Adoption of Released Rice Varieties in Chhattisgarh: Assessment through Methodological Approach of Expert Panel Estimates

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Introduction

- Rice is the most important food crop from point of view of area and production.
- World's rice area is 154 m ha & production 661 m ton.
- India is the 2nd largest producer after China.
- India contributes 96 m ton production to the world rice production.
- Rice is cultivated in India in 44 m ha area.

Brief in Rice of Chhattisgarh

- Chhattisgarh is known as “Rice Bowl in India”.
- Rice covers more than 70% area in the state.
- Chhattisgarh have largest germplasm collection in world.
- Rice is cultivated in the state under rainfed lowland (49%), upland (27%) and irrigated (24%) ecosystems.
- Rice is cultivated in different fragile environments.
- Rice yield is low and varies from 1.0 - 4.5 t/ha with an average of 1.9 t/ha.

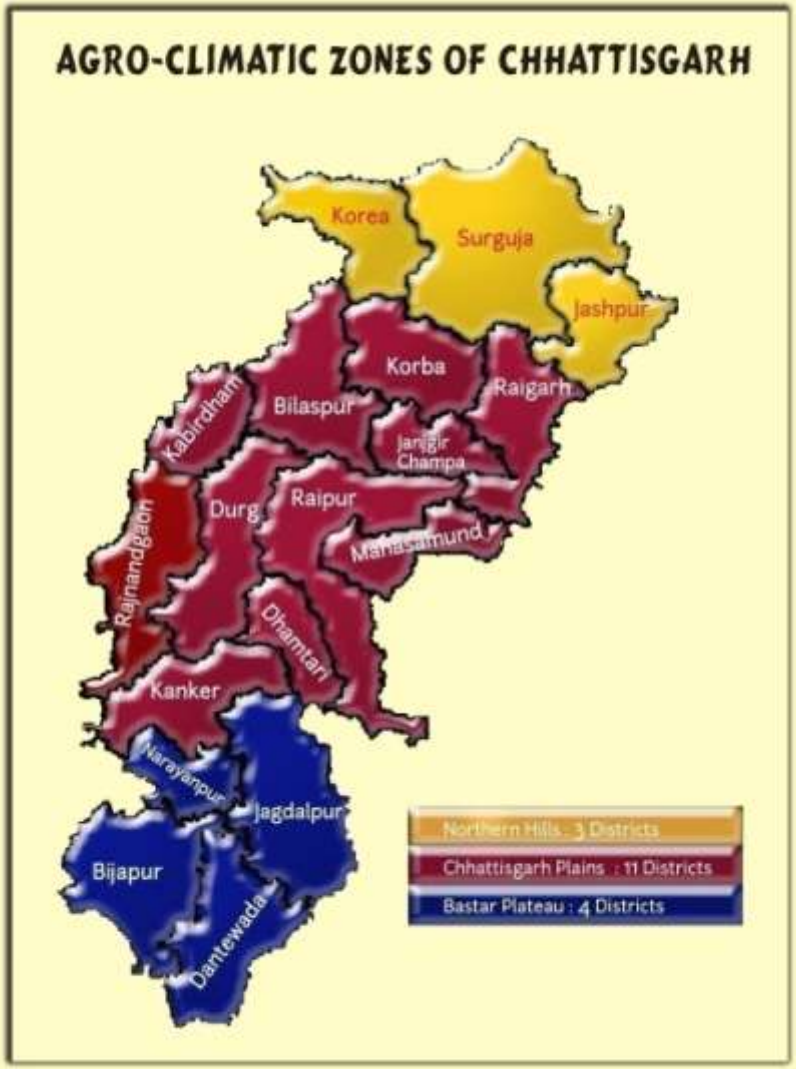
Justification

- Rice scientists of public & private sectors are engaged for developing rice varieties to different production environments.
- Rice scientists work more in favorable environment (Irrigated ecosystem).
- Rice scientists work less in unfavorable environment (rainfed ecosystem), which accounts for about 76% of the area.
- Many rice varieties released by scientists are not widely adopted by farmers in rainfed ecosystem.

Objectives

- To examine involvement of rice scientists in varietal development,
- To document varietal releases,
- To examine adoption pattern of rice varieties through experts' estimation method,
- To validate the expert estimates of cultivar-specific adoption through farm surveys.

Agro-climatic Zones



Agro-climatic Zone	Districts
Chhattisgarh Plains (11 districts)	Raipur, Durg, Rajnandgaon, Bilaspur Dhamtari, Mahasamund, Korba, Raigarh, Kabirdham (Kawardha), Janjgir and Kanker
Bastar Plateau (4 districts)	Bastar, Dantewada , Narayanpur and Bijapur.
Northern Hills (3 districts)	Surguja, Jashpur and Koria.

Rice Area, Production & Yield in Chhattisgarh

	2000-01	2007-08
Area(m ha)	3.795	3.568
Production (m ton)	3.494	5.267
Yield (t/ha)	0.920	1.480

Net Cropped Area (NCA) & Cropping Intensity (CI)

Agro-climatic Zone	2002-04			2005-07		
	Share in total (%)	NCA (m ha)	CI (%)	Share in total (%)	NCA (m ha)	CI (%)
Chhattisgarh Plains	69	3.29	121	65	3.08	127
Bastar Plateau	13	0.64	102	17	0.83	104
Northern Hills	18	0.84	112	18	0.84	112
Chhattisgarh State		4.78	117		4.75	121

Percentage MV area

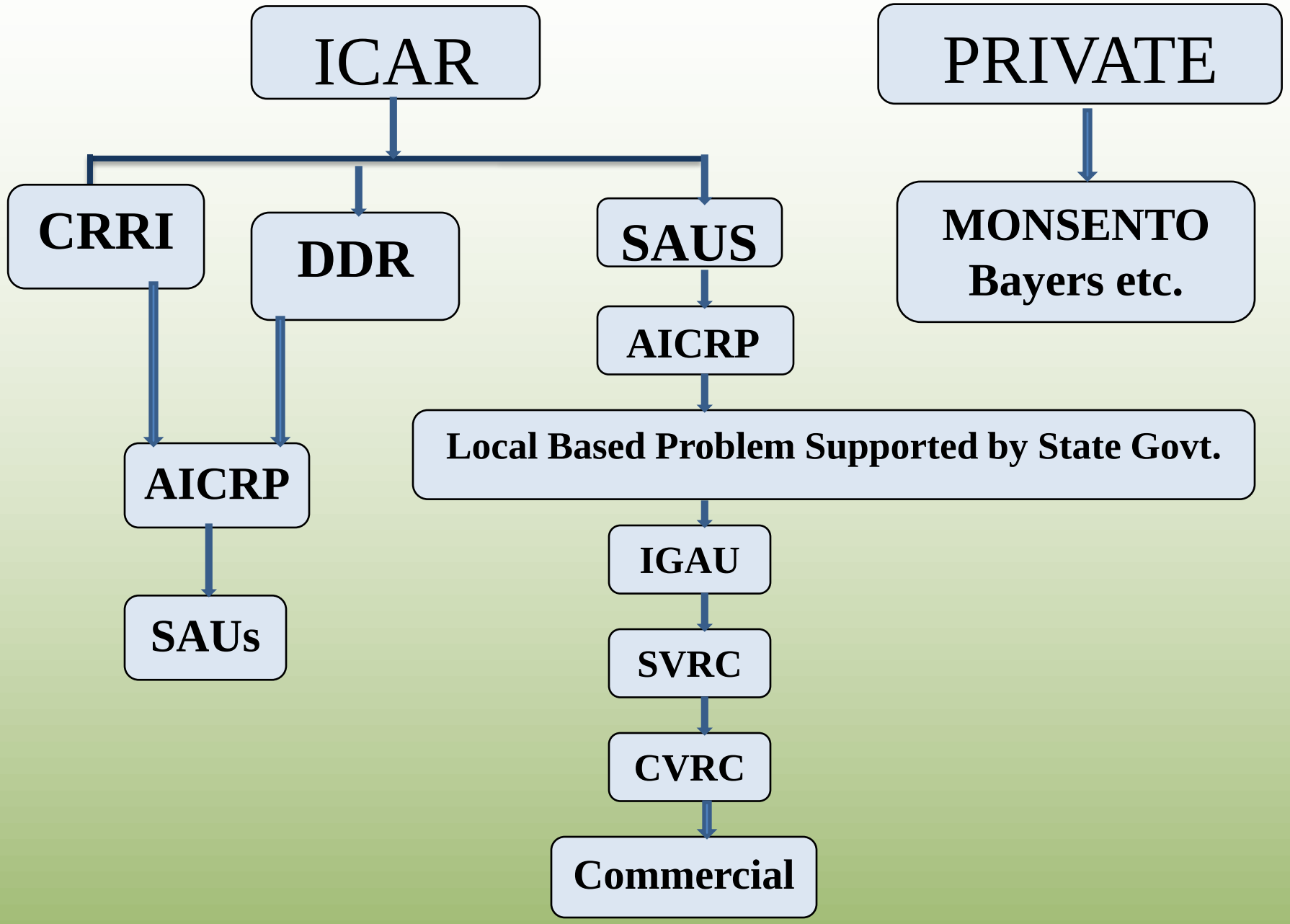
Agro-climatic zone	2002-04	2005-07
Chhattisgarh Plains	60	70
Bastar Plateau	04	17
Northem Hills	29	32
Chhattisgarh State	48	56

Area under irrigated & rainfed rice

Agro-climatic Zone	2002-04		2005-07	
	Irrigated	Rainfed	Irrigated	Rainfed
Chhattisgarh Plains	36	64	43	57
Bastar Plateau	01	99	04	96
Northern Hills	02	98	02	98
Chhattisgarh State	27	73	31	69

Note: Canal irrigation accounts for 69% of the irrigated area. Tubewell irrigation provided by govt. programs accounts for 14 -17% of the irrigated area.

Organization of rice research

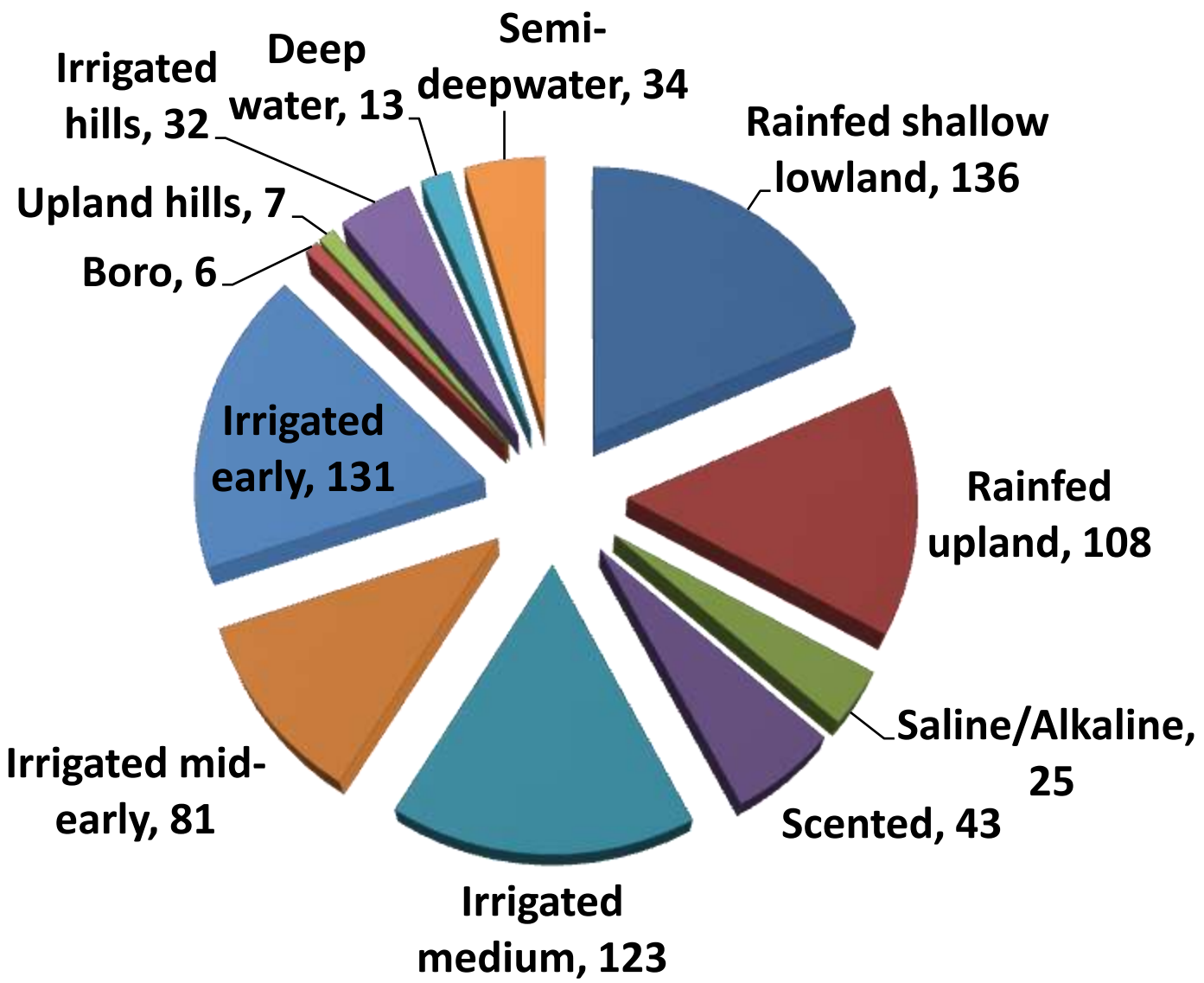


Rice varietal releases at national level

Ecosystem	2005	2009	Diff	% Δ
Rainfed shallow lowland	136	161	25	18
Rainfed upland	108	117	9	8
Saline/Alkaline	25	32	7	28
Scented	43	53	10	23
Irrigated medium	123	152	29	24
Irrigated mid-early	81	100	19	23
Irrigated early	131	138	7	5
Boro	6	11	5	83
Upland hills	7	7	0	0
Irrigated hills	32	37	5	16
Deep water	13	14	1	8
Aerobic		1	1	-
Others		2	2	-
Semi-deepwater	34	38	4	12
Total	**739**	**863**	**124**	**17**

May 2009 -- Total Rice Varieties = 863; Irrigated = 523; Rainfed = 338; Others = 2

Rice Varietal Releases at National Level, 2005



Rice varieties released by IGAU from 2001 to 2010

Name of Variety	Recommended Domain	Duration	Year released
Danteshwari	Upland conditions	100-105	2001
Bamleshwari	Irrigated condition for all soils	130-135	2001
Indira Sugandhit dhan 1	Irrigated conditions	125-130	2005
Samleshwari	Rainfed upland for Direct Seeding	105-112	2007
Chandrahausani	Irrigated and Rainfed Bunded	130-135	2007
Jaldubi	Rainfed shallow land & semi deep water	135-140	2007
Indira Sona Hybrid	Irrigated conditions	120-125	2007
Karma Mahsuri	Rainfed bunded medium to heavy soils	125-130	2007
Indira Barani Dhan 1	Rainfed shallow lowland conditions	125-130	2010
Maheshwari	Irrigated and Rainfed conditions	130-135	2010
Durgeshwari	Irrigated conditions	130-135	2010
Indira Rajeshwari	Irrigated & Rainfed conditions	120-125	2010

The University released 12 varieties of rice: 7 for Irrigated, 2 for Rainfed upland, 1 for Rainfed shallow land & 2 for Rainfed medium land, respectively.

Number of scientists and FTE

Particular	Number/FTE	Percentage
No. of scientists included in the survey	8	
FTE	5.5	69
No. of scientists by discipline:		
Plant Breeding & Genetics	7.0	88
Plant Pathology	1.0	12
FTE by discipline:		
Plant Breeding & Genetics	4.7	85
Plant Pathology	0.8	15

FTE by Theme

Theme	FTE	Percentage
Breeding	0.3	5
Breeding for better grain quality	0.2	4
Breeding for better grain quality and pest and disease resistance	0.4	7
Breeding for higher yield	1.5	28
Breeding for hybrid rice	0.6	11
Breeding for pest resistance	0.1	1
Breeding for disease resistance	1.3	23
Breeding for pest and disease resistance	0.1	2
Pest management	0.2	4
Conservation of germplasm	0.9	16
Total	5.5	100

FTE by Eco-system

Ecosystem	FTE	Percentage
Irrigated	1.93	35
Rainfed	1.48	27
Upland	0.59	11
Across ecosystem	1.51	27
Total	5.50	100

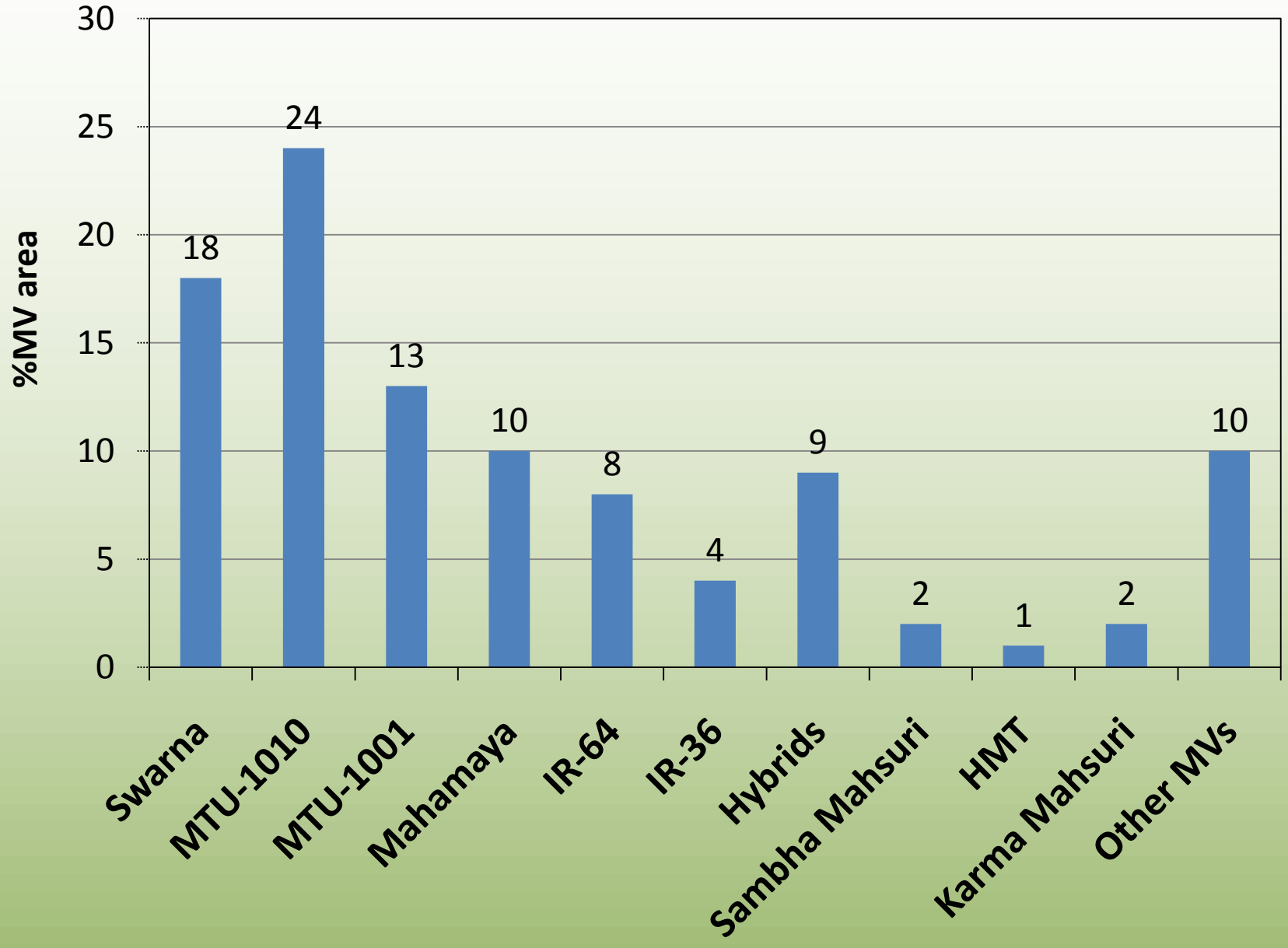
Expert Panel Estimates of MV Adoption

District	% MV Area
Bilaspur	88
Kanker	95
Dhamtari	98
Rajnandgaon	90
Raipur	85
Kawardha	80
Chhattisgarh Plains	89
Surguja (Northern Hills)	78
Bastar (Bastar Plateau)	40

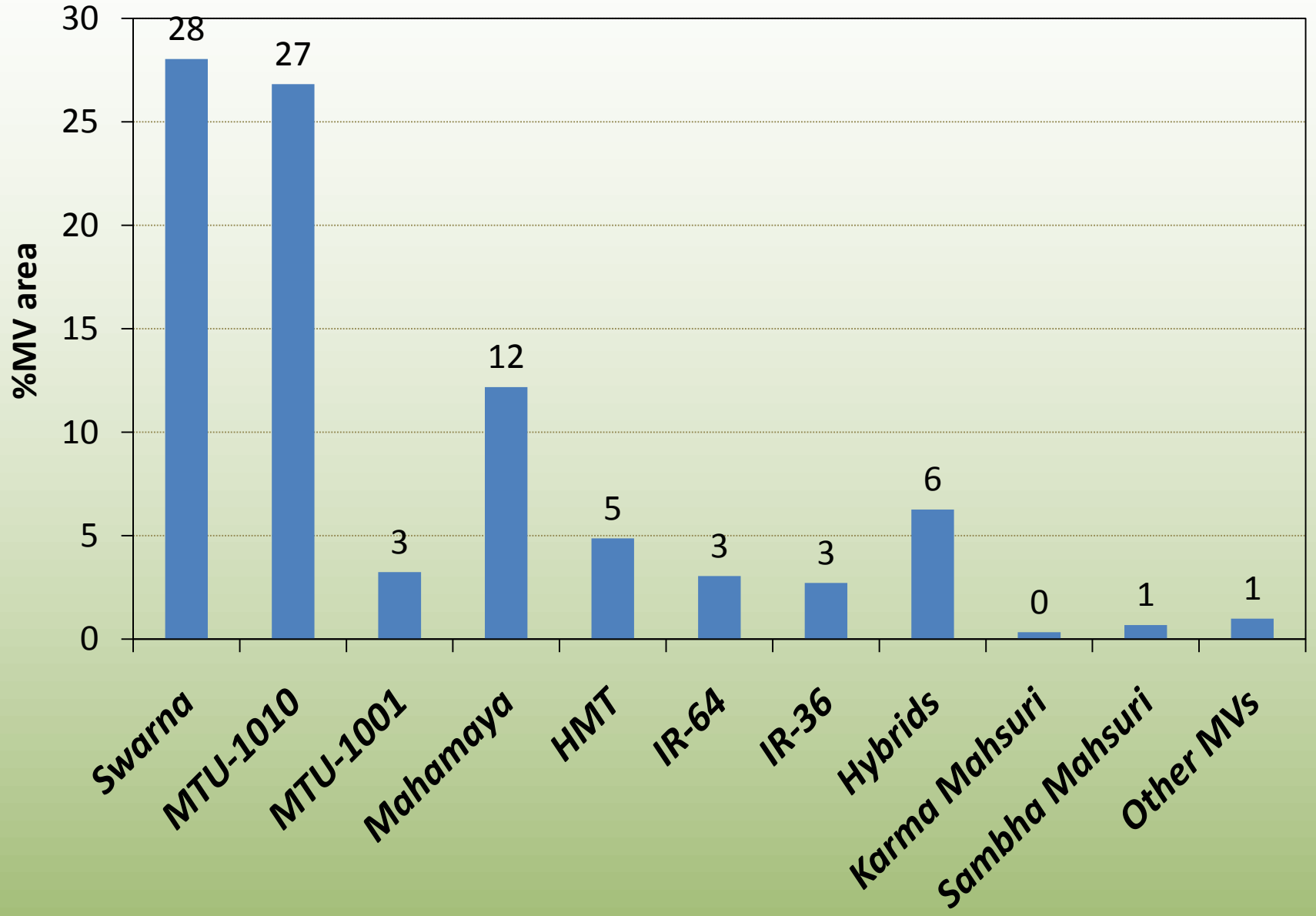
Expert Participation in Estimation Process

District	No. of experts				Total
	Scientists/PC/ SMS KVK	Agriculture Department	Farmers	Seed Sector	
Bilaspur	8	5	4	0	17
Kanker	5	2	7	1	15
Dhamtari	1	1	27	0	29
Rajnandgaon	0	3	12	1	16
Raipur	12	0	0	0	12
Kawardha	8	1	6	1	16
Surguja	0	0	9	0	9
Bastar	2	2	8	0	12
Total	36	14	73	3	126

MV Adoption estimates by Expert Panel



MV Adoption from Farm Level Survey



Lessons Learned in the Conduct of Expert Elicitation

- Investigators faced difficulties in organizing expert panel involving experts from outside the university system.
- Investigators having problems to get the consent from experts for finalizing the date, time and place to accommodate.

Conclusions

- Time allocation of rice scientists in IGAU is less for unfavourable environment (rainfed) possibly due to lower budget allocation. Budget allocation across ecosystems should be re-examined.
- Estimates of MV adoption obtained through expert elicitation are approximately the same as statistical records.
- Most popular variety is MTU-1010 followed by Swarna, MTU-1001, Mahamaya and IR-64 and together they cover 76% of area grown to MVs.
- Estimates of cultivar-specific adoption levels from expert elicitation are approximately the same as estimates from farm-level survey. Deviations were insignificant.
- Athough the approach provides quick and clean estimates with less manpower and cost, implementation should be conducted by administrative authorities.

Thanks