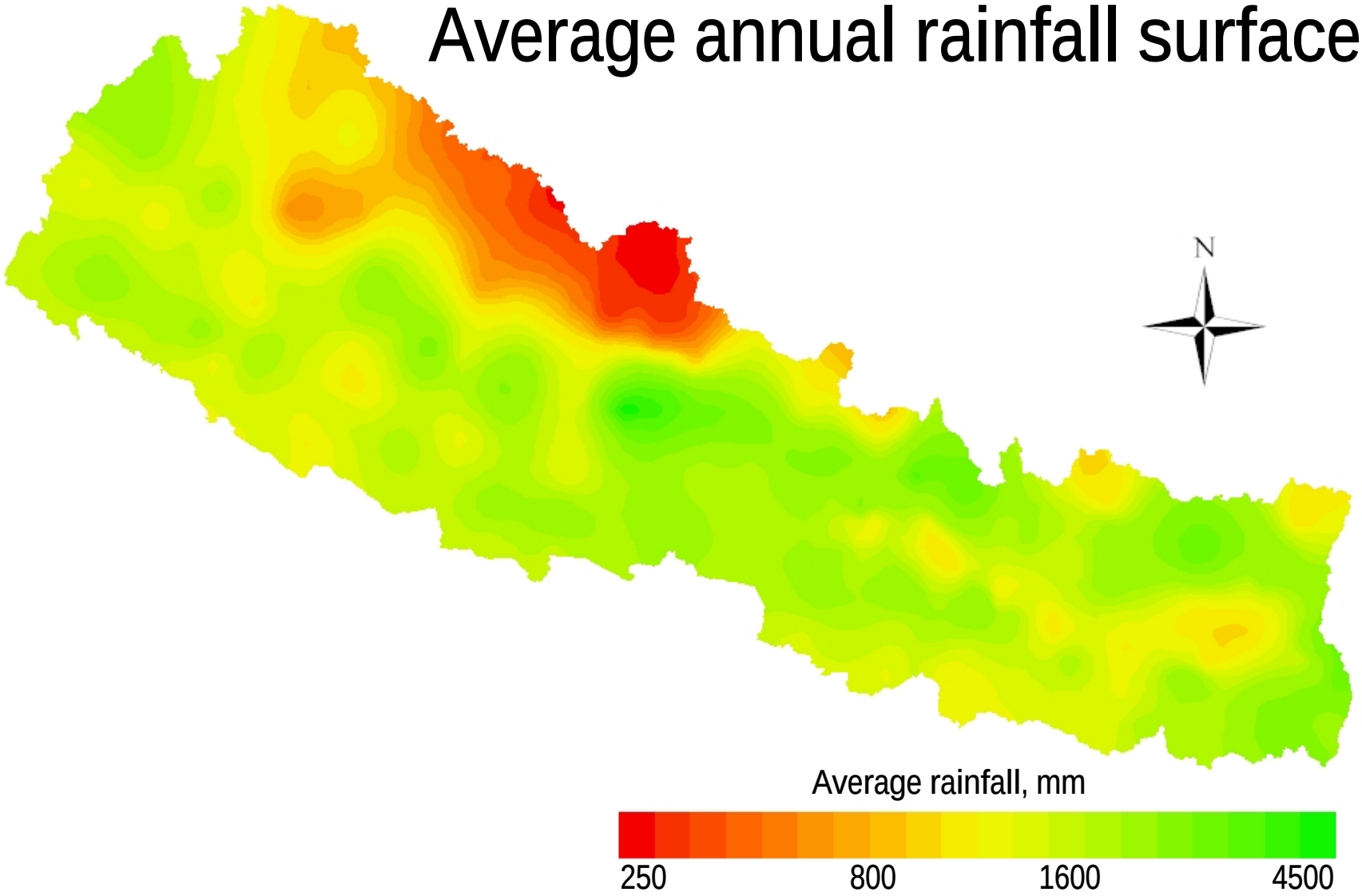
Rainfall and rice production relationship



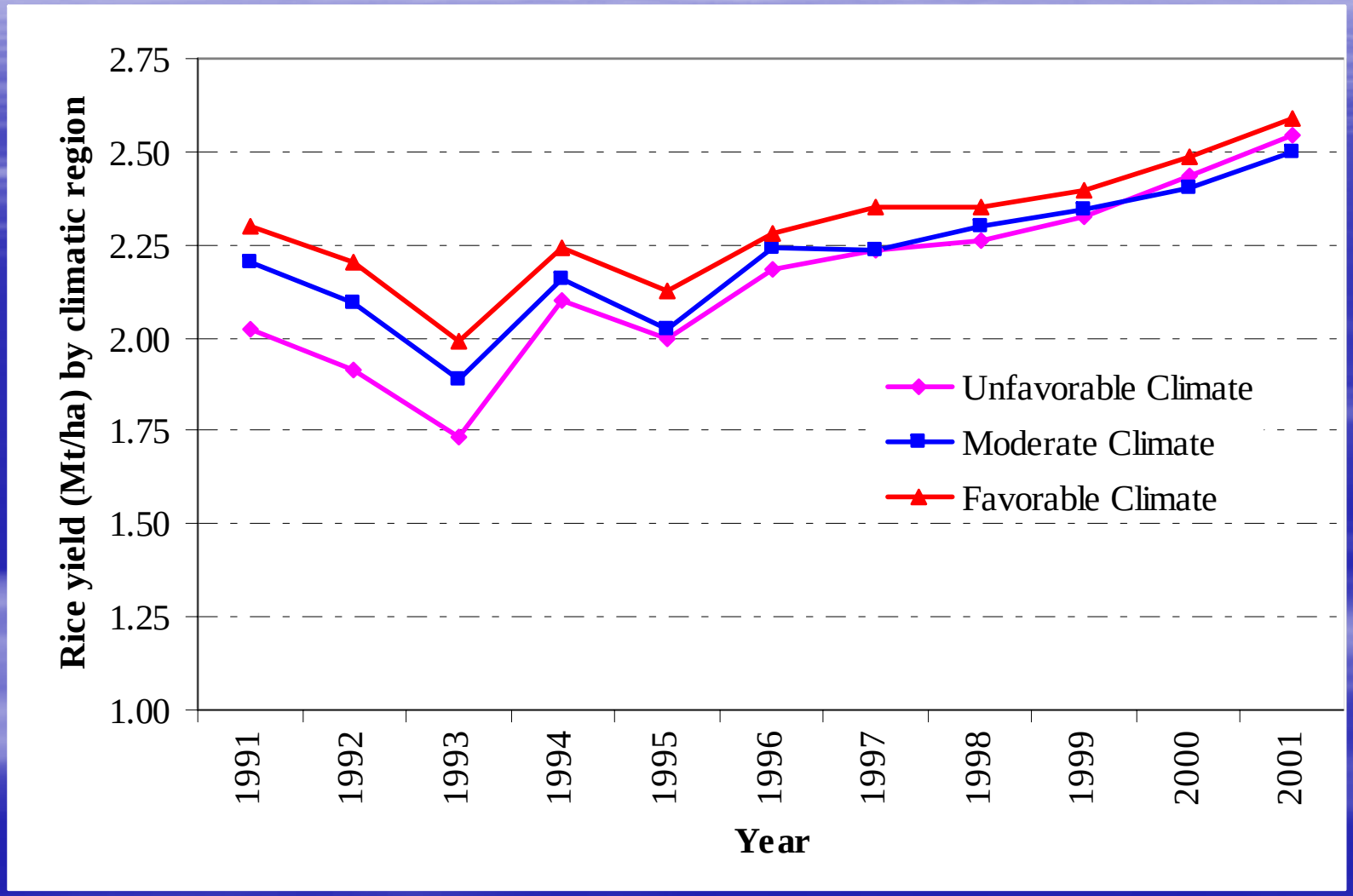
Climate Stations in Nepal



Average annual rainfall surface



Analysis of yield differentials: climatic regions



Estimates of fixed effect model: with and without climate

Parameters	Model 1		Model 2	
	Coef.	Std. Err.	Coef.	Std. Err.
IRR land (% of total rice area)	0.00417***	0.00091	0.00426***	0.00093
SEI development index	0.00313***	0.00069	0.00357***	0.00078
SLP (% of SLP Ter., 4-30^0)	-0.00149*	0.00062	-0.00155*	0.00062
FRT - N, P, K (Mt/ha)	0.00004***	0.00001	0.00004***	0.00001
DRY districts (Yes=1)	-	-	0.02940	0.03512
NOR districts (Yes=1)	-	-	0.04524	0.03600
Constant	1.91851***	0.05356	1.89153***	0.05933
F	54.24***		36.40***	
R^2	0.204		0.207	
N	616		616	

Conclusion

- No significant difference in yield between DRY and WET climate;
- Regardless of difference in climate each district is theoretically capable of producing same quantity of rice per unit area;
- Research establishment in Nepal seems to be responsive to spatial variability in climate;
- This effort, however, contingent upon active engagement of researchers for development and dissemination of appropriate technology.