A scenic view of a mountain range with snow-capped peaks and a small village in the foreground. The mountains are rugged and covered in snow, with some green patches on the lower slopes. The village consists of several small, stone buildings with dark roofs. The sky is clear and blue.

Estimating cultivar specific adoption of improved rice varieties in Nepal

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Objective of the paper

This paper aims at providing information on:

- Rice area, production and yield and their trends in Nepal
- Rice research investment, variety release pattern and cultivar specific adoption of rice
- Analysis of expert panel survey, defects and ways to improve the efficiency of the method

I hope

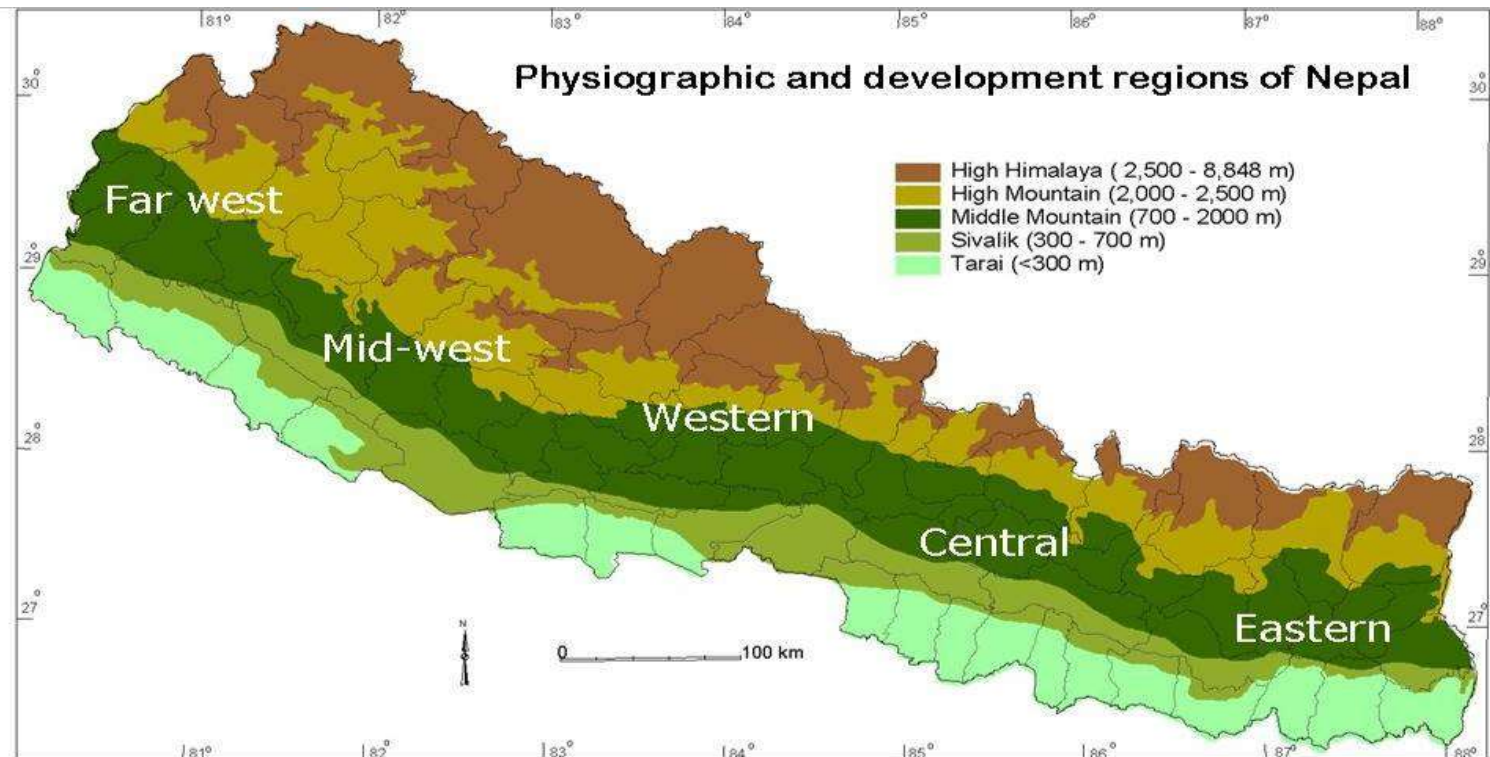
- These information will be important for rice technology intervention, varietal selection and development in future
- Assess the implication of panel survey as an approach for wider technology adoption studies

Introduction

- Rice grown on half of the total cropped area - accounts for >half of the total food grain production
- Contribute 20% to the AGDP
- >70% of the farm population depends on rice farming for their livelihood
- Supplies 40% of the food calorie intake of Nepali people
- Grown under a wide range of agro-ecological conditions from lowland in Terai (50 masl) to valley and mountain (2830 masl)
- 70% rice area in Terai , 26% in hills and only 4% in mountains
- Production: 72%, 25% and 3% respectively
- Total rice area- almost 1.5 million ha and yield is 2.7 t/ha
- Mainly cultivated during wet season-spring also (early rice)
- Western mid-hill- directly seeded-rapidly disappearing

Rice area, production and yield by development region (2009/10)

Particulars	Western	Mid-west	Far west	Eastern	Central	Nepal
Total rice area (ha)	325719	165939	143531	440653	408378	1481289
Production (t)	979597	492267	338086	1142137	1171860	4023823
Yield (t/ha)	3	2.9	2.35	2.59	2.87	2.71

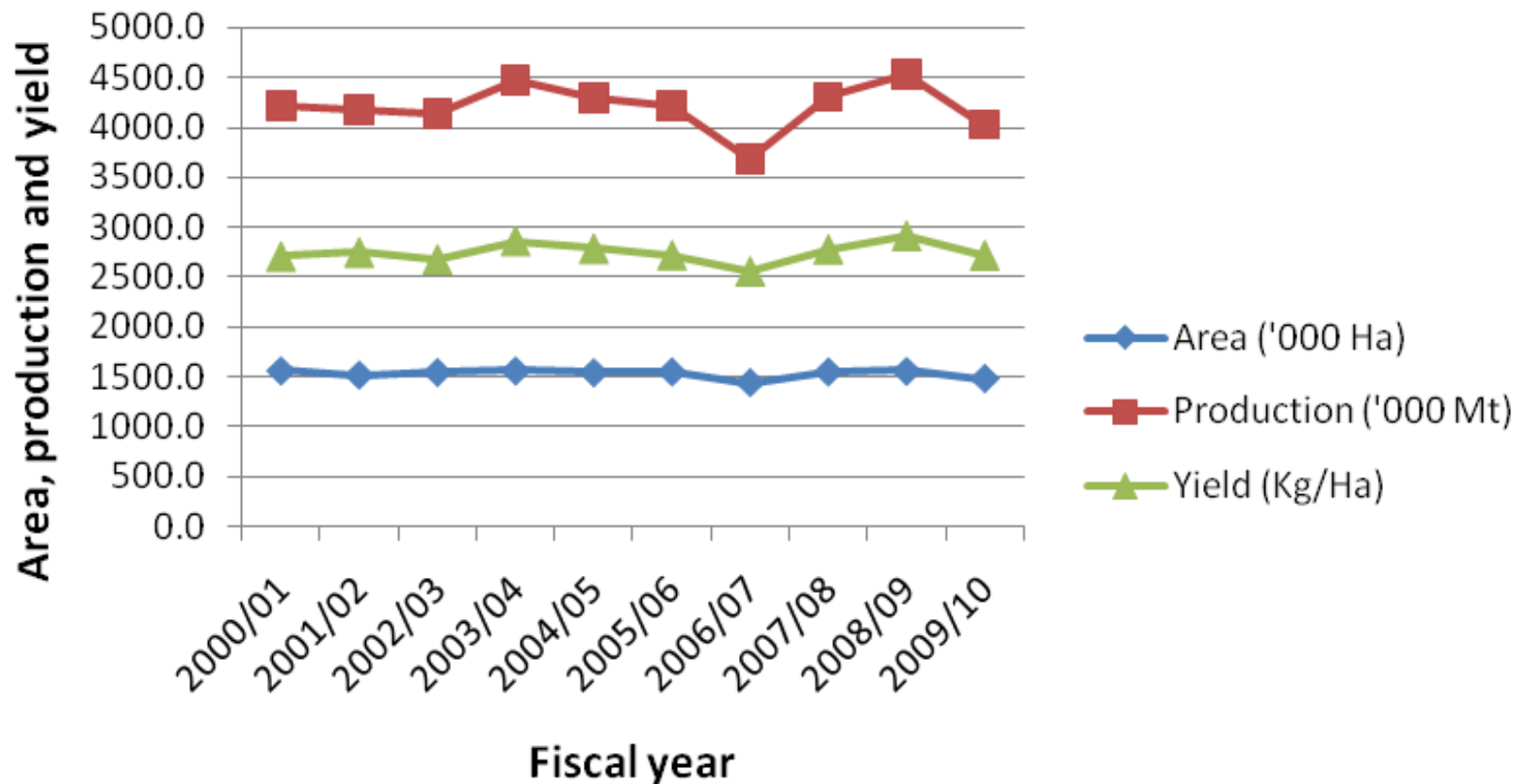


Rice area, production and yield by ecological region

<i>Ecological region</i>	<i>Rice area</i>		<i>Rice production</i>		<i>Yield (t/ha)</i>
	(000 Ha)	Percent	(000Mt)	Percent	
Mountain	62.2	4.2	114.6	2.8	1.8
Hills	387.7	26.2	1004.3	24.9	2.6
Terai	1031.5	69.6	2905	72.2	2.8
Nepal	1481.3	100	4023.8	100	2.7

Rice over time in Nepal (2000-2010)

Trend of rice area, production and yield in Nepal
(2000/01-2009/10)



Rice area and yield by variety type

<i>Particular</i>	<i>Irrigated</i>		<i>Rainfed</i>		<i>Total</i>	
	MV	TV	MV	TV	MV	TV
Mountain						
Area (%)	35.7	1.2	51.5	11.7	87.2	12.8
Yield(t/ha)	2.5	1.8	1.8	1	2.1	1.1
Hill						
Area (%)	43.1	3.3	39.7	13.9	82.8	17.2
Yield(t/ha)	3.3	2.1	2.3	1.8	2.8	1.8
Terai						
Area (%)	56.0	3.8	33.3	6.9	89.3	10.7
Yield(t/ha)	3.4	2.3	2.5	2	3.1	2.1
Nepal						
Area (%)	51.9	3.6	35.7	8.9	87.6	12.4
Yield(t/ha)	3.4	2.2	2.4	1.8	3	2

Rice research in Nepal

A. Organization of rice research

- Agricultural research - mainly the government sector responsibility
- NARC sole government organization to conduct rice researches
- IAAS rice research in collaboration with some national and international agencies
- Few NGOs - also working - focus on participatory varietal selection
- Rice research in Nepal began in 1950s with the collection and evaluation of 930 rice germplasm on the agricultural research farms (Mallick, 1981)
- However, a systematic coordinated rice research program began in 1972-National Rice Improvement Program (NRIP) established

Rice research.....

B. Resource allocation in rice research

- Human resource capacity in rice research is currently limited, even though NARC has a fairly good number of researchers (total of 474)
- Only 50 researchers are involved in rice research across the country either full- or part-time
- Only 10 were involved on a full-time basis
- Plant breeding and agronomy accounted for the highest proportion of the FTE researchers

Rice research.....

C. Budget investment in rice research

- Expenditures per FTE researcher estimated to be about US\$5,930 at current price (Gauchan and Pandey, 2011)
- This budget covered current operational research costs, staff salary, cost of research support staff, and administrative and capital costs
- Staff salary accounted for a large share (51%) of total costs
- However; salary of researcher in Nepal is very low (region/international level)-\$15,780 in eastern India and \$21,110 in rest of India in 2000 (Pandey and Pal, 2007)

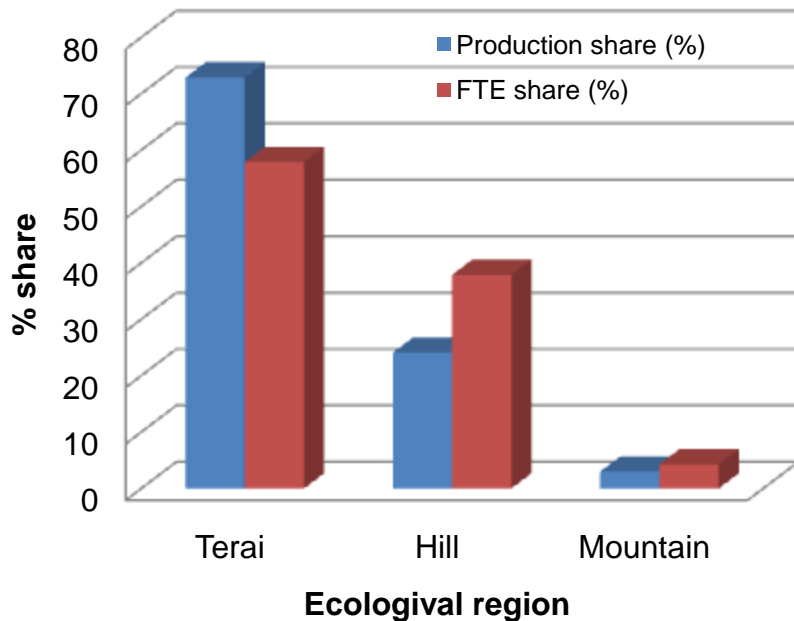
Rice research budget to total agri- research budget

<i>Year</i>	<i>Operational rice research budget (US\$000)</i>	<i>Rice research to operational agri-research budget (%)</i>
2001/02	146	5.7
2002/03	50	4.1
2003/04	47	3.8
2004/05	66	5.21
2005/06	41	4.27
2006/07	51	4.34
2007/08	49	3.69
2008/09	27	2.21

The share of actual operational agricultural research budget during the period estimated to be 30% of the total agricultural research budget. Thus, actual expenditures available for rice research is very low.

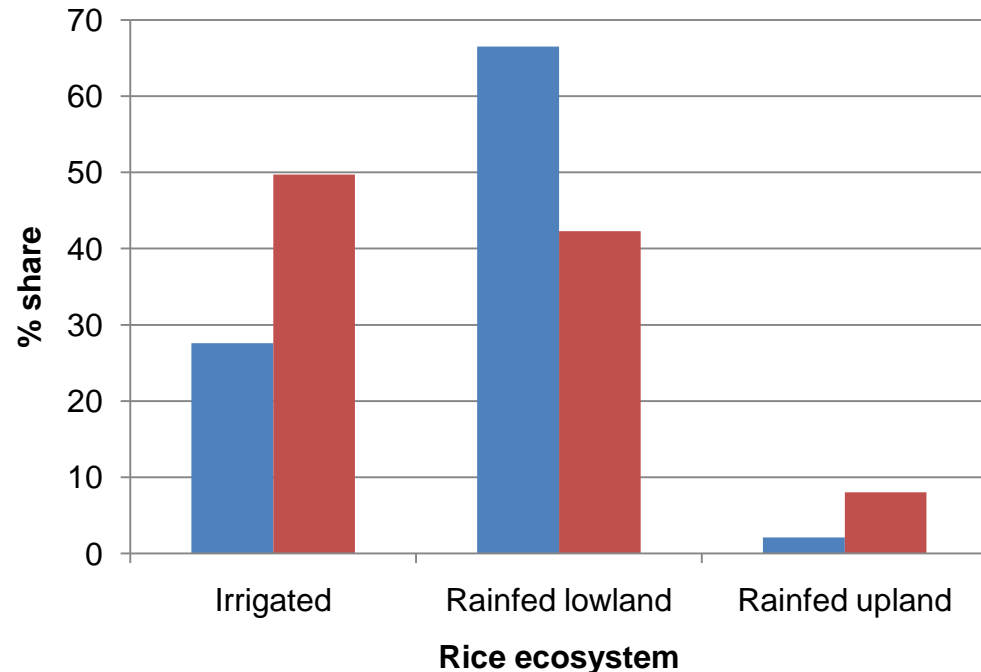
Full Time Equivalent in rice research

Fig: Production and FTE share by ecological region



FTE: Terai=58 (73%), hill 38 (24%)

Fig: Production and FTE share by rice ecosystem



- FTE: Rainfed-less-42 (68%); irrigated=50 (33%)
- Rainfed upland slightly overinvested-rainfed lowland-underinvested in terms of FTE

Pattern of rice variety release

- Since 1966 -CH-45 released
- 67 varieties released- 13 early rice and 54 main season rice
- Agro-ecological condition forms the principal basis
- All the varieties released before 2000-ecological region wise recommendation
- However, in recent year (2010 /2011)-ecosystem wise recommendation- some stress tolerant varieties released (Sukhadhan-1, 2, 3; Swarna sub-1, Samba sub-1)
- Regarding time-one-third after 2000

Pattern of rice variety release

- Among the varieties released - 43% recommended to terai only; 26% for both terai and hill and the rest 31% for hill (including valleys) only.
- Regarding the maturity days, 30% short (100-125 days) varieties, 9% medium (125-135 days) and 61% long (more than 135 days)

List of varieties released during 2000-2011

Variety	Released year	Maturity (days)	Recommendation domain
Manjushree-2	2002	149	Kathmandu valley
Khumal-11	2002	144	Kathmandu valley
Chandannath-1	2002	191	Jumla valley and similar high hills
Chandannath-3	2002	191	Jumla valley and similar high hills
Hardinath-1	2004	110	Terai, Inner terai
Loktantra	2006	130	Terai, Inner Terai, Mid-hills (3000 fit)
Khumal-8	2006	158	Terai, Inner Terai, Mid-hills
Mithila	2006	145	Terai
Ramdhan	2006	133	Terai, Inner terai
Barkhe-3004	2006	157	Terai, Inner terai
Pokhareli Jethobudho	2006	185	Pokhara valley (600-900 masl)
Sunaulo Sugandha	2008	145	Western terai
Lalkabasmati	2010	150	Central and Estern terai
Ghaiya-1	2010	115	Terai, Inner terai, Mid-hills
Hardinath-2	2010	125	Terai, Inner terai
Tarahara-1	2010	113-115	Eastern and Central terai
Khumal-10	2010	140-145	Mid-hills
Khumal-13	2010	140-145	Mid-hills
Sukhadhan-1	2011	125	Rainfed terai, Foothill
Sukhadhan-2	2011	125	Rainfed terai, Foothill
Sukhadhan-3	2011	125	Rainfed terai, Foothill
Swarna sub-1	2011	150-155	Irrigated terai/Flood prone area
Samba sub-1	2011	145-150	Irrigated terai/Flood prone area

Cultivar specific adoption

- Expert panel survey (HH Survey and CI – going on) - 26 districts - in 2010 (will be 28)
- DADO office
- Both individual and group estimate
- Participants:
 - DADO
 - Agronomist
 - Planning officer
 - Extension officer
 - Breeder
 - JT/JTA working in DADO and/or service centers especially experienced in rice
 - Private sector seed dealers

Cultivar specific adoption.....

MV: 15-96%; All=85%

1. Radha-4
2. Sabitri
3. Bindeshwori
4. Gorakhnath
5. Sawa masuli

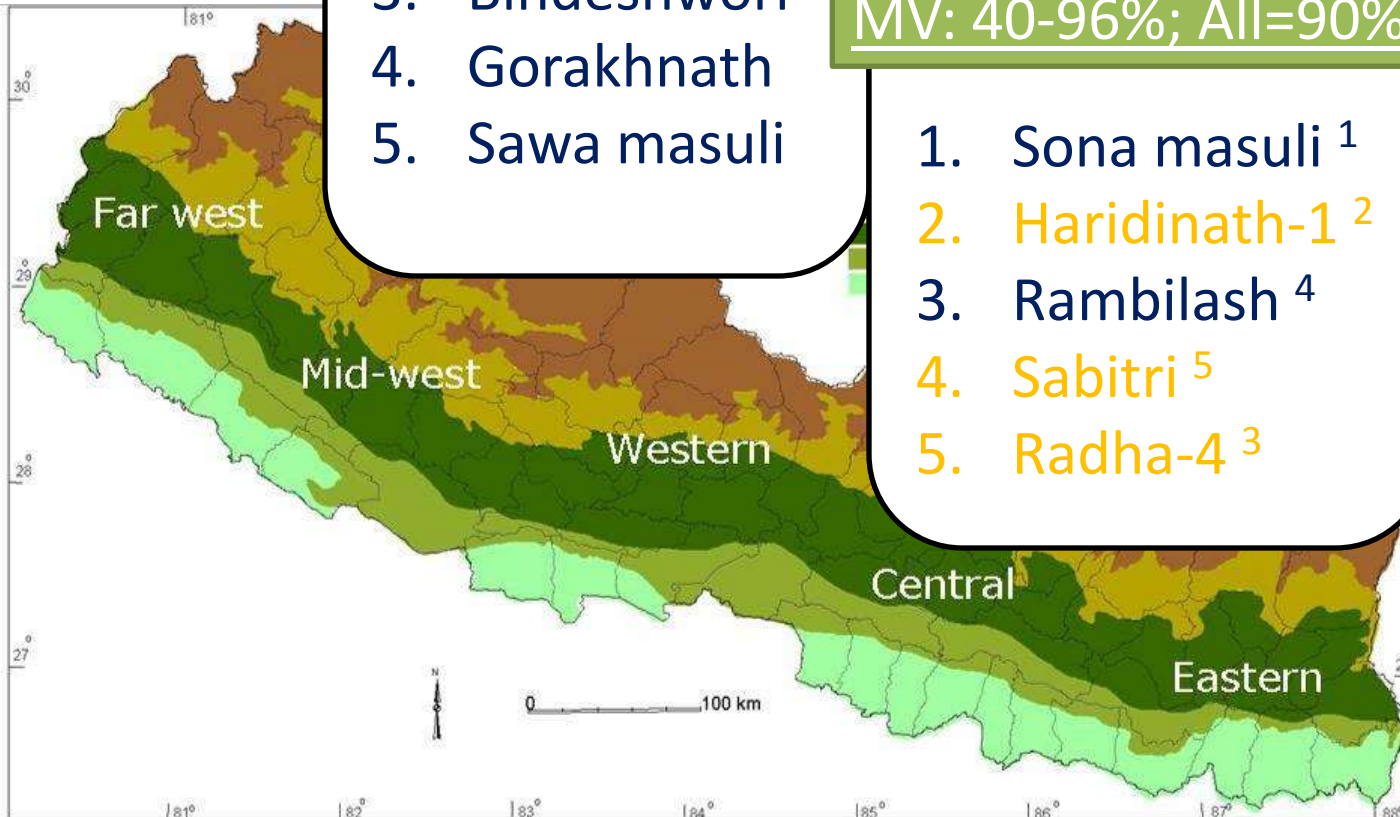
MV=88% in totality (MOAC exactly same)

MV: 40-96%; All=90%

1. Sona masuli ¹
2. Haridinath-1 ²
3. Rambilash ⁴
4. Sabitri ⁵
5. Radha-4 ³

Terai

Both hill and terai



Hill less MV area

- Poor access to MV
- Unavailability of suitable varieties

Strength and weaknesses of expert panel as a survey tool - researchers' view

Panel strength

- Effective tool for quick assessment of cultivar specific adoption-which will otherwise be time consuming and lengthy process
- Low cost method
- For broader study of technology adoption - might be the cheapest technique
- Important database generation
 - No official cultivar specific adoption data in Nepal-valuable information for GOs and NGOs working on rice research and development-equally important to private sector seed traders

Strength and weaknesses.....

Panel weaknesses

- Some contradiction with secondary information in some districts
- Dispute among the representatives from different sectors
- Question of authenticity of information generated
- Domination of seniors
- Difficulty in identifying knowledgeable participants and appropriate time venue for meeting

How will panel be more effective?

- Participants from diversified field/organization/sectors
- More participants should be field based workers
 - Officers who live in centre-rely more on secondary information they have already developed
- Some incentives will encourage active participation
- However, incentives increases unnecessarily more number of participants though are not knowledgeable
- Facilitators role to avoid domination
- Involving appropriate no. of participants (5-10)-if more unnecessarily more cost but not necessarily more and correct information

Conclusion

- Research investment in rice in terms of both the operational research budget and FTE researchers-negligible- inadequate technology development-poor productivity growth
- Total investment in rice research in the country is not yet adequately studied - IAAS and NGOs' investment?
- Research investment-not proportionate to production share of different ecosystems and ecological regions
- Expert panel survey - a pioneer job and an innovative approach-quick and cost effective also
- However, verification through HH survey and Community interview utmost necessary

Conclusion.....

- MV adoption is comparatively low in hill – due to poor access to improved variety seeds and poor suitability of released varieties in higher altitude
- Ecosystem wise recommendation - new approach-this strategy should be continued to make available the varieties suitable to different ecological regions, ecosystems and socio-economic conditions
- Research focus on developing drought tolerant varieties ((Rainfed rice two-third of rice production))
- Majority of improved varieties released - long duration varieties - farmers' demand short duration varieties - to be considered in investing limited capital on rice research in the future

Thank you

Thank you

