

Spatial and Temporal Variation of Agricultural and Rural Transformation across Selected Villages in Bihar and Madhya Pradesh

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Content

- **Introduction- background of ICRISAT VLS/VDSA project**
- **Context of the villages selected in Bihar and MP**
- **Recent results and findings and dynamics of changes on:**
 - **Rural infrastructure, crop production,**
 - **Govt. of welfare and SP supports to rural households**
 - **Credit, agricultural wage rate trend**
 - **Extent of agro-mechanization, and**
- **Study implications**

Objectives of the Study

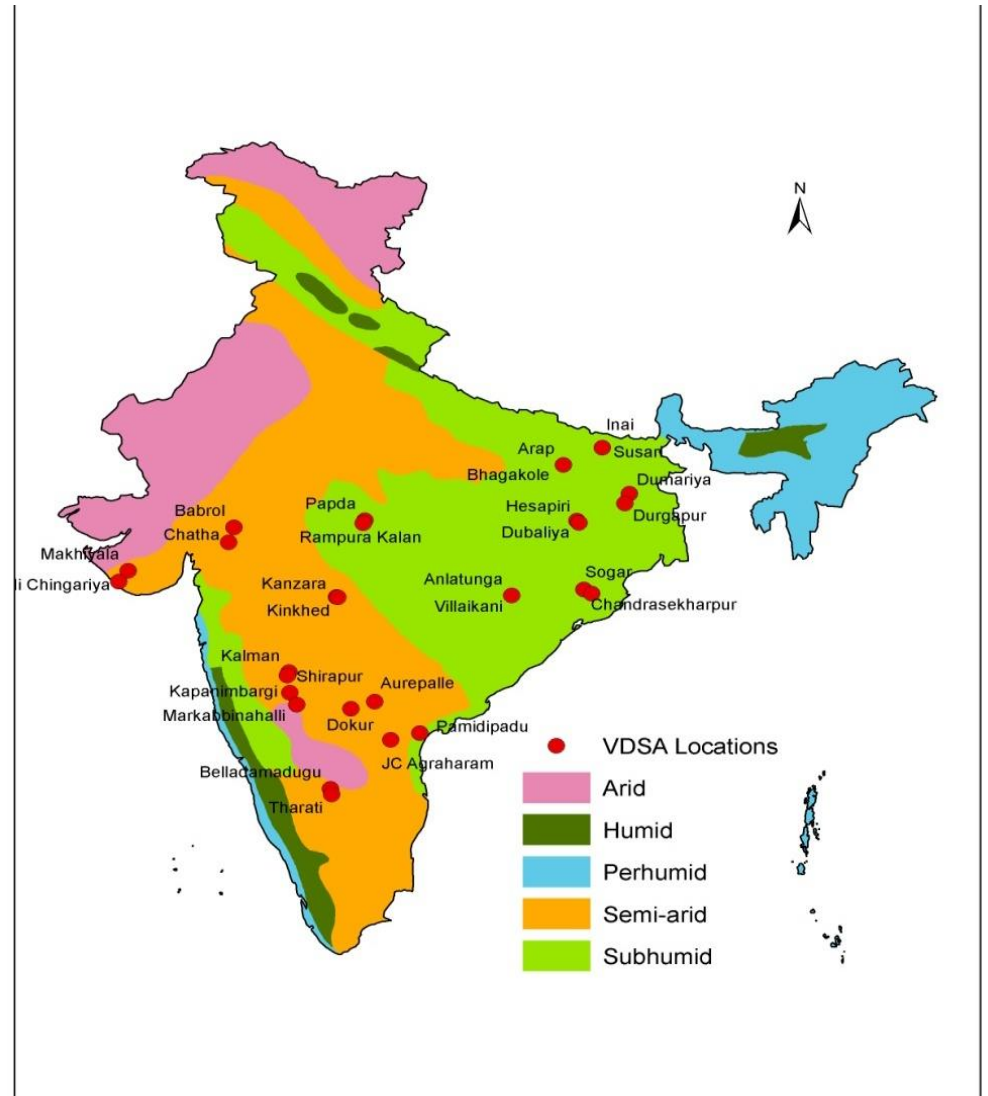
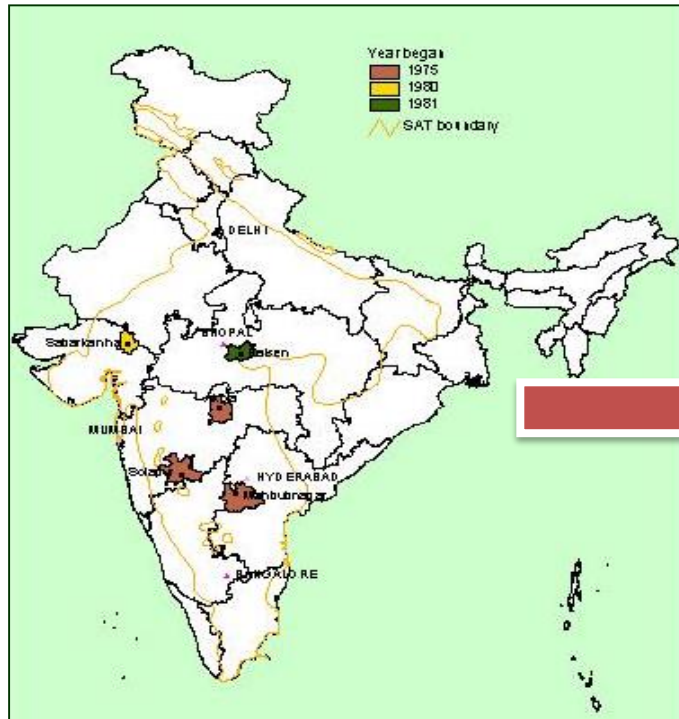
- To assess spatial variation on agricultural production, productivity and technology uses across selected ICRISAT-VDSA villages in Bihar and M P.
- To assess extent of transformation in the agrarian economy across the villages
- To assess extent of agricultural technology uses, agril-mechanization and rural infrastructures across the selected villages.



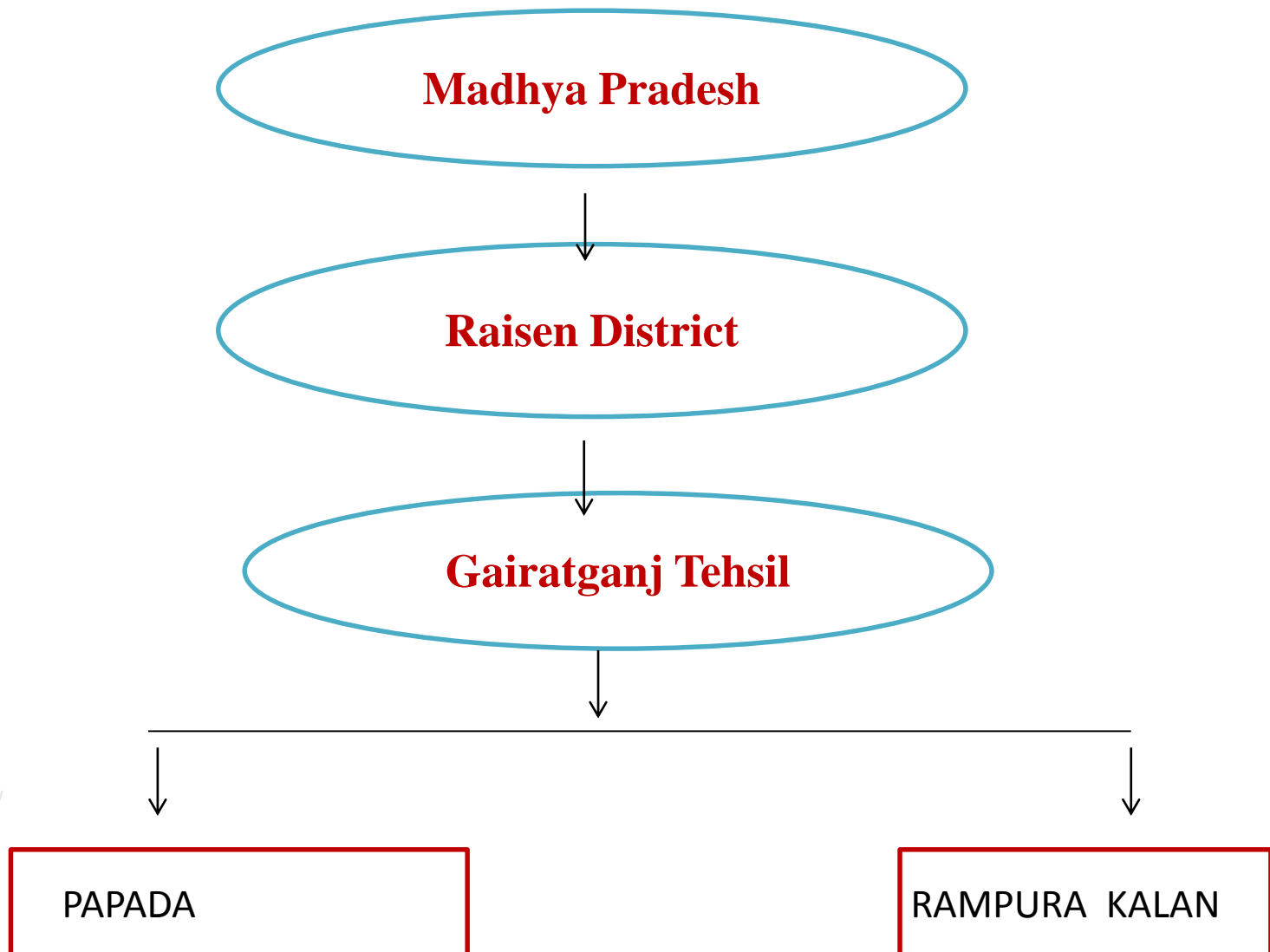
ICRISAT- VLS (VDSA) Project Villages in MP & Bihar

2009-14

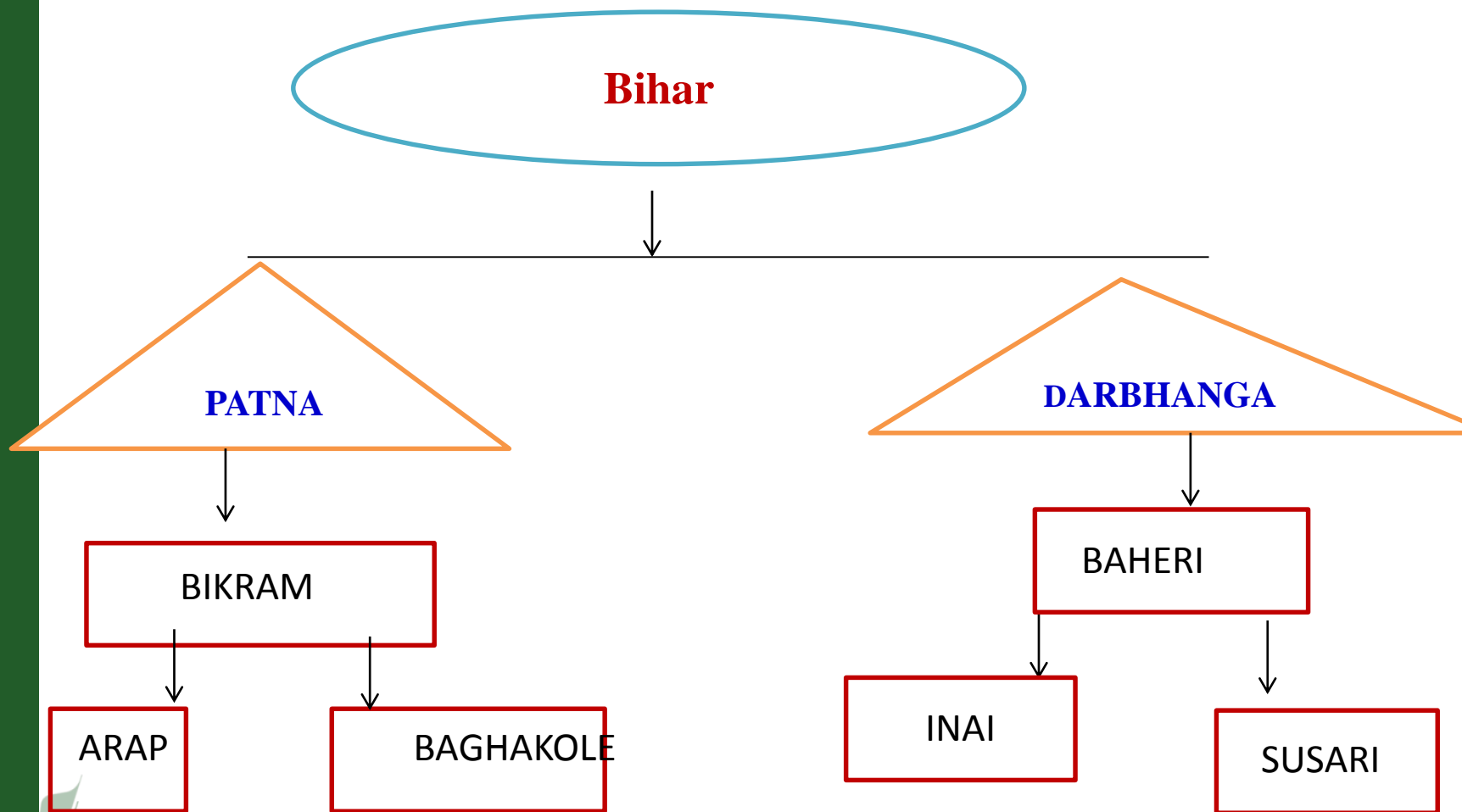
1975-85



Study Locations: MP VDSA project sites



Study Locations: Bihar VDSA project sites



Methodology and Data

- Micro level (villages/household) level data analysis using VDSA panel data
- Panel household data compiled by VDSA project
- Integration of Quantitative & Qualitative data analysis (**Q2 analysis**)
- Focus on changes in the changes on cropping patterns, farm structure, production practices across the spatial setting of the villages and over the time

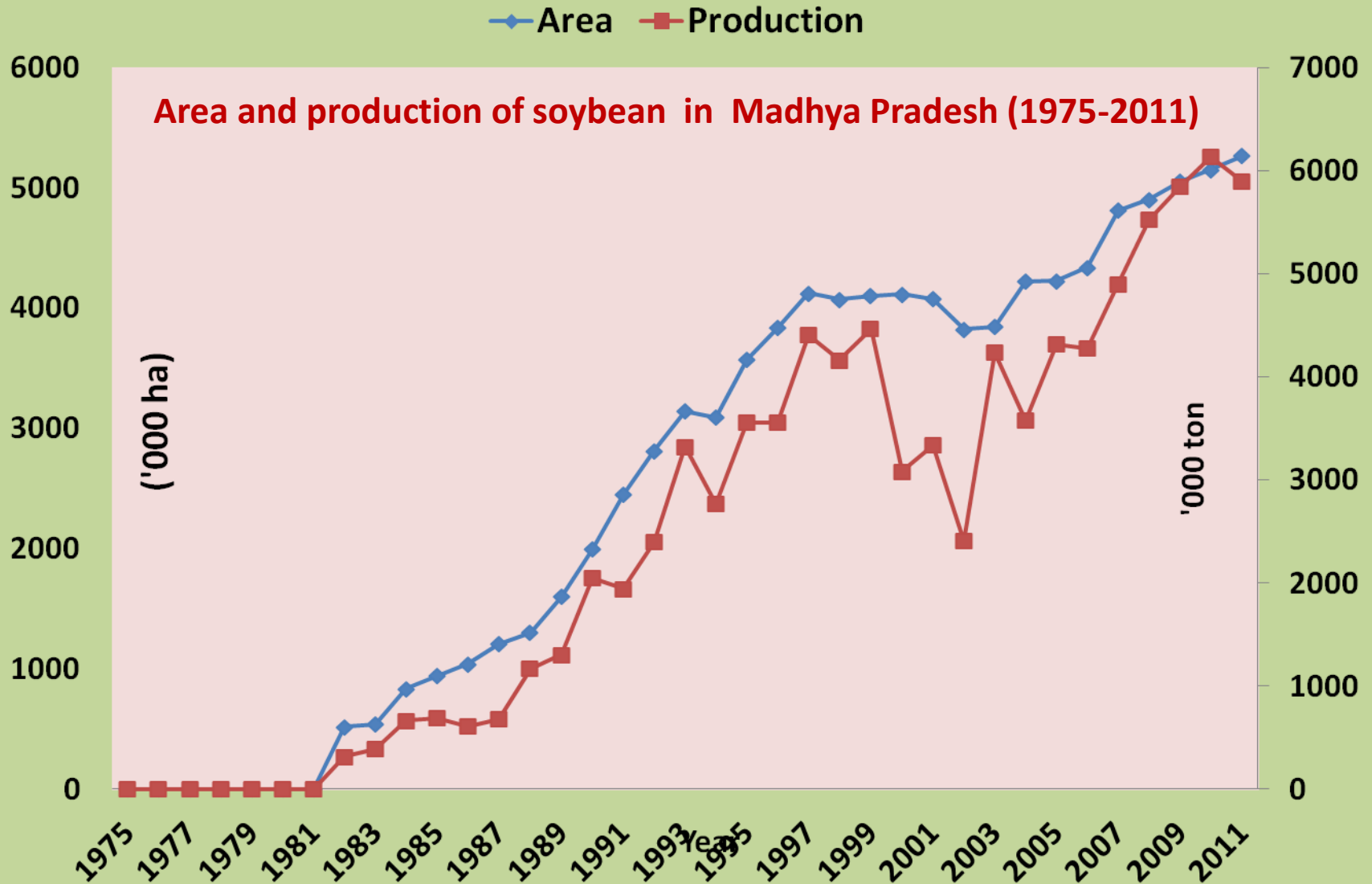
Panel survey



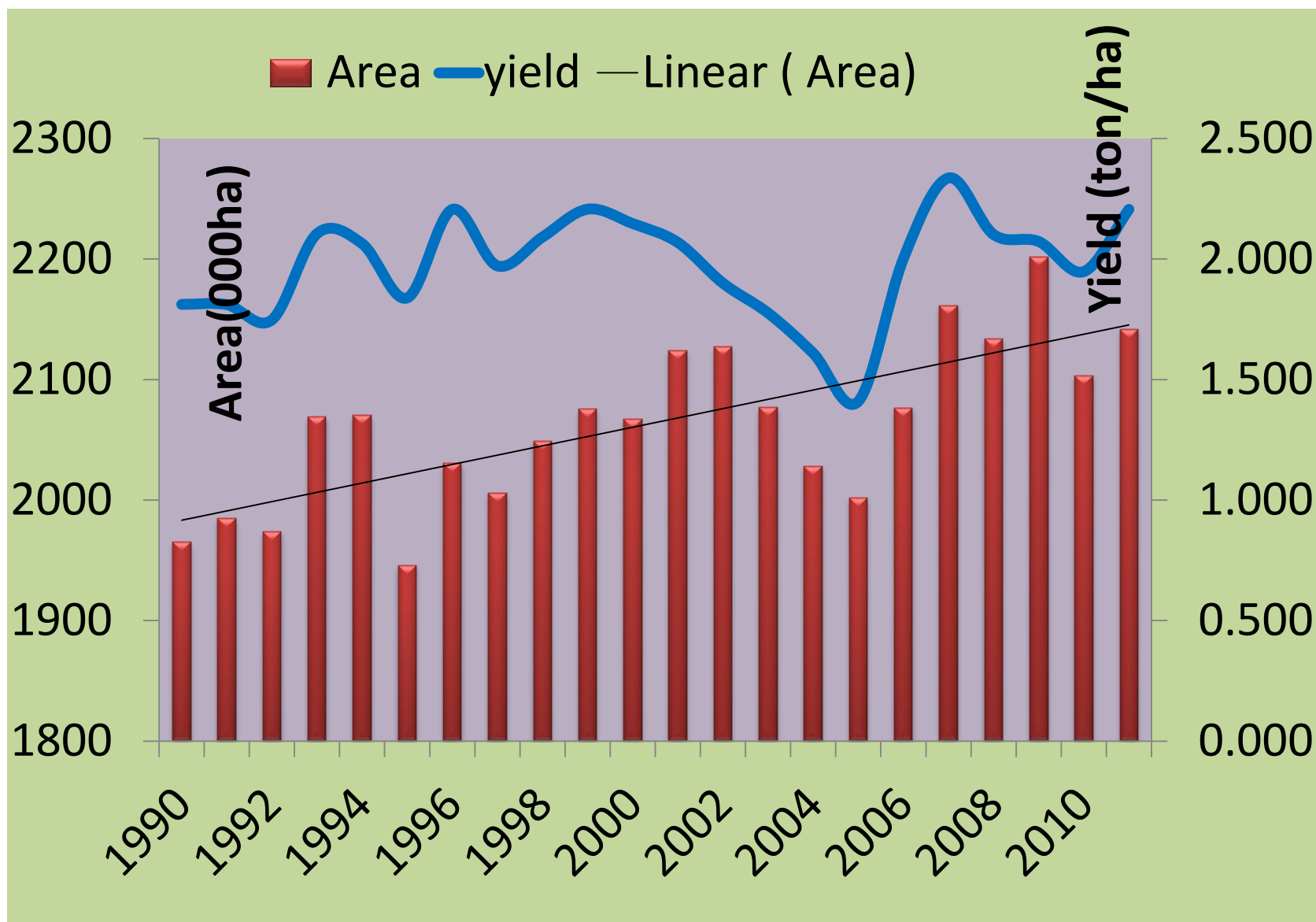
VDSA four villages for longitudinal study in Bihar



MP agriculture - Soybean – wheat system



Trend on wheat acreage and yield in Bihar 1990-2011



II. Rural economy and agrarian settings across the villages

Features of the selected VDSA project villages in Bihar and MP

Factors	MP – Raison District		Bihar – Patna District		Bihar – Darbhanga district	
	Papada	Rampura Kalan	Arap	Baghkola	Inai	Susari
1. Distance from Nearest town (Block HQ) in km	13	10	0	4.5	5	15
2. Total no of households	197	398	722	503	590	644
3. Total Population (2009)	1250	2400	3855	3046	3596	4494
4. Family size (census)	6.35	6.03	5.34	6.06	6.09	6.98
5 Sample households no	40	40	40	40	40	40

Productive asset across the 6 villages in Bihar and MP, 2011

Factors	MP – Raison District		Bihar – Patna District		Bihar – Darbhanga district	
	Papada	Rampura K.	Arap	Baghkola	Inai	Susari
1. Number of HH	40	40	40	40	40	40
2. Land Holding (own) per household (ha)	2.73	1.58	0.84	1.31	0.55	0.71
3. Operational holding per households (ha)	3.75	2.92	1.22	1.64	1.21	0.83
4. % Irrigated Area (Operational Land)	55	52	96	95	92	96
5. Total Value of Farm Equipment (Rs/HH)	61,335	43,511	76,640	78,182	36,130	40,750
6. Per Capita Income(Rs)	17,999	15,062	27,884	43,266	18,827	10,583

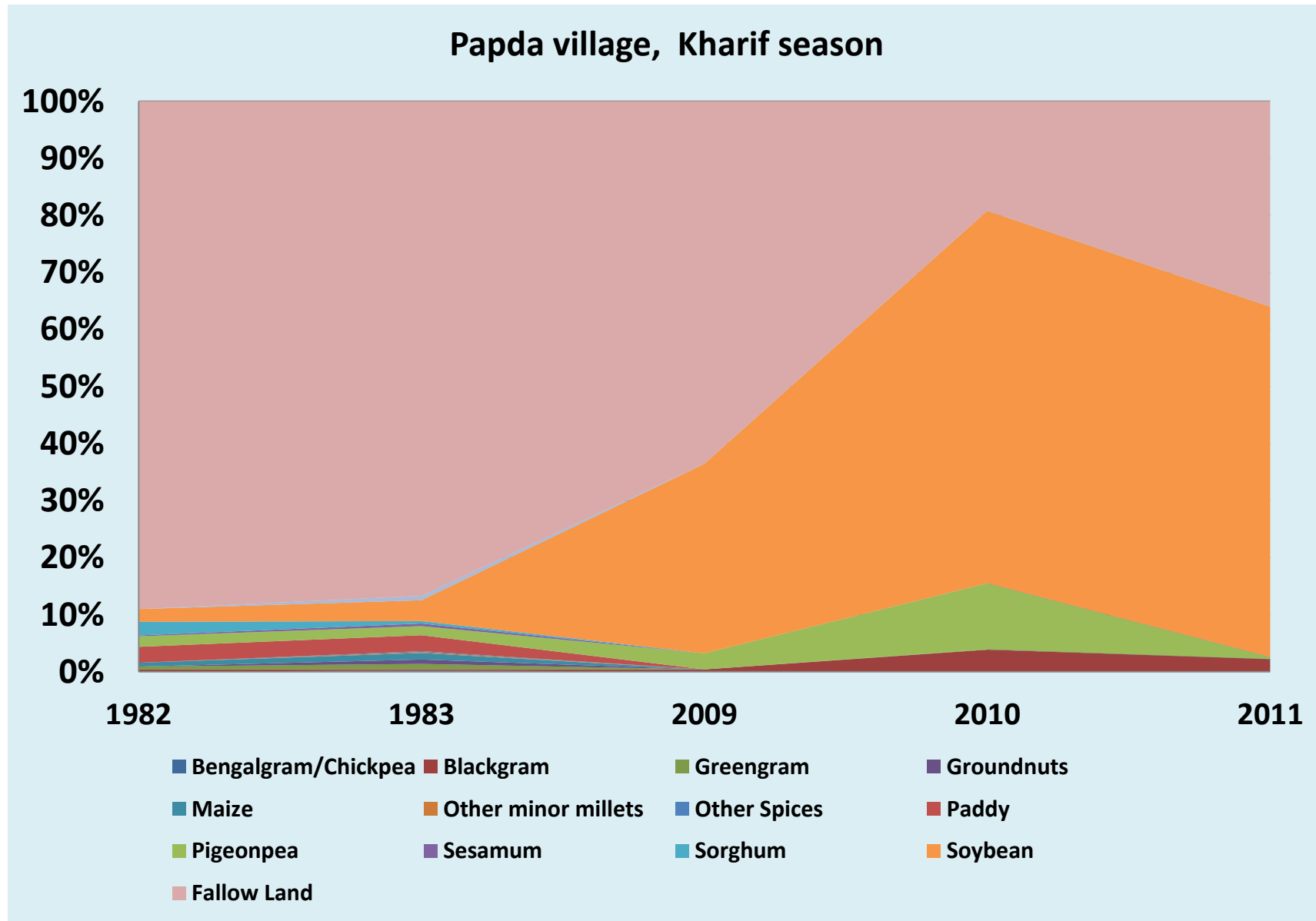
Basic households infrastructures

Building & Consumer durables	Raisen (MP)- No of HH	% HH in Raison Sample	Patna (Bihar)- No of HH	% HH in Patna	Darbhanga- (Bihar) No of HH	% HH in Darbhanga
1. Building_Strong walls & RCC roof	4	5	28	35	32	40
2. Building-Strong walls & other roofs	37	46	34	43	31	39
3. Toilet in own household	22	28	49	60	16	20
4. No of Electrified households	74	93	62	78	20	25
5. Tap water connected households	29	36	6	8	0	0
6. Television own households	34	43	48	60	10	13
7. Telephone/Mobile owned HH	61	76	70	88	62	78
8. Motor cycle/scooter owned HHs	32	40	23	29	17	21
Total sample households	80		80		80	

Lives stock structures across the villages by farm size, 2011

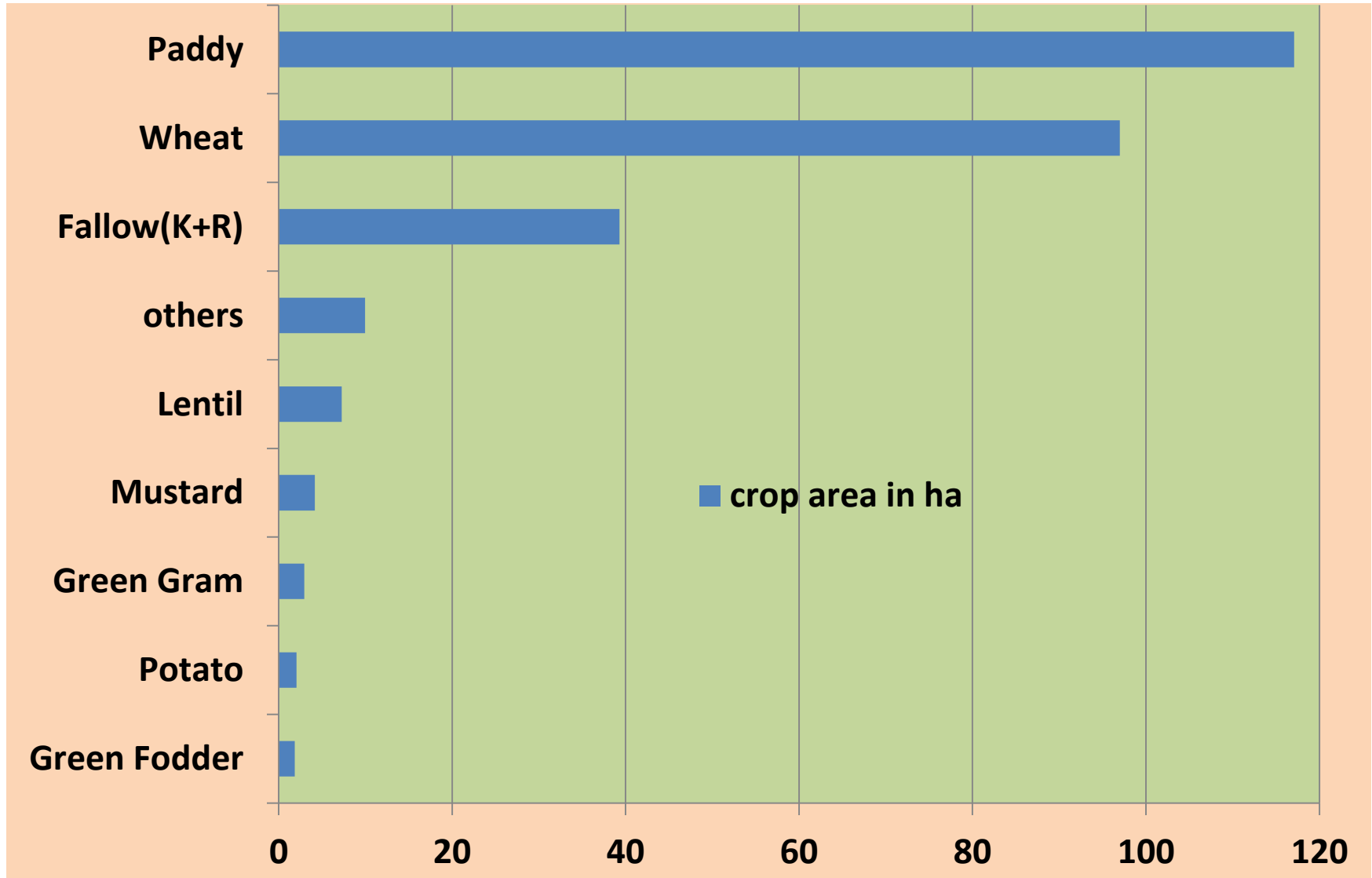
	MADHYA PRADESH				BIHAR		
VILLAGE	Labor + small	Middle + Large	Avg. of 2 Villages in MP		Labor + Small	Middle + Large	Avg. of 4 Village in BIHAR
Draft animals	1.25	2.15	1.70		0.73	1.60	1.16
Improved cows	-	0.05	0.03		-	0.05	0.03
Local Cows	2.15	3.55	2.85		1.50	2.70	2.10
Improved buffaloes	-	0.05	0.03		-	0.05	0.03
Local buffaloes	0.30	1.00	0.65		0.20	0.83	0.51
Young stock	2.60	5.40	4.00		1.85	4.35	3.10
Sheep & goats	3.05	-	1.53		2.28	-	1.14
Poultry	0.25	-	0.13		0.23	-	0.11
Others	0.05	0	0.025		0.03	-	0.01

Changes on crop acreage in Papada village (kharif), MP



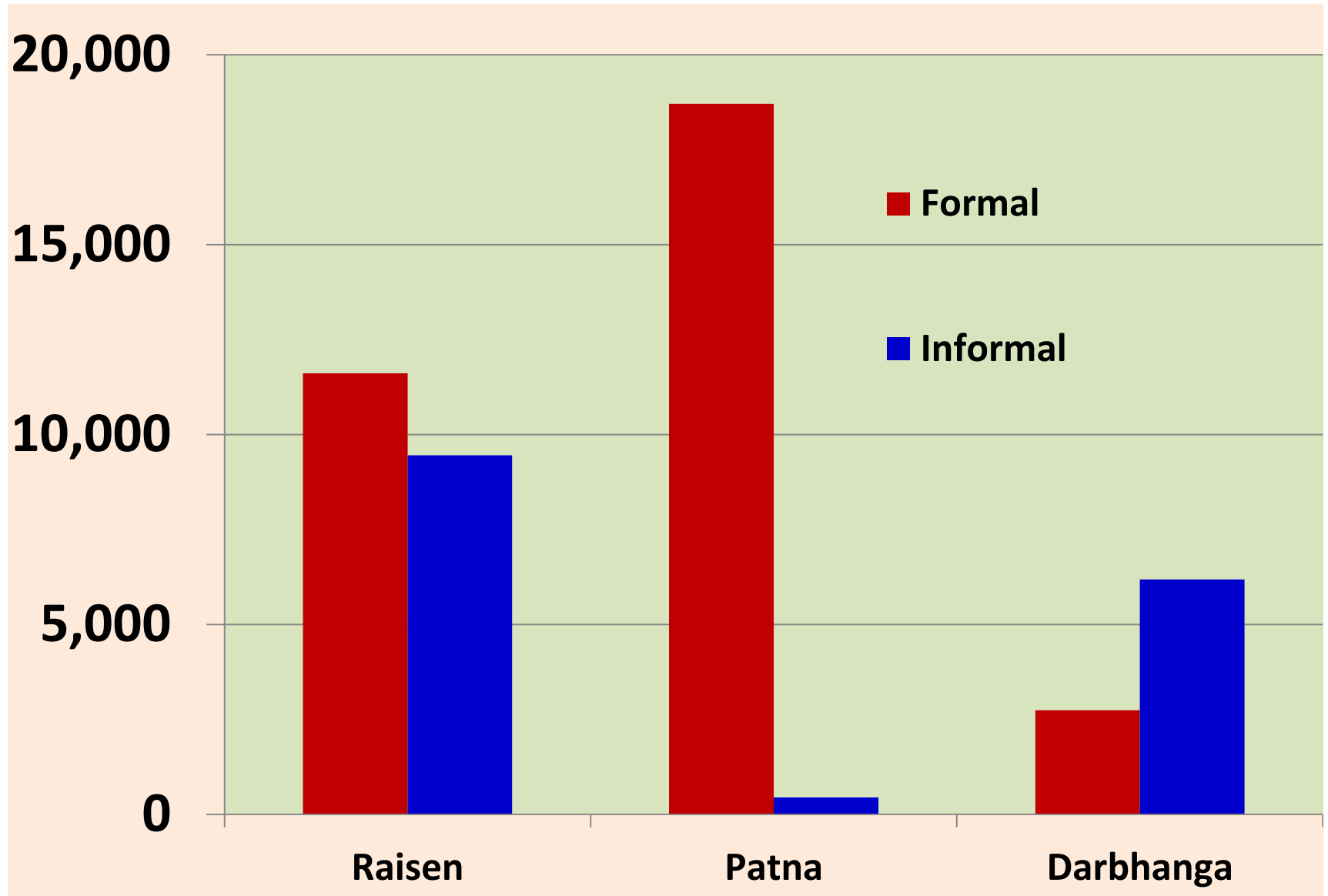
Source: ICRISAT- VDSA data source

Cropping Pattern in Bihar Villages 2011 (area in ha)

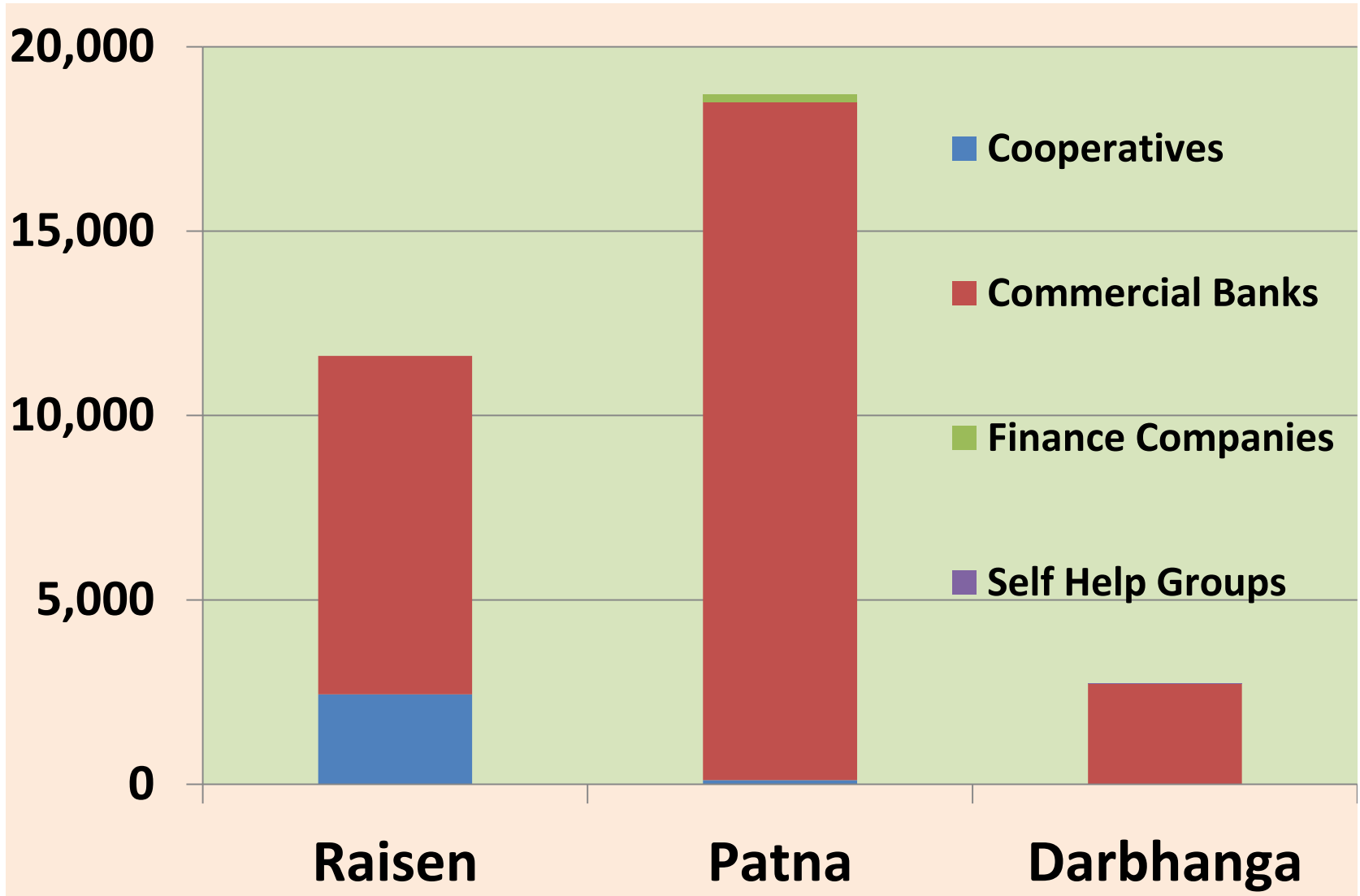


III. Credit and rural debt across the villages

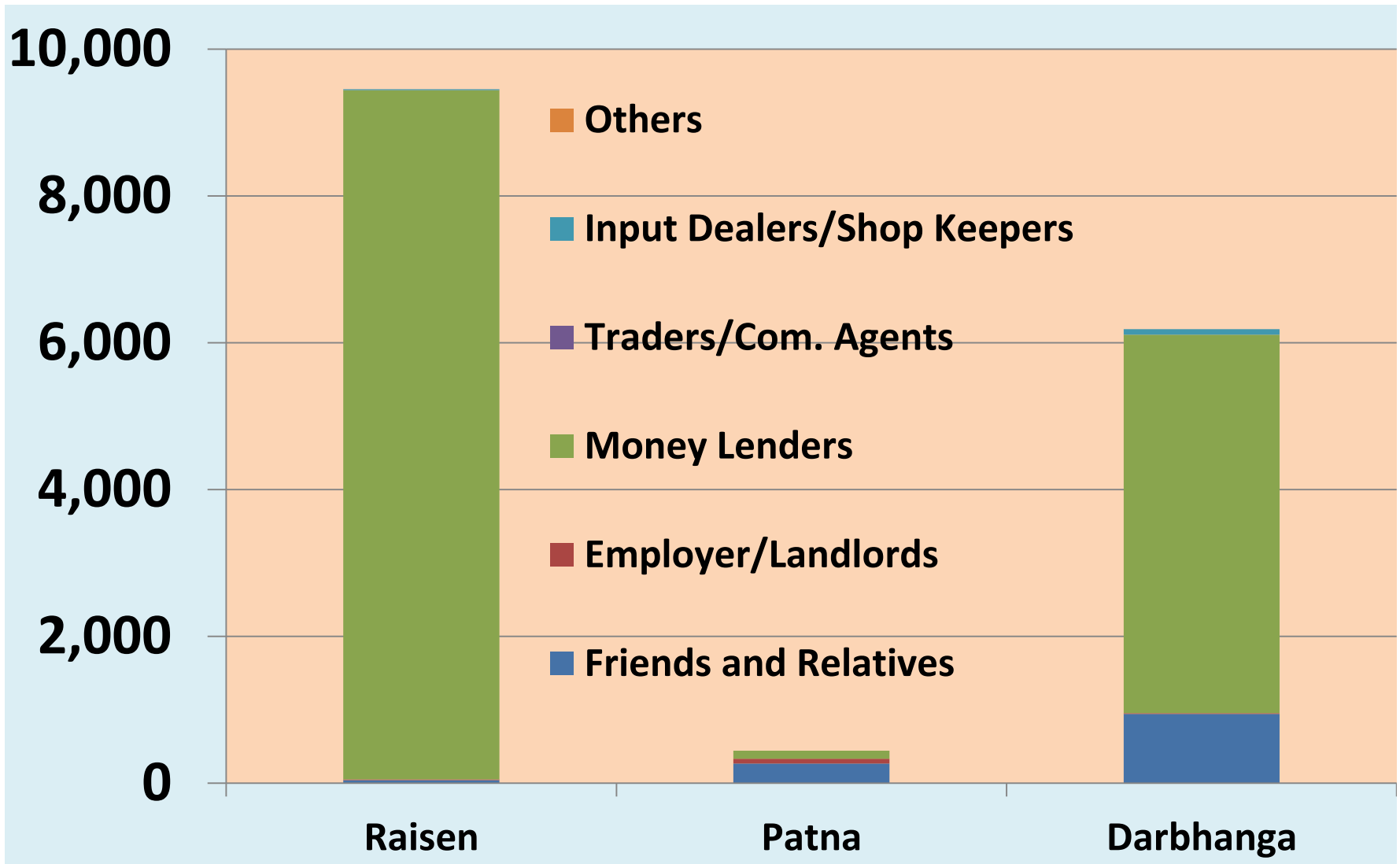
Avg. per household debt across the villages in 2011



Avg. per household debt from formal sources across the villages



Avg. per household debt from informal sources across the villages



Benefits received by sample household from Govt. welfare program across the villages in Bihar in 2011

Village	District	No of govt. welfare program	Avg. benefit per household (Rs./HH/year)
Bagakole	Patna	10	27,673
Arap	Patna	10	20,654
Inai	Darbhanga	10	2,180
Susari	Darbhanga	4	506

Note: Based on the welfare benefits that were received by the sample households

There is huge difference on benefits across the farm size in each of the village.

IV. Dynamics of agricultural wages and agro-mechanization

Changes on key factors in Rampura kalan (MP) over the 40 years

Particulars	1970-71	1980-81	2000-01	2011-12
Total no. of households	250	280	350	390
Percentage of Literacy	15	25	40	80
Area operated in hectares	NA	560	860	1,480
Male Ag. labor wage (Rs/day (2011 prices))	50	35	90	100
No. of houses electrified (%)	0	70	90	98
No. of tractors/village	1	3	15	20
No. of threshers/village	0	1	7	18

Source : Authors' Focus Group Discussion, 2012

Dynamics of use of tractor in Papada village, MP

Year	No of Tractor in the village	% of land under tractor plough (Kharif)	Rental rate of tractor for plough	% of land under bullock plough (Kharif)
2001	5	20	200	80
2003	7	25	225	75
2005	10	35	300	65
2010	14	60	400	40
2011	15	65	450	35
2012	17	75	500	25
2013	19	85	550	15

Combine harvester for soybean harvested in Papada village (MP)

Year	harvesting under Combined harvesters (%)	Rental Rate (Rs/acre)
1998	20	1,000
2000	40	1,200
2005	55	1,200
2010	70	1,500
2011	70	1,500
2012	75	1,500
2013	75	1,800
2014	80	1,800



**Economic analysis of combined harvester use for wheat in Papada village, Raisen, MP
(Partial budget analysis), 2012-13.**

(1) BENEFIT	Cost (Rs/ac)	(2) COST	Cost (Rs/ac)
1 (A) ADDED RETURNS		2 (A) Added cost	1,000
		Rental charge of harvester .	1,000
1 (B) Reduced Cost		2 (B) REDUCED RETURNS	
Reduced cost for labor use for harvesting , threshing	3,390	Total loss of straw	1,500
		Grain loss (5%)	560
Total added benefit	3,390	Total reduced returns	3,060

Net gain : (reduced return + reduced cost – (added cost+ reduced returns)

Net gain = Rs. 3,390 - Rs 3,060 = Rs 330/ac (USD6.5/ac)

Labor shortage and other complex factors are operating in adoption of these lumpy equipments

Ploughing by Tractor & Bullock in ARAP, Bihar, 2001-2014

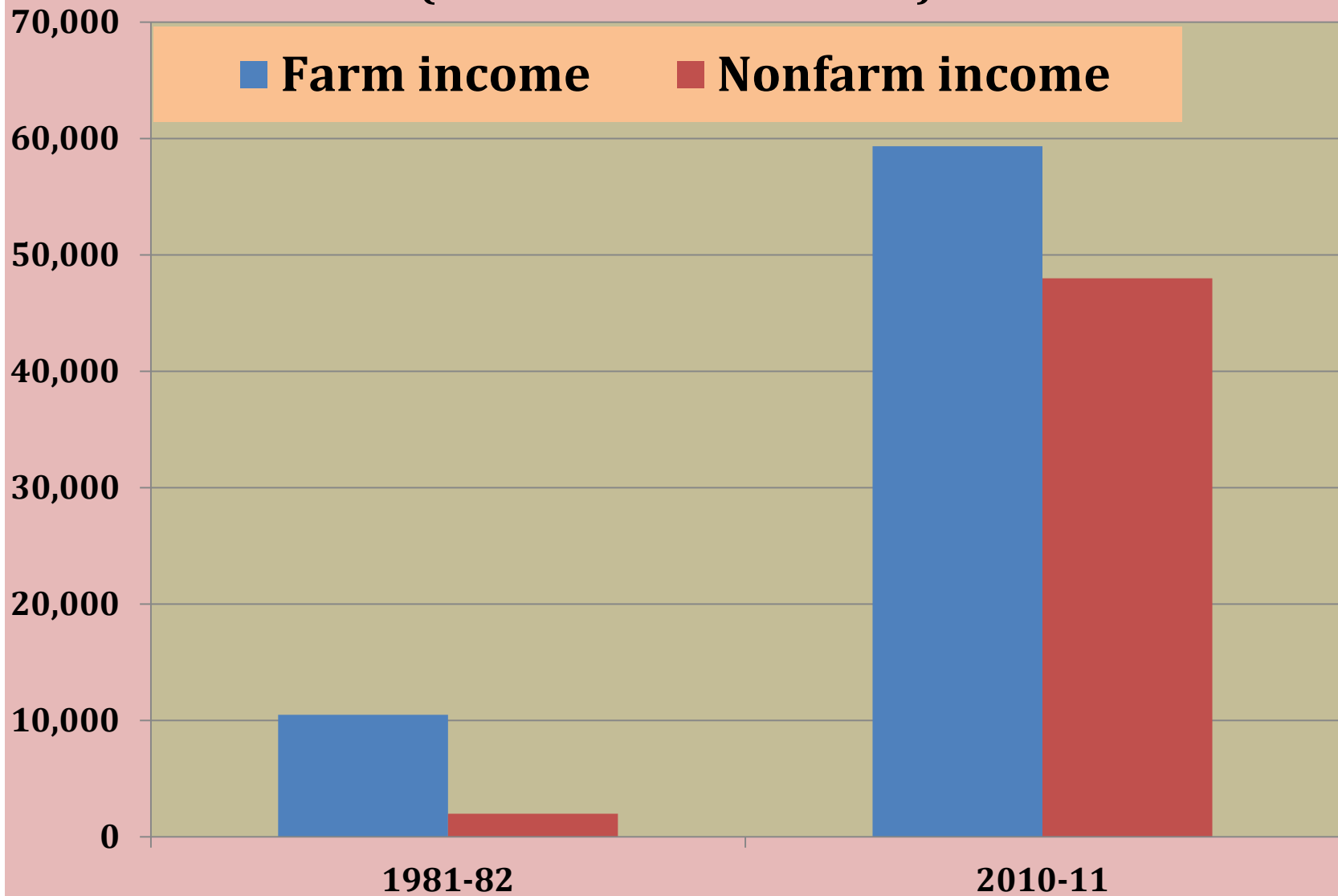
Year	No. of tractors in the village	Usage of % in Kharif	Rental rate (Rs/ hr)		No . of Bullock pairs	Usage of % in Kharif	Wages (Rs/day)
2001	8	30	250		300	70	125
2004	12	55	300		175	45	150
2005	12	60	325		150	40	165
2008	18	90	400		30	10	200
2009	20	95	500		10	5	225
2010	21	100	600		1	NA	NA
2011	21	100	700		1	NA	NA
2013	24	100	950		0	NA	NA
2014	26	100	1000		0	NA	NA

Source ; FGD with villager and key informants, ARAP, 2014

Combined harvester uses in farming in ARAP village, BIHAR

Year	No. of <u>Combined harvester</u> in the village	Usage of % in <u>Rice</u> harvested by Com. Harvester		% of <u>wheat</u> harvested by Combined harvester	
2006	01	15		20	
2007	01	17		20	
2008	01	17		20	
2009	01	20		20	
2010	01	20		20	
2011	01	20		25	
2012	01	20		25	
2013	02	30		30	
2014	02	35		35	

Avg. household income in the two study villages of MP (constant value of 2010 Rs)



Conclusion and Implications

1. The level of farm production and rural infrastructures greatly vary across the villages studies.
2. Fast Pace of transformation taking places across the sample villages of MP and Bihar selected.
3. Still, large numbers of households are depended upon informal source of credits, specially those villages located far from the market-town.

Conclusion and implications (cont..)

4. The cropping intensity has increased across all villages studied here, so in many parts of India.
5. There have been a fast pace of changes on cropping patterns, electrification, increased literacy rate, and increased use of farm machineries like tractors, threshers and combined harvesters use across villages.
6. Increasing pace of use of farm-machineries has played a critical role in improving land productivity (after 2000's), and farmers profitability in the last one decade.

The extent of changes and rural transformation vary across the villages in rural India, but fast pace of transformation is taking place across all of the villages in India now, specially over the last 10-15 years than in the past several decades.

Thank you very much

