Estimating the Adoption Rate of Modern Rice Varieties in Bhutan

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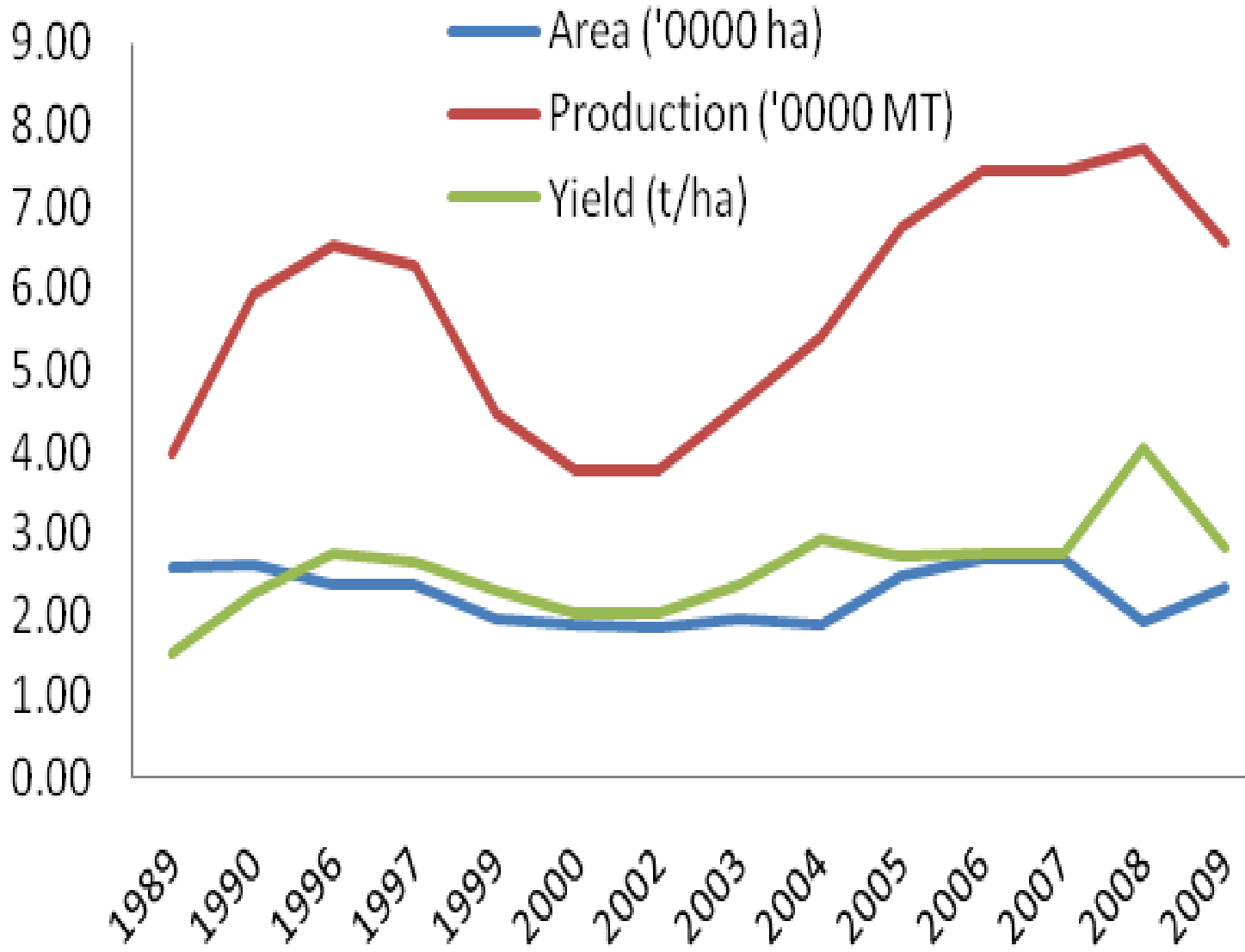
Background

- Rice an important food crop with over 69% of population engaged in rice farming
- Rice grown in about 23,444 ha with a total production of about 65,763 MT
- National average rice yield at 2.81 t/ha
- Domestic production of rice meets only about 50% of total requirement
- Rice AEZs – high, mid and low corresponding to warm temperate, dry and humid subtropical and wet subtropical zones respectively

Fig 1: Area, Production and Yield of Rice



Objectives

- Main objectives of this paper to update available information on adoption of modern rice varieties in Bhutan and quantify resource investment in rice research and development
- Bhutan - a collaborator of TRIVSA project with IRRI
- TRIVSA aims to attain a wider understanding of key aspects of performance of food crops genetic improvement and gain a deeper understanding of adoption and diffusion of new varieties
- This paper based on the results obtained so far from the project

Methods

1. Assessment of improved rice varieties

-- country/VRC records

2. NARES investment in research

-- questionnaire survey of rice scientists

3. Estimation of adoption rates

Expert Panel

- Quick and easy approach
- 12 local experts including breeders, agronomist, extension, seeds and farmers rep
- Forms used for data capture
- Altitudinal classification
- Data types – area coverage overall and altitude wise, variety specific adoption rates, most popular varieties

Methods

Household survey

- 8 main rice districts covered in high, mid and low altitude
- Multistage random sampling used
- 4 blocks from each district, 3 villages from each block and 3 households from each village
- Total sample size of 288 households
- Data entry, validation and analysis by RDC Bajo and IRRI
- Data types: general information, cultivation of improved varieties , traits of the improved varieties, inputs used

Key Results

Modern Varieties

- Rice research started in 1982
- Institutional links with IRRI from 1984
- First release of modern rice variety in 1988
- So far, 23 rice varieties released for all AEZs
- 15 are introductions and 8 locally developed for blast and cold tolerance
- Most varieties for irrigated ecosystem
- 2 varieties released for rainfed in 2010

Key Results

Resources and their allocation

- National rice program with 5 scientists allocating 30-60% of their time
- Spread across institutes/AEZs/ecosystems
- Plant breeding (40%), agronomy (40%) and crop protection (20%)
- Within breeding, variety develpment for high yield, blast resistance and drought tolerance
- Germplasm conservation an important activity

Allocation of rice research resources

Ecosystem	Actual FTE person-year				
	WT	DST	HST	WST	Total
Irrigated	0.67	0.61	0.21	0.18	1.67
Rainfed					
Lowland	-	-	-	0.18	0.18
Upland	0.10	-	-	-	0.10
Total					1.95
% share of each AEZ	39	31	11	19	

Expert panel estimate of area under HYV

Zone	% share in total rice area	Expert estimate of area under HYV in 2010 (%)	Area under HYV based on a previous study (Shrestha 2004) (%)
High	20	80	66
Mid	45	40	38
Low	35	55	17
All	100	53	35

Cultivar-specific adoption (%Area)

Varieties	Expert estimates		
	High	Mid	Low
Khangma Maap	50	0	0
Yusi Rey Maap	23	0	0
Yusi Rey Kaap	13	0	0
No 11	3	0	0
Jakar Rey Naab	3	0	0
IR 64	0	50	0
Wengkhar Rey Kaap	0	20	0
Bajo Maap	0	10	0
BR 153	0	0	70
Bhur Rey Kaap	0	0	10
Bhur Kamja	0	0	6
Other MVs	8	20	14

Comparison of expert estimates and household survey results (%)

Zone	% share in rice area	Expert estimate	Household survey
High	20	80	83
Mid	45	40	19
Low	35	55	46
All	100	53	42

Concluding Remarks

- National rice research program small with limited resources
- Overall research investment insignificant and resources spread thinly among ecosystems
- Nonetheless, 23 rice varieties released so far
- Comparative expert panel estimation and household survey to assess adoption rates
- Expert elicitation showed adoption rate as 53%
- Household survey results showed 42%
- Overall good match between the two but with discrepancies (expert estimation of 40% vs household survey 19% for mid altitudes)

Concluding Remarks

- The expert panel discussion organized for the first time in the country
- It was felt that it lacked adequate representation from all rice ecosystems and stakeholders
- Generally, estimates derived from expert panel were higher than household survey results
- Reasons for discrepancy could be errors in expert panel or household surveys or both
- One way to correct biases in expert panel-based estimates to have a larger number of local experts
- Expert estimation saves time and resources, and needs to be further developed and used more often.

THANK YOU FOR YOUR ATTENTION!