ADAPTATION TO CLIMATE VARIABILITY AND CHANGE AMONG SMALL AND MARGINAL FARMERS IN ODISHA, INDIA

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OUTLINE OF THE PRESENTATION

- Background
- Research questions
- Study area and methodology
- Findings
- Questions and discussion

BACKGROUND

- Indian Agriculture is likely to be negatively affected by climate variability and change.
- The need to understand how small and marginal farmers are adapting to climate variability and change.
- In our knowledge very few studies conducted on farmer adaptation to climate variability at household level in India, though a few empirical studies in African and Canadian context.

RESEARCH QUESTIONS

- What are the different coping and adaptation actions being used by the farmers in Orissa, India?
- What are the barriers to adaptation?

METHODS

- Large sample survey
- Survey tool: Structured questionnaire
- Unit of analysis: Household
- Sampling strategy: Stratified random sampling
- Statistical analysis using *descriptive statistics*


India
भारत
State or Union Territory
National Capital
State or Union Territory Capital
0 200 400 Kilometers
0 200 400 Miles
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Afghanistan
Kabul
Islamabad
Pakistan
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Tibet
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Gangtok
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Dehra Dun
Uttaranchal
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New Delhi
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Patna
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Jharkhand
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West Bengal
Kolkata (Calcutta)
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Itanagar
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Nagaland
Kohima
Shillong
Meghalaya
Manipur
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Aizawl
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Gandhinagar
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Raipur
Orissa
Bhubaneswar
Daman
Diu
Dadra & Nagar Haveli
Silvassa
Maharashtra
Mumbai (Bombay)
Hyderabad
Andhra Pradesh
Pondicherry
Arabian Sea
Bay of Bengal
Goa
Panaji
Karnataka
Bangalore
Chennai (Madras)
Tamil Nadu
Kavaratti
Lakshadweep
Kerala
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Port Blair
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Nicobar Islands
Sri Lanka
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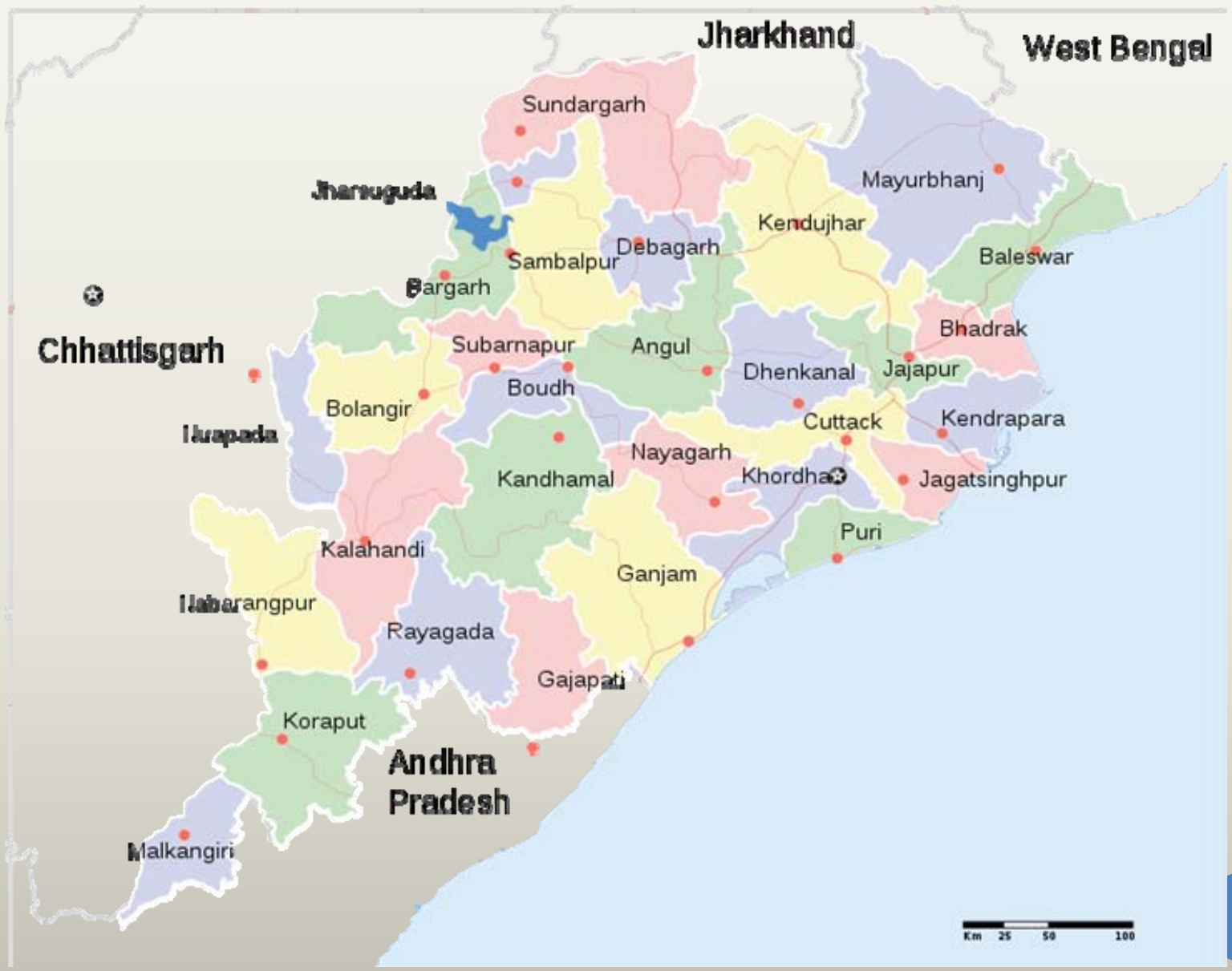
Indian Ocean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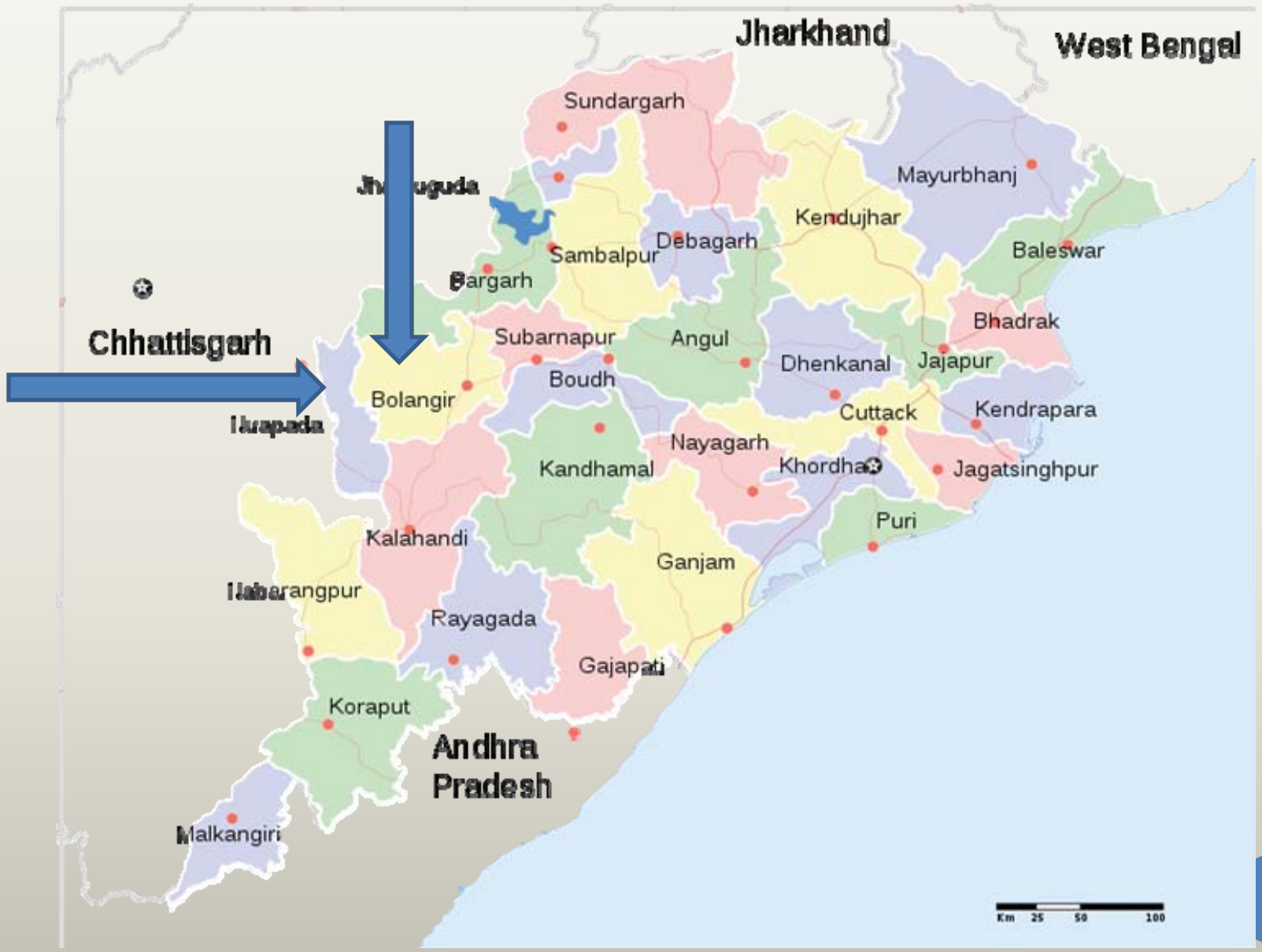
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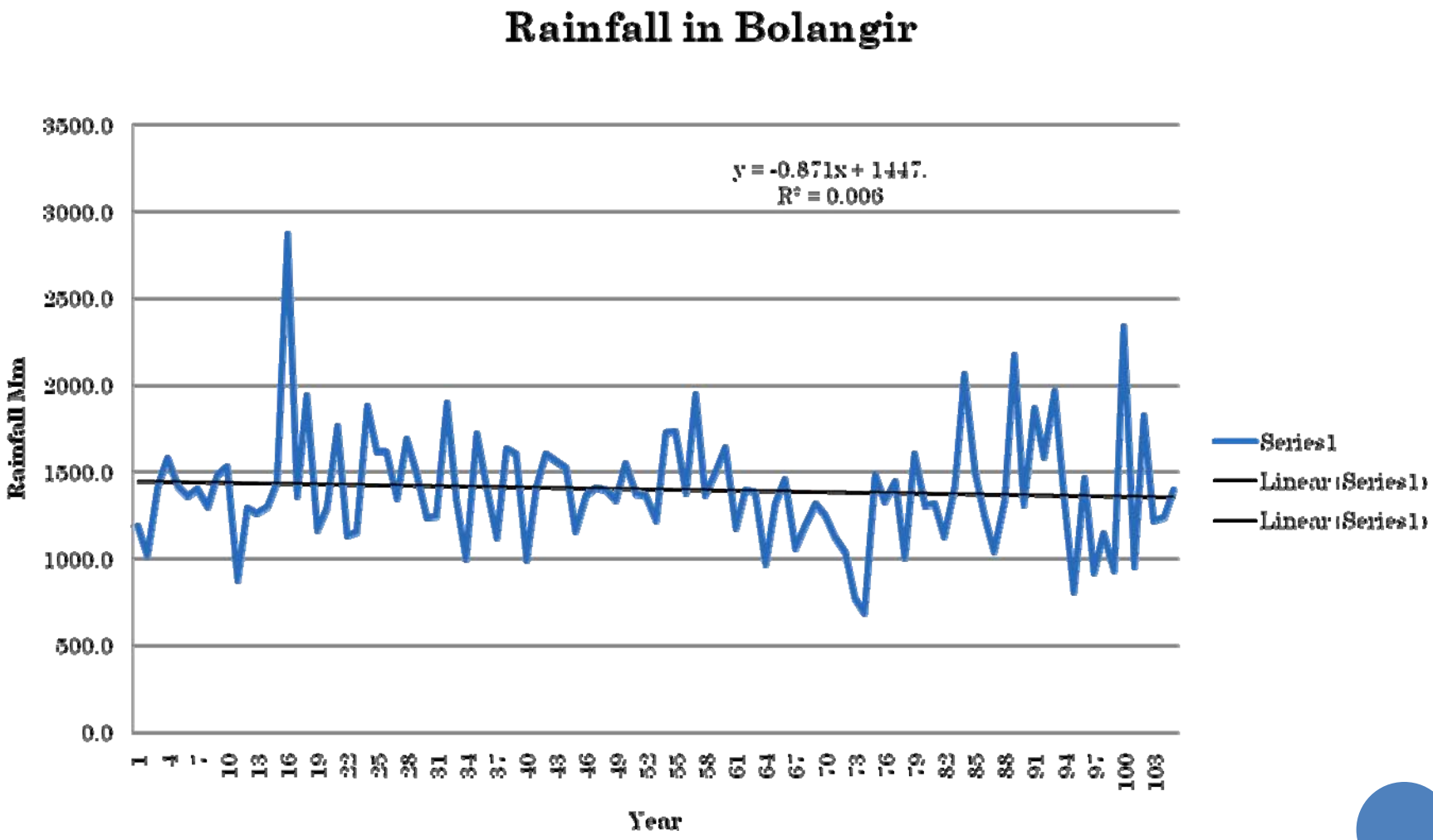
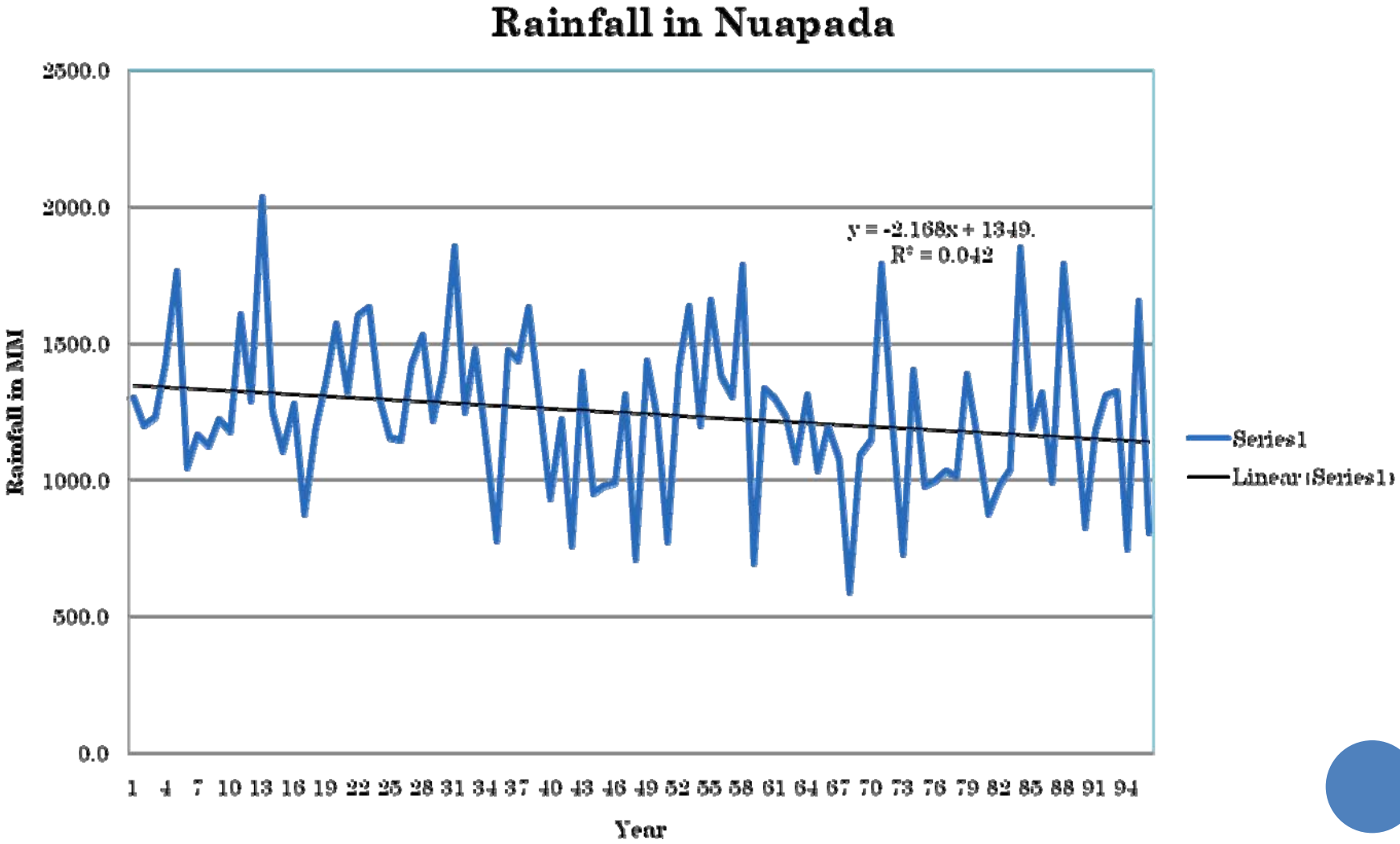
Andhra
Pradesh
Malkangiri
Km 25 50 100

AGRO-CLIMATIC ZONE OF THE STUDY AREA

No	Agro-climatic zone	Agricultural districts	Climate	Mean annual Rainfall (mm)	Mean maximum Summer Temp c^0	Mean minimum Winter Temp c^0	Broad soil group
1.	Eastern Ghat High Land	Major parts of Koraput, Nawarangpr	Warm and humid	1522	34.1	7.5	Red, Mixed red, black, Mixed red, yellow
2.	South eastern ghat	Malkangiri and part of Koraput	Warm and Humid	1710	34.1	13.2	Red, lateritic, black
3.	Western Undulating Zone	Kalahandi and Nuapada	Hot and moist, Sub-Humid	1352	37.8	11.9	Red, Mixed red and black, black
4.	Western central table land	Bolangir, Bargarh, Boudh, parts of sambalpur and Jhrsuguda	Hot, Moist and Sub humid	1614	40.0	12.4	Red and yellow, Red and Black, Black, brown forest, lateritic


Rainfall in Bolangir
y = -0.871x + 1447.
R² = 0.006
Rainfall Mm
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
Year
Series1
Linear (Series1)
Linear (Series1)


Rainfall in Nuapada
2500.0
2000.0
1500.0
1000.0
500.0
0.0
Rainfall in MM
y = -2.168x + 1349.
R² = 0.042
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58 61 64 67 70 73 76 79 82 85 88 91 94
Year
Series1
Linear (Series1)

ADAPTATION AND COPING ACTIONS REPORTED BY THE FARMERS

Type of action	Coping and adaptation actions
Farm production practices	Using Early Maturing Varieties of Paddy Seeds
	Changing Planting Dates
	Using different varieties of seeds of the same crop
	Water Conservation Practices
	Reducing rainfall dependence by using pond, well or river water
	Changing Quantity of Land Under Cultivation
Farm financial management	Livestock Diversification
	Income Diversification

Most of these coping and adaptation actions have also been identified in the literature (Thomas *et al* 2007; Deressa *et al*, 2009; Below *et al* 2010,Bryan *et al*,2011,Manadhar *et al* 2011)

IN RETROSPECT: DROUGHTS

- 1965: The Most Severe Drought In the Region

Many households depended on forests, buffer food stock along with selling their assets to cope with droughts.

- 1974: Another severe drought in the study Area

- Lost All their assets due to selling or mortgaging to big land owners and businessmen. (Indebtedness)

1985: The Green Drought

Production was good but all the food crops were taken by land owners and businessmen to whom they were previously indebted.(The trend of Migration Started to Andhra Pradesh). People were left with Nothing.

- 1996, 1998, 2000, 2002 -----Drought Years

Drought have become a common phenomenon in the region after 1965 without government support we small farmers have no option but to migrate and earn. (Climate Change is a serious problem for us)

(From a group discussion among farmers in Kirkita Village in Nuapada).

ADAPTING TO CHANGING WEATHER CYCLE: OBSERVATIONS

Ardra	**22 June-5 July**	**No Rain Planting Shifted to Below Earlier start of sowing season (Rice) Lack of seeds in the right time**
Punarvasu	6 July-19 July	**Now starting of sowing season**
Pushya	20 July- 2 August	**Now starting of sowing season**
Aslesha	3 August-16 August	
Makha	17 August- 30 August	
Pubba	31 August-12 September	
Uttara	13 September-26 September	**No Rain**
Hasta	27 September-9 0ctober	**No rain (Less Pulses Production) More Use of ground water and surface water sources instead of rain**
Chitta	10 October-23 October	**No Rain**
Swathi	24 October-5 November	**No rain**
Vishaka	6 November-18 November	**No rain**

"Awat Adar Nahi Diyo Jat No Diyo hasta.
Bina Khane Dona Gaye Pahuna aur Grihasta"

(Indo-Gangetic plains, "Kautilya")

(If there is no rain in Ardra (22 June–5 July) with the onset of the monsoon and No rain in Hasta (27 September–9 October) during the retreat, then both host And guest have to go without food).

Uttara Chusi,Yattara Gampa (Aanatapur, AP)

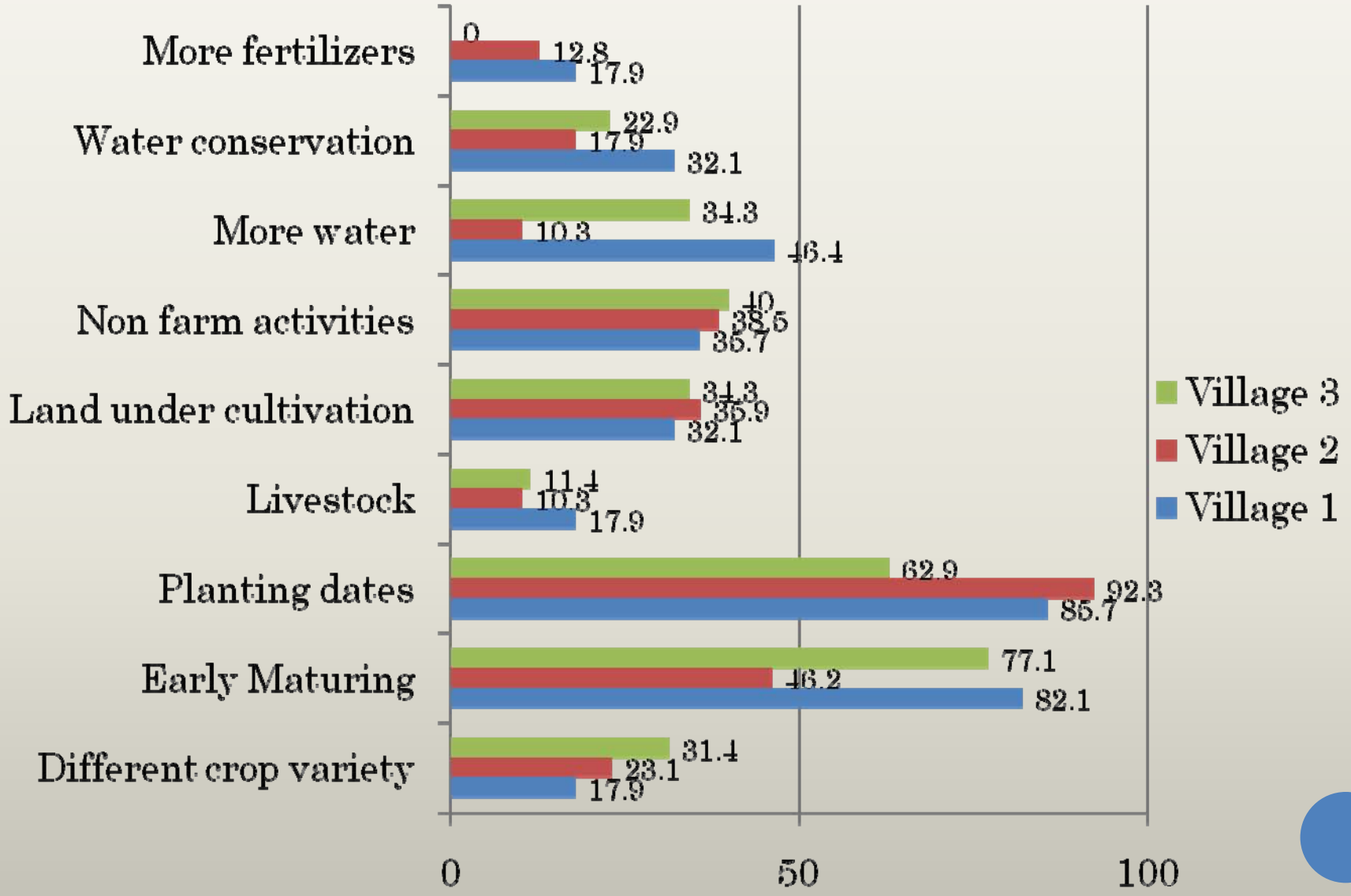
Wait for the Uttara rain (i.e. rainfall during 13–26 September),if it fails, leave the place.

SHIFTING TO EARLY MATURING VARIETY OF PADDY

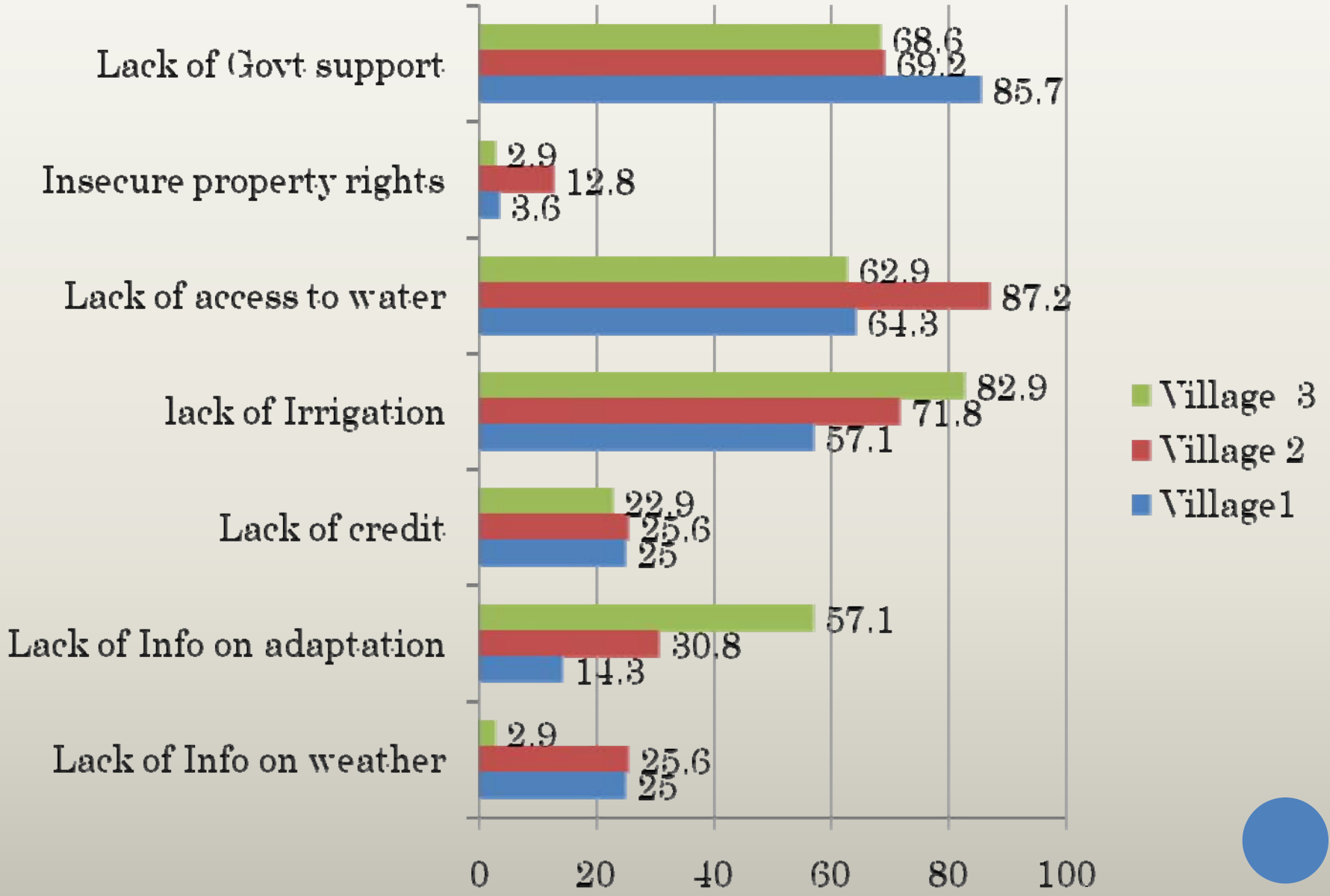
- The varieties used to help the farmers to survive droughts are no longer available.
- Traditional verities of seeds are no longer available.

For example, paddy collection list.xls

ADAPTATION AMONG FARMERS



PERCEIVED BARRIER TO ADAPTATION



PRELIMINARY OBSERVATIONS FROM THE FIELD

- Most of the farmers perceive that climate is changing in the area and they are observing a declining rainfall pattern.
- Farmers are adapting to the changing climate change to some extent through autonomous and private adaptation.
- Public adaptation can play an supportive role in increasing farmers adaptive capacity, however, public intervention in the adaptation seems to be very less in the study area. For example,
- Crop Insurance is not effective. The reason being government apathy for example, only two days time given to people for filling the forms.
- Traditional water harvesting system dying over the years, many farmers reported that it should be revived to deal with changes in the weather and climate.


THANK
YOU