



for Targeted Breeding

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IRRI's Market Research Team (MRT)



About us

Consumer preferences and VC assessment

Preference prioritization

Varieties

Characterization

I4Rice

Blog



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How

do we make rice breeding more market-oriented?

IRRI

1. Making R&D more market-driven

- Consumers' preferences
- Stakeholders' preferences
- Demand, market segments
- VC constraints & opportunities
- Standards, business models
- Short-medium term

2. Making rice markets more R&D-driven

- Testing new products
- Testing new marketing strategies
- Testing new business models
- Building demand, markets
- Altering prefs, purchase behavior
- Medium-long term

Market

Demand for traits comes from 2 directions



PRODUCT PROFILE: IRRIGATED – SE ASIA

TARGET REGIONS:

Philippines, Indonesia, Vietnam

MUST TRAITS:

- High yield
 - Phil: Rc82, Rc222; Indon: Ciherang
- Lodging resistant
- Grain quality: long slender, intermediate AC, low chalkiness (<15%), high milling recovery
- **Bacterial leaf blight** (min. level = PSBRc82)
- **Brown plant hopper** (min. Level = PSBRc82)
- (Phil.+Indon.) Tungro virus resistance (min level = ?)

1. Standard
2. Aromatic
3. Nutrient-enriched

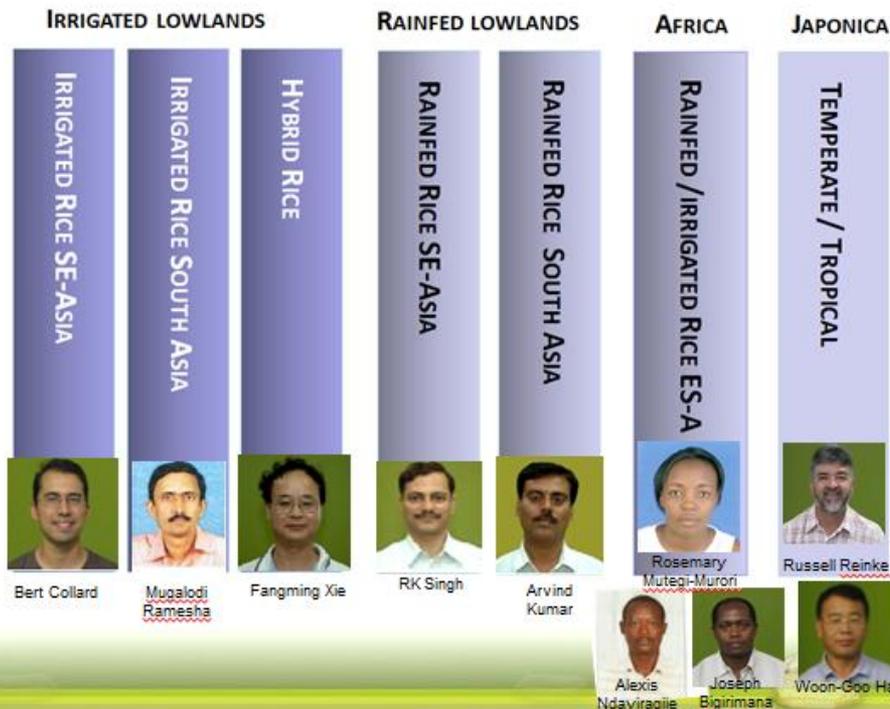
RANGE TRAITS:

- Blast resistance
- Maturity: very early (<=90 days) to early (<120 days)
- Aroma (specific)*

WIN TRAITS:

- Submergence tolerance (Sub1) wet season
- Maturity: 90-100 days with high yield
- Chalkiness (<5%)
- High head rice yield (>55%)
- High Zn and/or Fe
- No cadium
- False smut tolerance

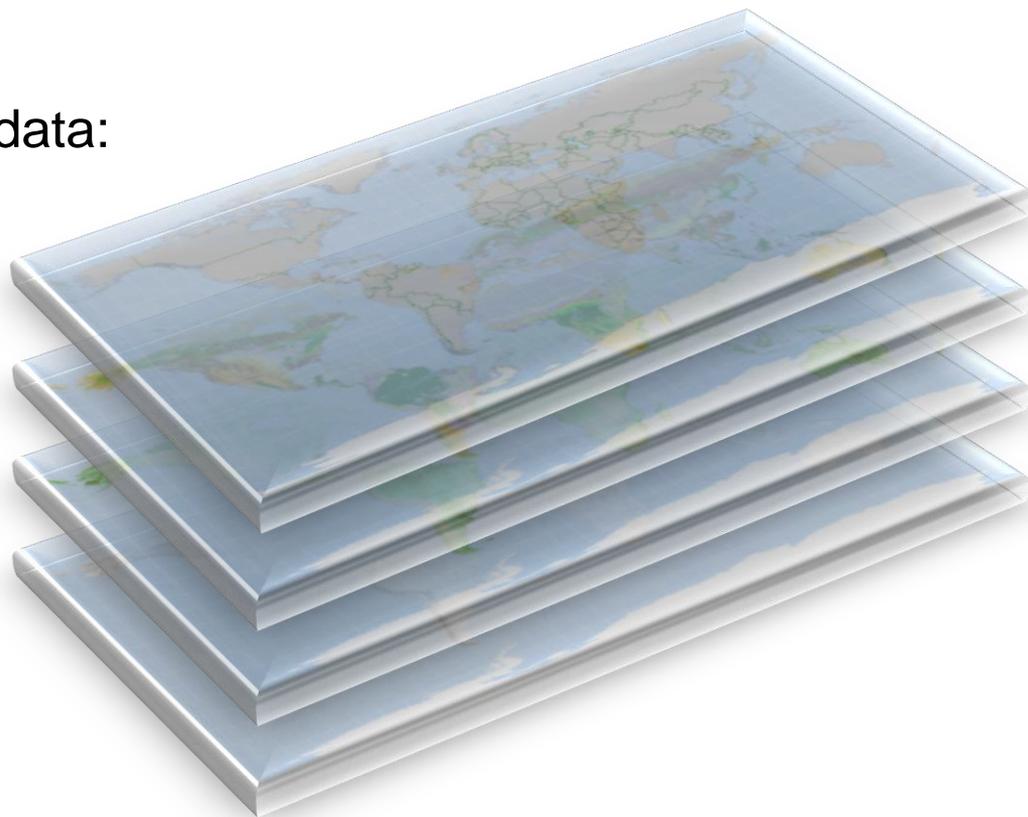
IRRI VARIETY DEVELOPMENT PIPELINES



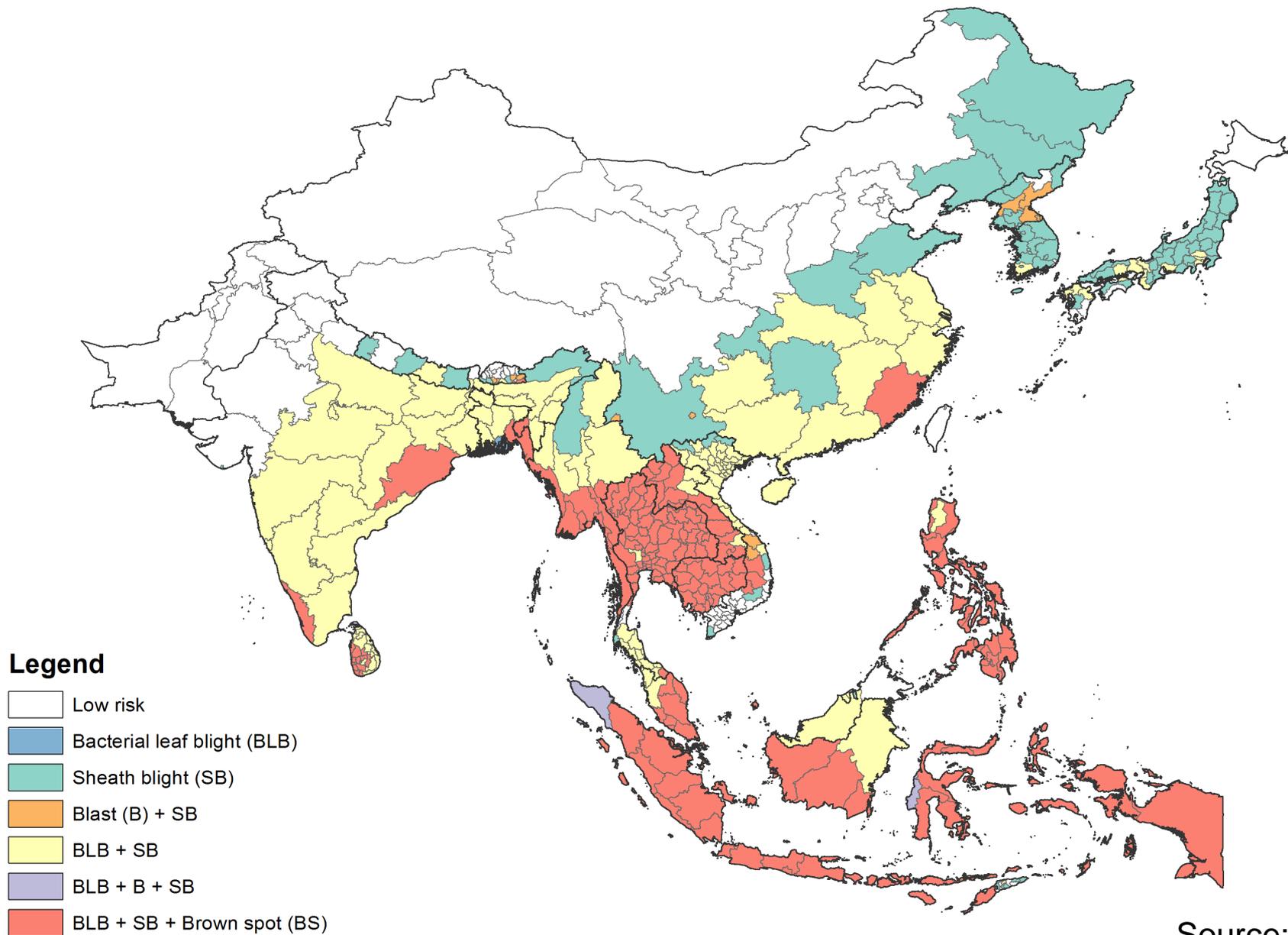
Characterization of rice environments

Collection of geo-referenced data:

- ✓ area & production
- ✓ crop calendar
- ✓ crop establishment
- ✓ cropping intensity
- ✓ climate
- ✓ rural/urban population
- ✓ rural/urban poverty
- ✓ consumption
- ✓ biotic stresses (BLB, blast, sheath blight, brownspot)
- ✓ abiotic stresses (drought, flood, temperature)



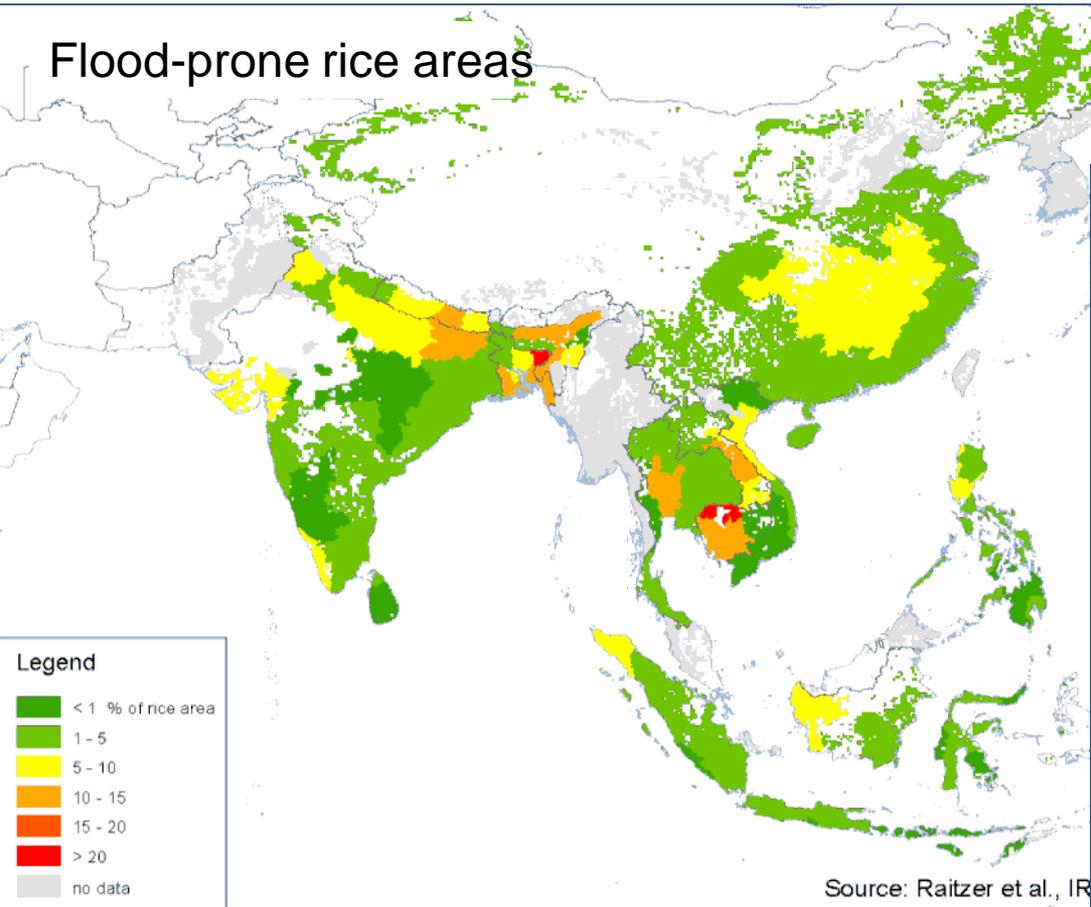
BIOTIC STRESS



Source: A. Sparks

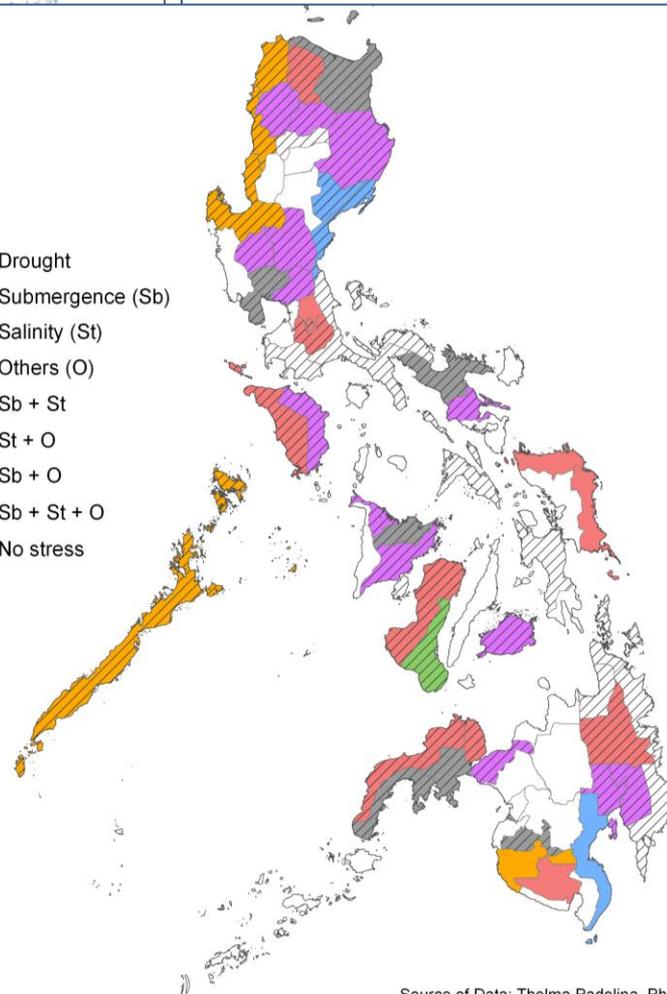
ABIOTIC STRESS

Flood-prone rice areas



LEGEND:

- Drought
- Submergence (Sb)
- Salinity (St)
- Others (O)
- Sb + St
- St + O
- Sb + O
- Sb + St + O
- No stress



Consumer preferences



What kind of rice do consumers want?

An assessment of preferences of urban consumers in India and Bangladesh

By Marie Claire Custodio, Joanne Ynion, and Matty Demont

Dr. Laborte is a scientist and CGIAR specialist in the Social Science Division (SSD). Dr. Demont is a senior consultant and leader of the SSD market and value chain research team, which includes Ms. Custodio, senior associate scientist; Ms. Ynion, assistant scientist; and Mr. Pajonigan, CGIAR and database management specialist.

At least a third of the world's rice is produced and consumed in South Asia. By 2025, about 160 million tons of rice will be needed to feed South Asia, about 40% of which will be consumed in urban areas. Income growth, urbanization, and other socioeconomic transformations have affected consumption and preferences for food including rice. To understand the current rice preferences and have a basis for projections of future demand for rice quality, we interviewed 1,800 rice consumers in 11 major cities in East and South India and Bangladesh. This is part of an ongoing study by the Market Research Team at the International Rice Research Institute (IRRI) to understand market demand for rice quality traits and characteristics, and to contribute to the development of product profiles for a more targeted rice breeding program at IRRI and its national partners. Our preliminary results are presented here.



Major cities can be important leverage points for farmers if they succeed in matching grain quality with urban consumer preferences.

Profile of respondents

Category	East India	South India	Bangladesh
Gender	28% Male, 72% Female	0% Male, 100% Female	7% Male, 93% Female
Socio-economic class	40% Low, 40% Middle, 20% High	40% Low, 40% Middle, 20% High	40% Low, 40% Middle, 20% High
Family size	4-5 members	4-5 members	4-5 members

Consumer preferences for size, shape, and aroma

Region	Preference for long-grain rice	Preference for medium-grain rice	Preference for short-grain rice
East India	55%	35%	10%
South India	55%	35%	10%
Bangladesh	55%	35%	10%

Consumer preferences for grain size in different cities in East India

City	Long-grain rice	Medium-grain rice	Short-grain rice
Delhi	80%	15%	5%
Chennai	71%	24%	5%
Mumbai	65%	28%	7%
Bombay	65%	28%	7%
Delhi	71%	24%	5%

Under consideration for publication in *Global Food Security*

Increasing food security in Asia through consumer-focused rice breeding

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E-mail address: m.custodio@irri.org (M.C. Custodio).



Rice Grain Quality and Consumer Preferences: A Case Study of Two Rural Towns in the Philippines

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* These authors contributed equally to this work. † These authors also contributed equally to this work. * mcinley@irri.org

Abstract

Hedonic pricing analysis is conducted to determine the implicit values of various attributes in the market value of a good. In this study, hedonic pricing analysis was applied to measure the contribution of grain quality and experience attributes to the price of rice in two rural towns in the Philippines. Rice samples from respondents underwent quantitative routine assessments of grain quality. In particular, gelatinization temperature and chalkiness, two parameters that are normally assessed through visual scores, were evaluated by purely quantitative means (differential scanning calorimetry and by digital image analysis). Results indicate that rice consumed by respondents had mainly similar physical and chemical grain quality attributes. The respondents' revealed preferences were typical of what has been previously reported for Filipino rice consumers. Hedonic regression analysis showed that grain quality characteristics that affected price varied by income class. Some of the traits or socioeconomic factors that affected price were parent broken grains, gel consistency, and household per capita rice consumption. There is an income effect on rice price and the characteristics that affect price vary between income classes.

OPEN ACCESS

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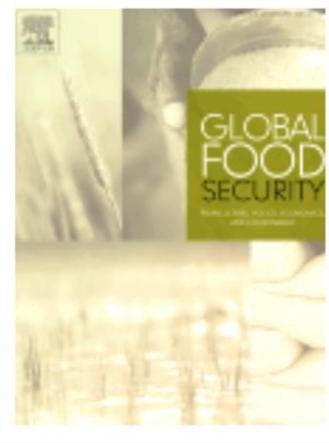
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Data Availability Statement: All data are hosted by the Harvard Dataverse (<https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7927/H7TQ-ND0000>). Data are also hosted at IRRI (<http://data.irri.org/harvarddataverse>) under Project ID: 96.

Funding: The cost of data collection and grain quality analysis were covered through funds available from the Global Rice Science Partnership (GRSP). More information about GRSP is available at www.grsp.org. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

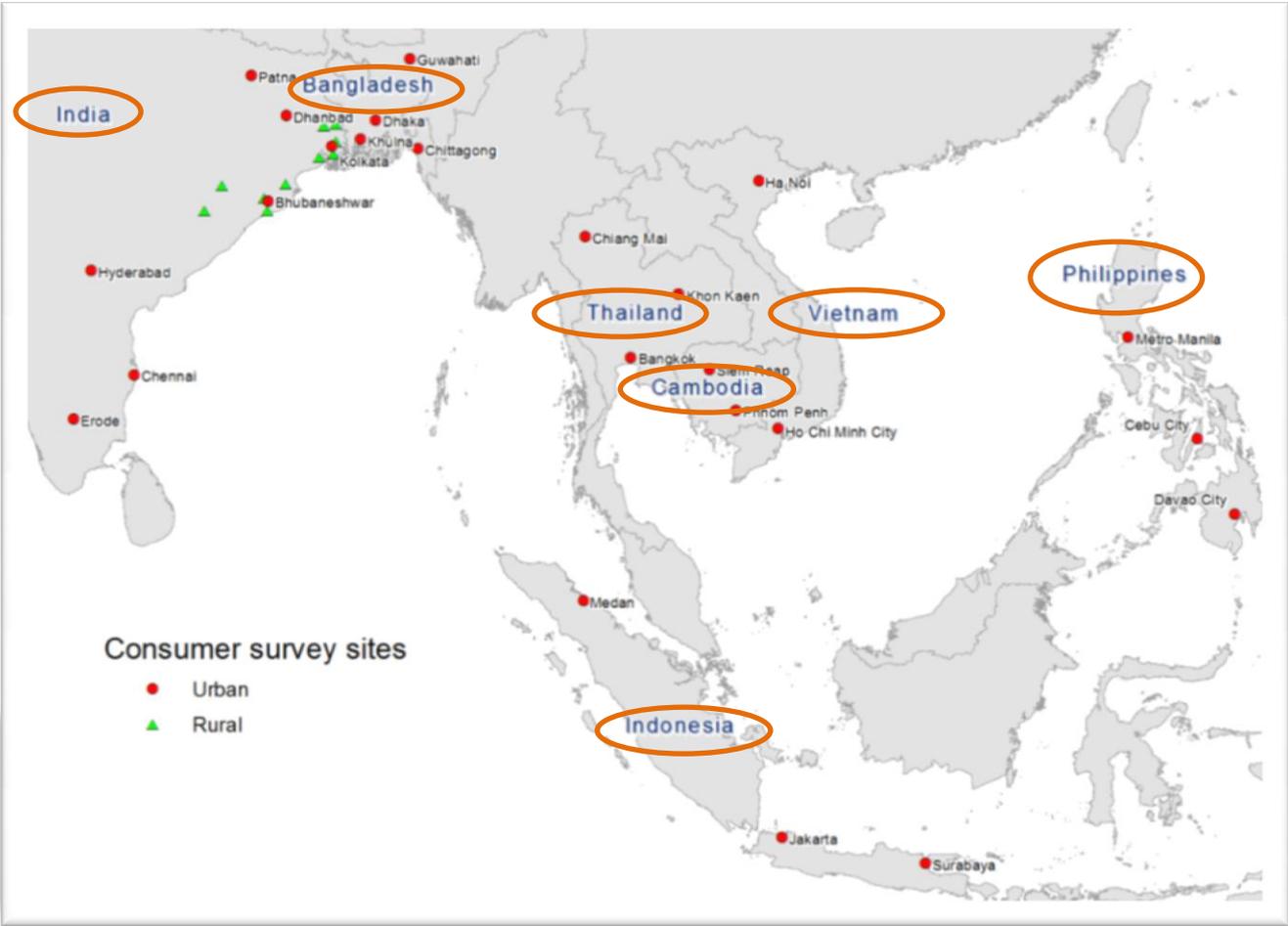


GLOBAL FOOD SECURITY

6, 2016 1/17

Consumer surveys

Consumer surveys: 24 cities in 7 countries



Questionnaires in local languages and Visual stimuli

	PROJECT PEARL Master Questionnaire Rapid Appraisal Master	RESPONDENT #: RECRUITER: INTERVIEWER:
Respondent's Full Name _____		
Address _____		
Postal Code _____ Country _____ City _____		
Telephone Number (Mobile) _____ (Home) _____		
E-mail address: _____ @ _____ Interview Date: _____		
Interview Time Start _____ End _____ Interview length (in mins) _____		

India		
Code	N	
Chennai (South)	1	250
Erode(South)	2	150
Hyderabad (South)	3	200
Kolkata(East)	4	200

INTRODUCTION:
Good morning / afternoon / evening. I am _____ from InsightAsia Research Group. We are currently conducting a market research study on some household grocery products. Can you spare me a few minutes of your time? I need to ask you a few questions to see if you are suitable to participate in our survey.

নমস্কার আমার নাম _____ আমি ইনসাইট এশিয়া রিসার্চ গ্রুপ থেকে আসছি। বর্তমানে আমরা কিছু পরিবারের মুদি পণ্যের উপর একটি মার্কেট রিসার্চ সমীক্ষা পরিচালনা করছি। আপনি কি আমাকে আপনার কয়েক মিনিট অনাবশ্যক সময় দিতে পারবেন। আমি আপনাকে কিছু প্রশ্ন জিজ্ঞাসা করে দেখতে চাই যে আপনি আমাদের সমীক্ষা অংশগ্রহণের উপযুক্ত কি না।

Yes, willing to participate	হ্যাঁ, অংশগ্রহণে ইচ্ছুক	1	CONTINUE
No, not willing to participate	না অংশগ্রহণে ইচ্ছুক নয়	2	THANK & CLOSE

	Code	n
National Capital Region (NCR)	1	200
Cebu	2	150
Davao	3	150

INTRODUCTION:
Good morning/afternoon/evening. I am _____ from InsightAsia Research Group. We are currently conducting a market research study on some household grocery products. Can you spare me a few minutes of your time? I need to ask you a few questions to see if you are suitable to participate in our survey.

Magandang umaga/hapon/gabi. Ako po si _____ mula sa InsightAsia Research Group, isang market research company. Kami po ay kasalukuyang nagsasagawa ng isang market research study tungkol sa grocery products sa bahay. Maaari po ba ninyo kaming bigyan ng ilang minute ng inyong oras? May mga kailangan lang po kaming tanungin sa inyong ilang mga katanungan para malaman kung kayo po ay maaaring sumali sa aming survey.

Yes, willing to participate/ <i>Oo, gustong sumali</i>	1	CONTINUE
No, not willing to participate/ <i>Hindi, ayokong sumali</i>	2	THANK & CLOSE

T PEARL Questionnaire Rapid appraisal Interview	RESPONDENT #: RECRUITER: INTERVIEWER:

_____ (Home) _____	
_____ Interview Date: _____	
_____ Interview length (in mins) _____	

Q07. How would you describe the traits or characteristics of rice which your family prefers?

Please describe to us the three most important characteristics or traits.

It can be in terms of **eating quality, physical characteristics** of the uncooked and cooked rice, **nutritional benefits** or **cooking quality**

Size

PICTURE CARD Q07B (1)/Q17B (1)

Shape

PICTURE CARD Q07B (2)/ Q17B (2)

Rice traits and categories

Q07. How would you describe the traits or characteristics of rice which your family prefers?

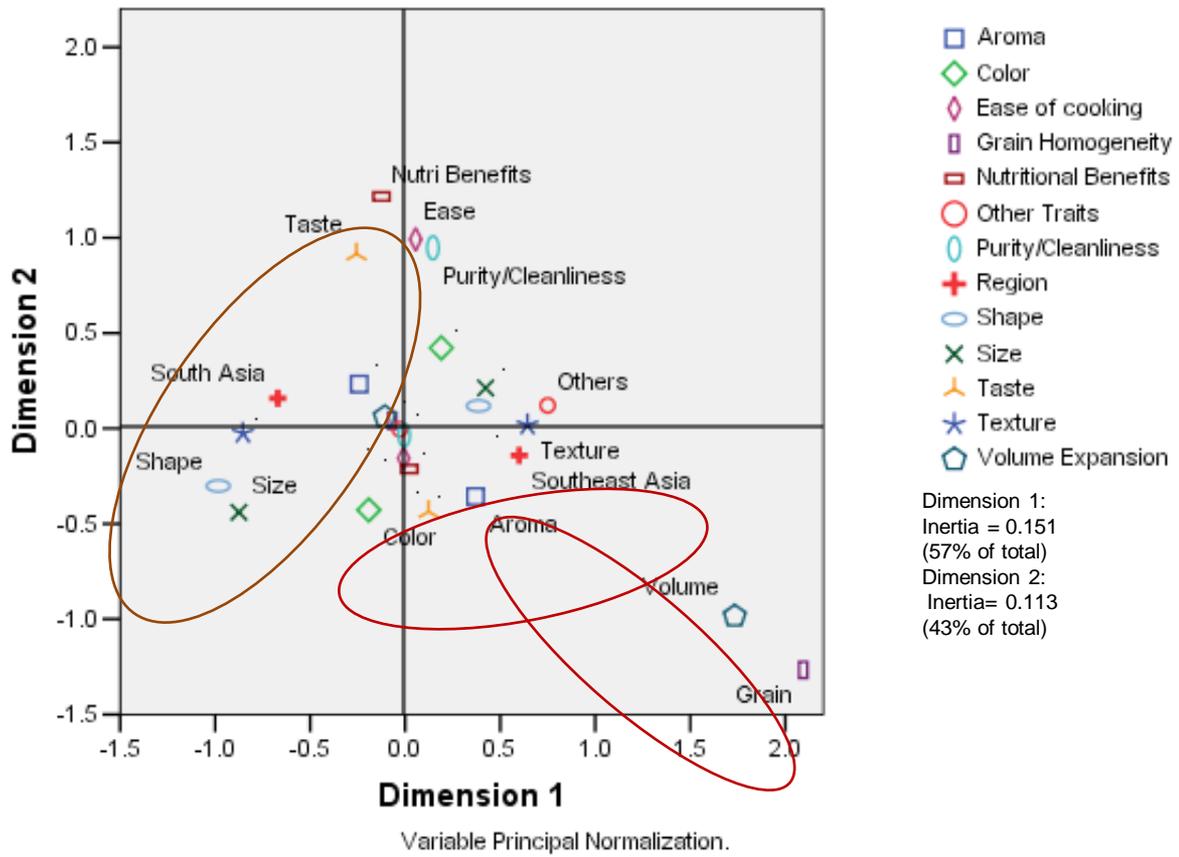
Consumers: 101 descriptors, 12 categories of traits

Rice trait variables and corresponding descriptors elicited from urban consumers during surveys in selected cities in South and Southeast Asia in 2013–2014.

Category of traits	Rice characteristics (descriptors based on respondents' responses)
Taste	Good taste, delicious, tasteful, sweet
Size	Short, medium, long to extra-long
Shape	Bold, medium, slender
Color	White, yellowish, brown, red, black, unspecified
Grain homogeneity	Uniform size and shape, grains not broken/whole kernels
Aroma	Pandan-like, sweet, newly-harvested, pure/unique rice aroma, unspecified
Texture	Soft, sticky, not sticky, firm, chewy, not too sticky not too loose, smooth
Volume expansion	High volume expansion, increase in quantity after cooking
Ease of cooking	Does not need excessive water, grains do not need a lot of water to cook, does not take a long time to cook, easy to cook
Nutritional benefits	Has high nutrition, non-fattening, contains vitamins, “whole grain” (unpolished), nutritional benefits (unspecified)
Purity/cleanliness	No/little impurities, clean, no unhulled rice or small, no stones, no dead rice
Other traits	Shiny, rice stays good for long time, does not quickly stale, good quality (unspecified)

Urban consumers: Geographic homogeneity and variability of preferred rice traits

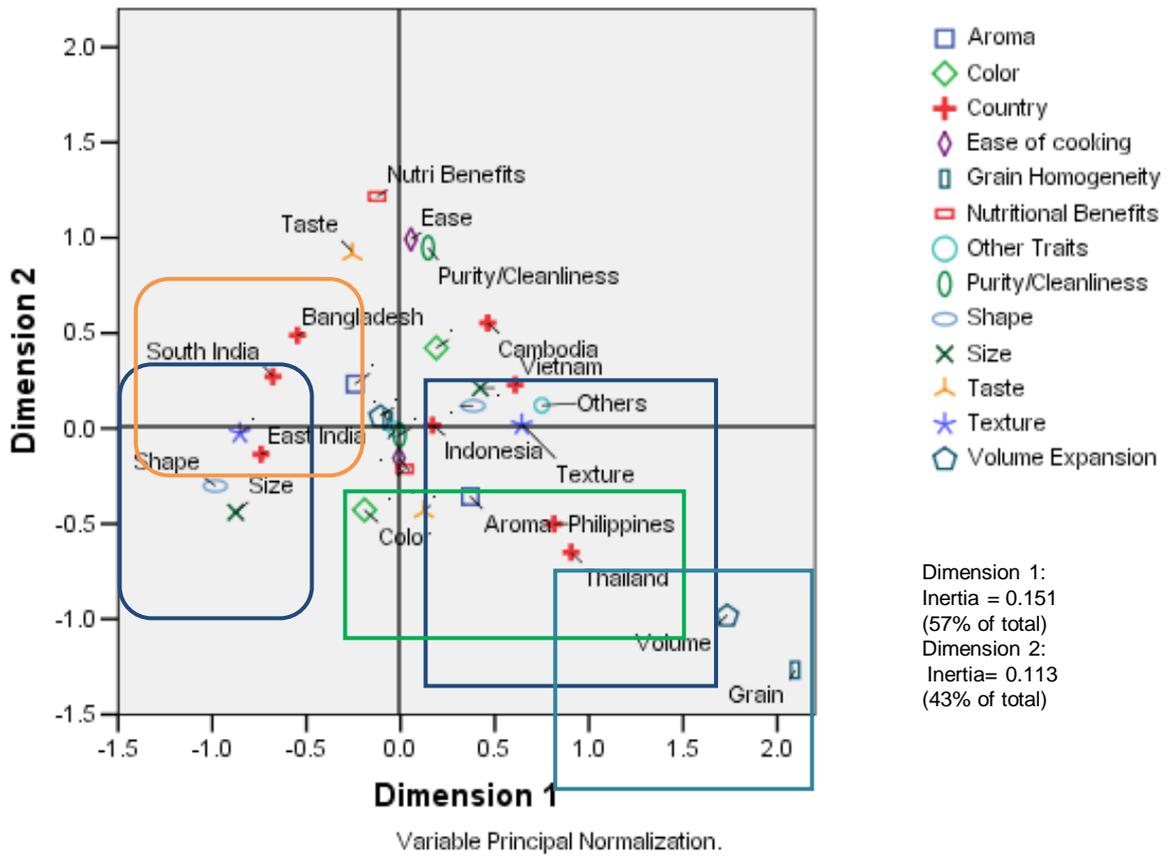
Joint Plot of Category Points



Perceptual map of urban consumers' most preferred rice traits by region

Urban consumers: Geographic homogeneity and variability of preferred rice traits

Joint Plot of Category Points



Perceptual map of urban consumers' most preferred rice traits by country

Urban consumers: Specificity of preferred rice characteristics

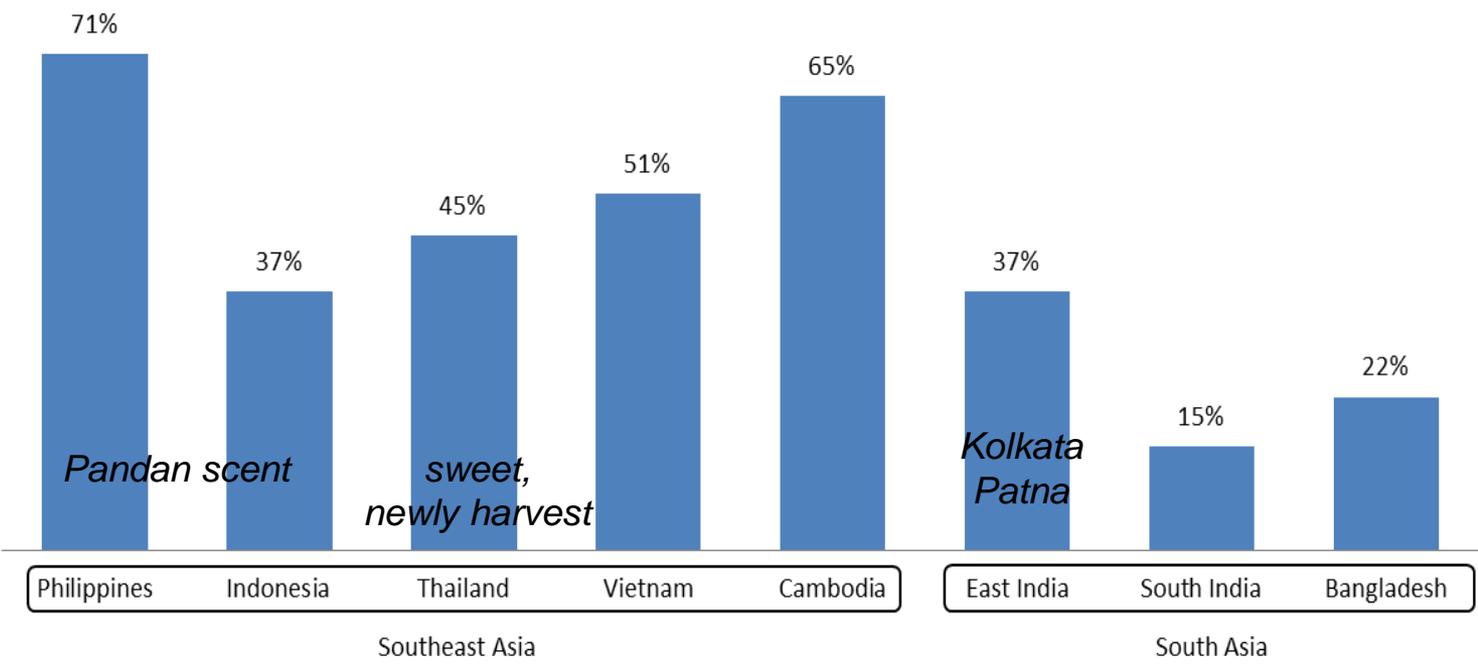
1) Texture

Top five most preferred rice characteristics based on urban consumer surveys in 24 cities in selected South and Southeast Asian countries in 2013–2014.

Rank	Southeast Asia					South Asia		
	Philippines	Indonesia	Thailand	Vietnam	Cambodia	East India	South India	Bangladesh
1	Aromatic	White	Soft	Sticky and chewy	Soft	Slender	Good taste	Good taste
2	Soft	<i>Nasinya pulen*</i>	Aromatic	Aromatic	Aromatic	White	White	White
3	White	Aromatic	White	Soft	Good taste	Medium-size	Slender	Slender
4	High volume expansion	Soft	High volume expansion	White	White	Good taste	Medium-size	Short
5	Chewy	Good taste	Long to extra-long	Not too sticky and not too loose	Firm texture	Aromatic	Smooth	Aromatic
n	500	500	500	300	350	803	619	501

Urban consumers: Specificity of preferred rice characteristics

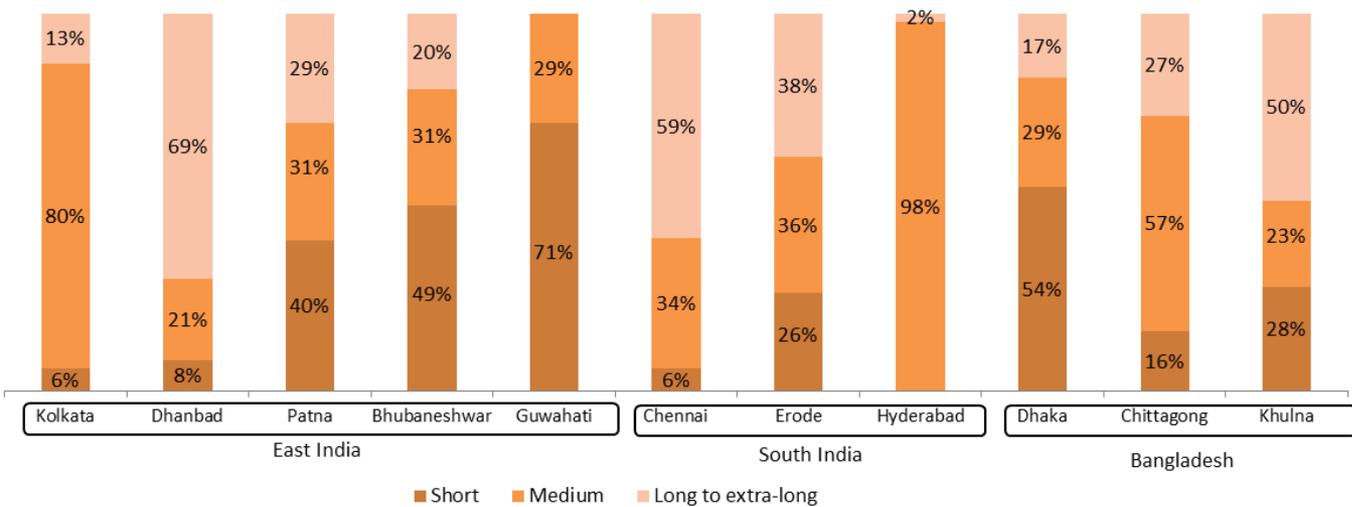
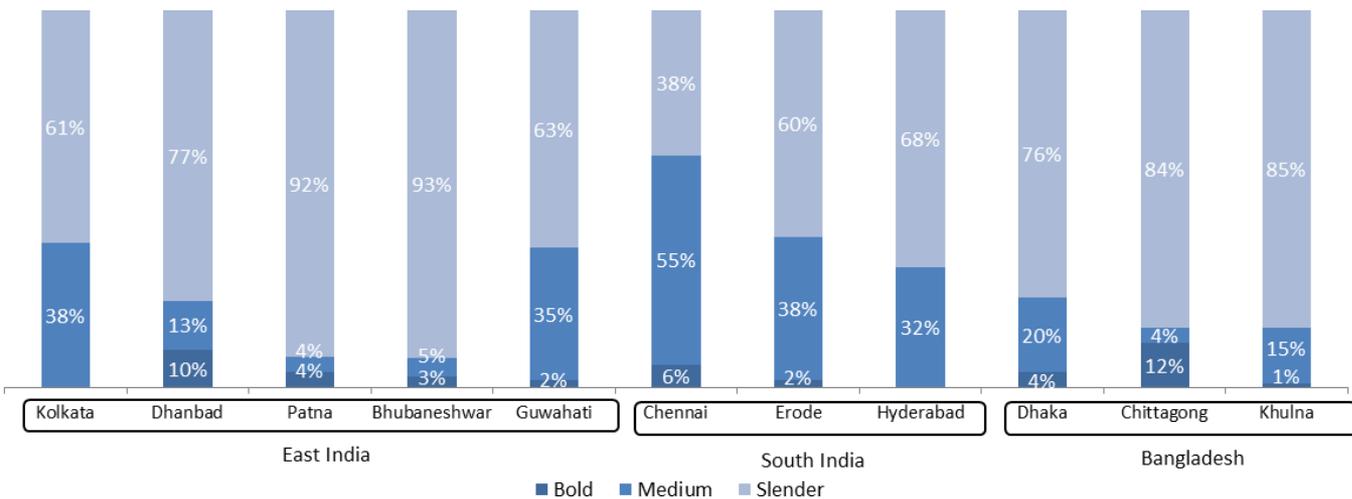
2) Aroma



Proportion of respondents who consider aroma as most preferred rice trait

Urban consumers: Specificity of preferred rice characteristics

3) Shape and size



Urban consumers: Differentiated demand

3) Volume expansion

Top five most preferred rice characteristics based on urban consumer surveys in 24 cities in selected South and Southeast Asian countries in 2013–2014.

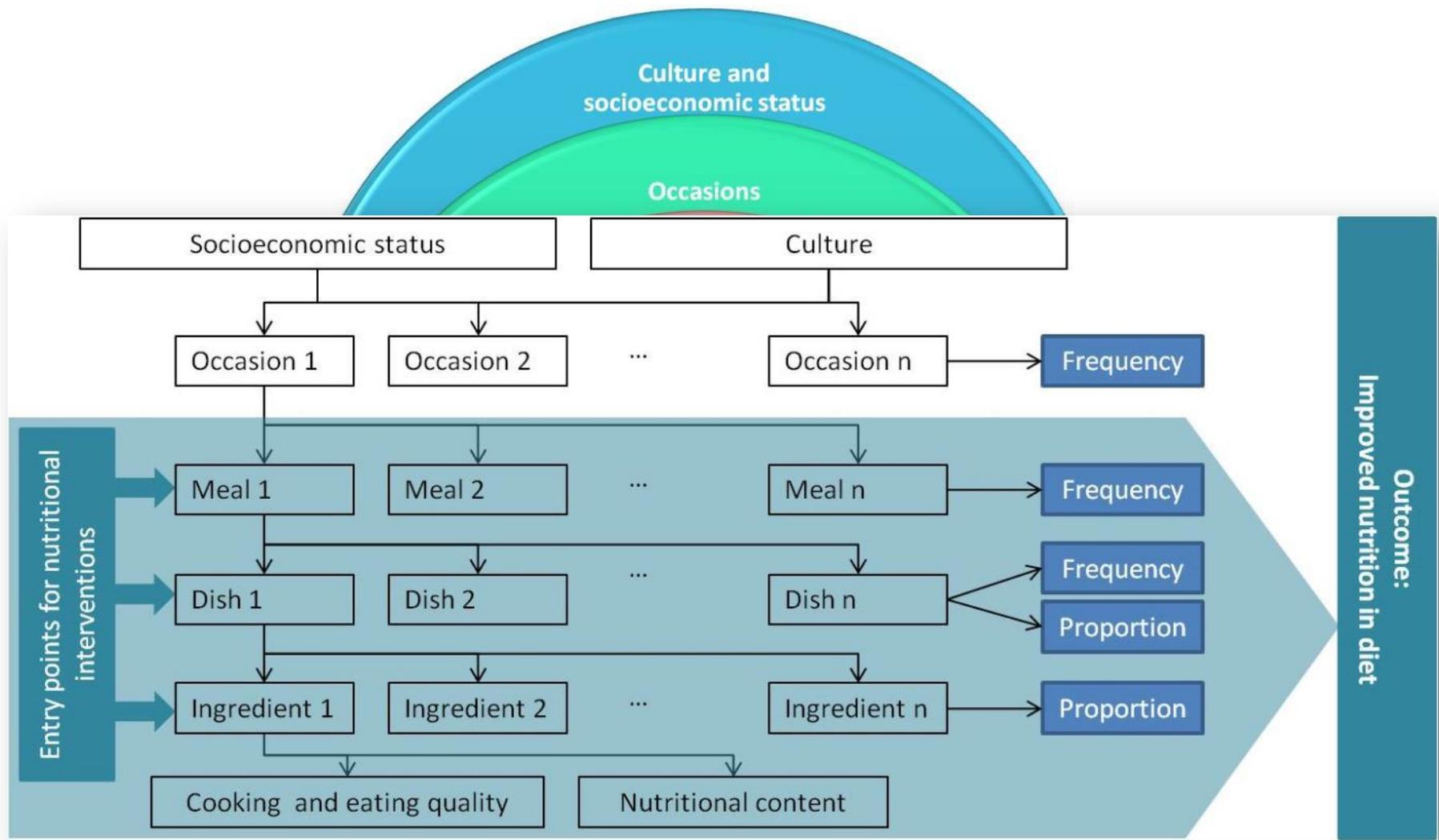
Rank	Southeast Asia					South Asia		
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1	Aromatic	White	Soft	Sticky and chewy	Soft	Slender	Good taste	Good taste
2	Soft	<i>Nasinya pulen*</i>	Aromatic	Aromatic	Aromatic	White	White	White
3	White	Aromatic	White	Soft	Good taste	Medium-size	Slender	Slender
4	High volume expansion	Soft	High volume expansion	White	White	Good taste	Medium-size	Short
5	Chewy	Good taste	Long to extra-long	Not too sticky and not too loose	Firm texture	Aromatic	Smooth	Aromatic
n	500	500	500	300	350	803	619	501

4) Nutritional benefits; Sticky rice

Bangladesh: Most preferred rice characteristics of urban consumers

Rank	All	Cities		
		Dhaka	Chittagong	Khulna
1	Good taste	Good taste	Good taste	White
2	White	White	White	Slender
3	Slender	Slender	Vitamin content	Good taste
4	Short	Short	Aromatic	Sticky
5	Aromatic	Aromatic	Slender	Aromatic
Weighted	501	296	134	72

Gastronomic Systems Research (GSR)



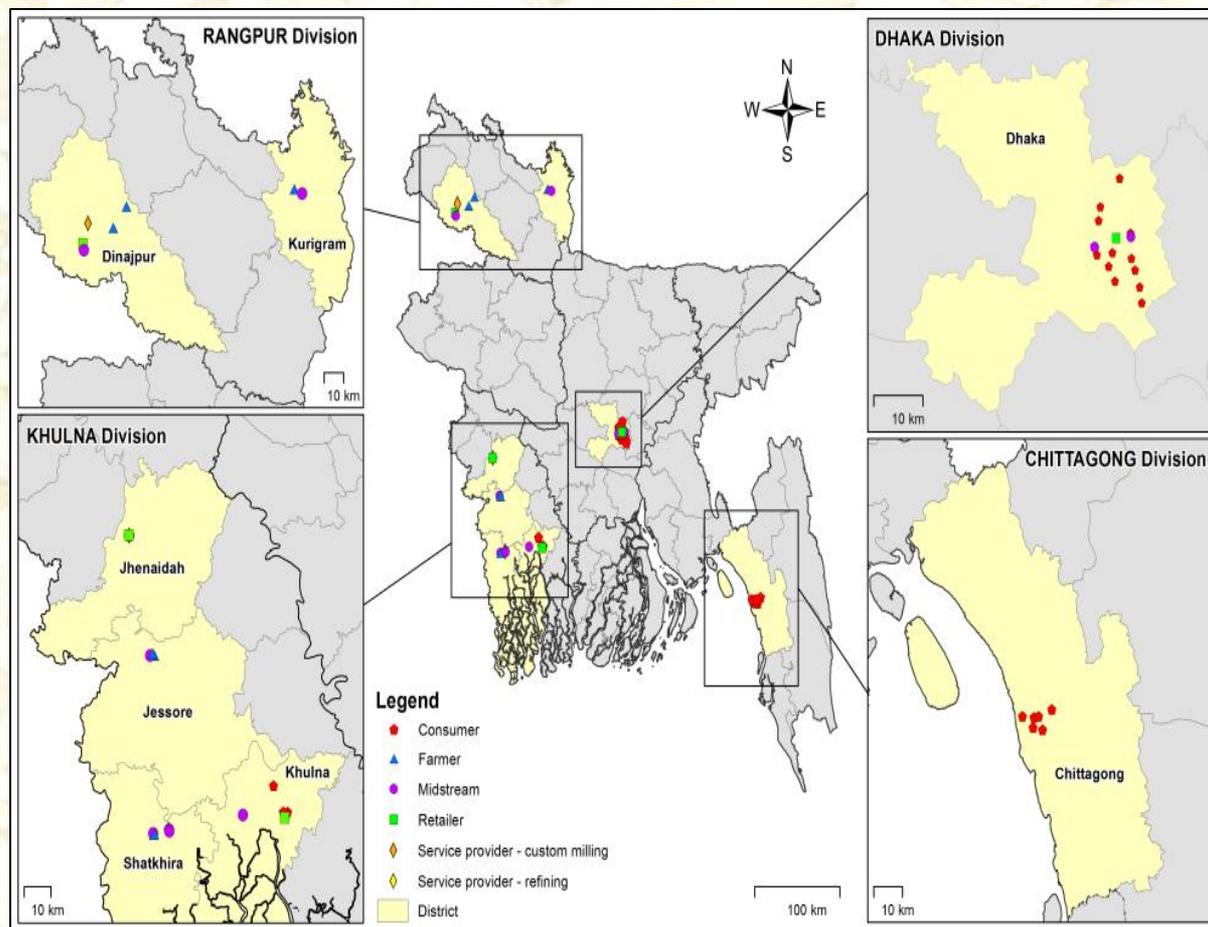
Hybrid Rice Development Consortium (HRDC) Annual Meeting, International Rice Research Institute (IRRI), Los Baños, Philippines, 30 March – 1 April 2016



Farmers and other value chain actors

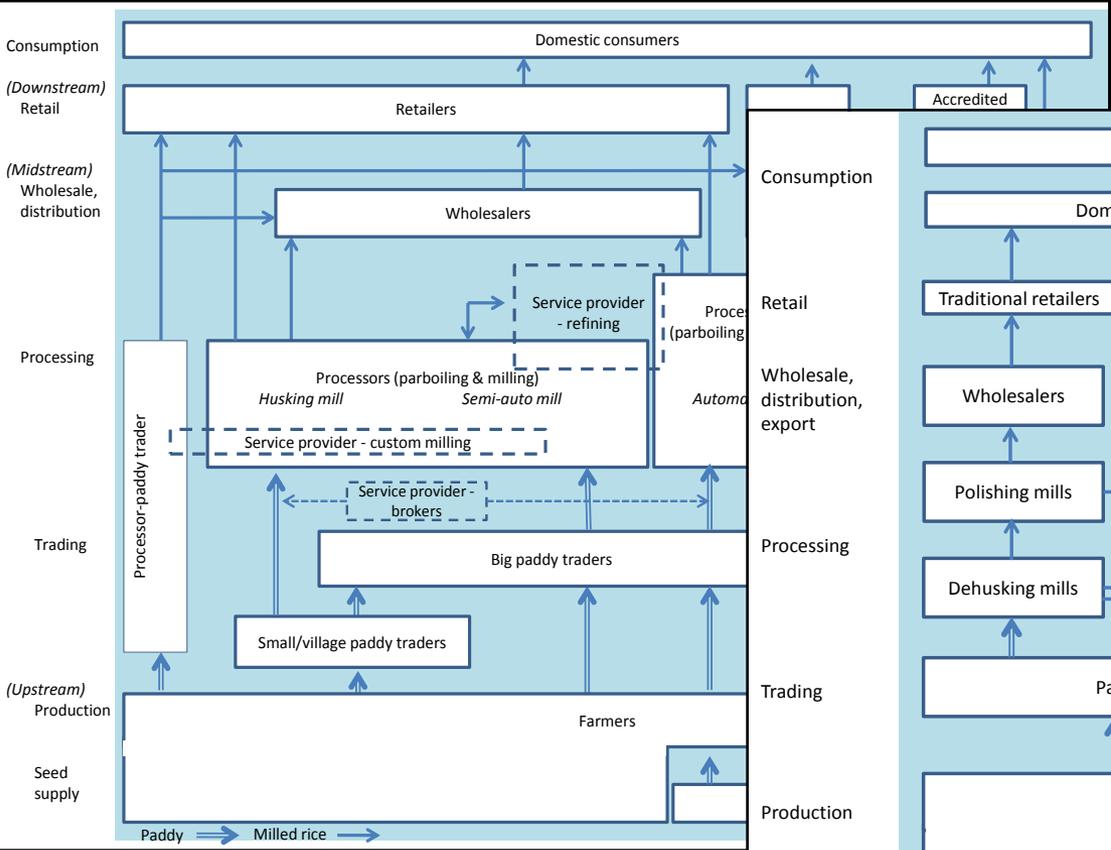
Stacked survey with different segments:

- FGD with farmers
- In-depth interviews with midstream actors and retailers.

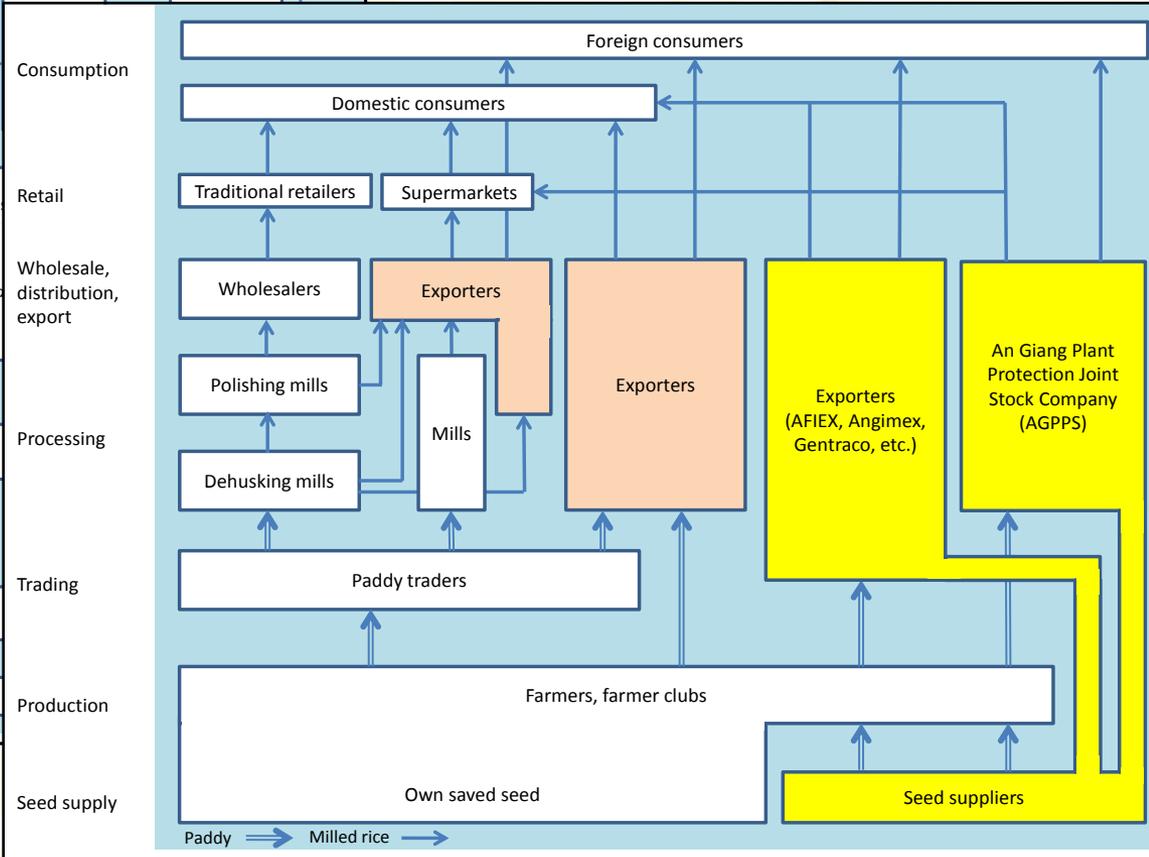


Rice value chain actors and flow of rice

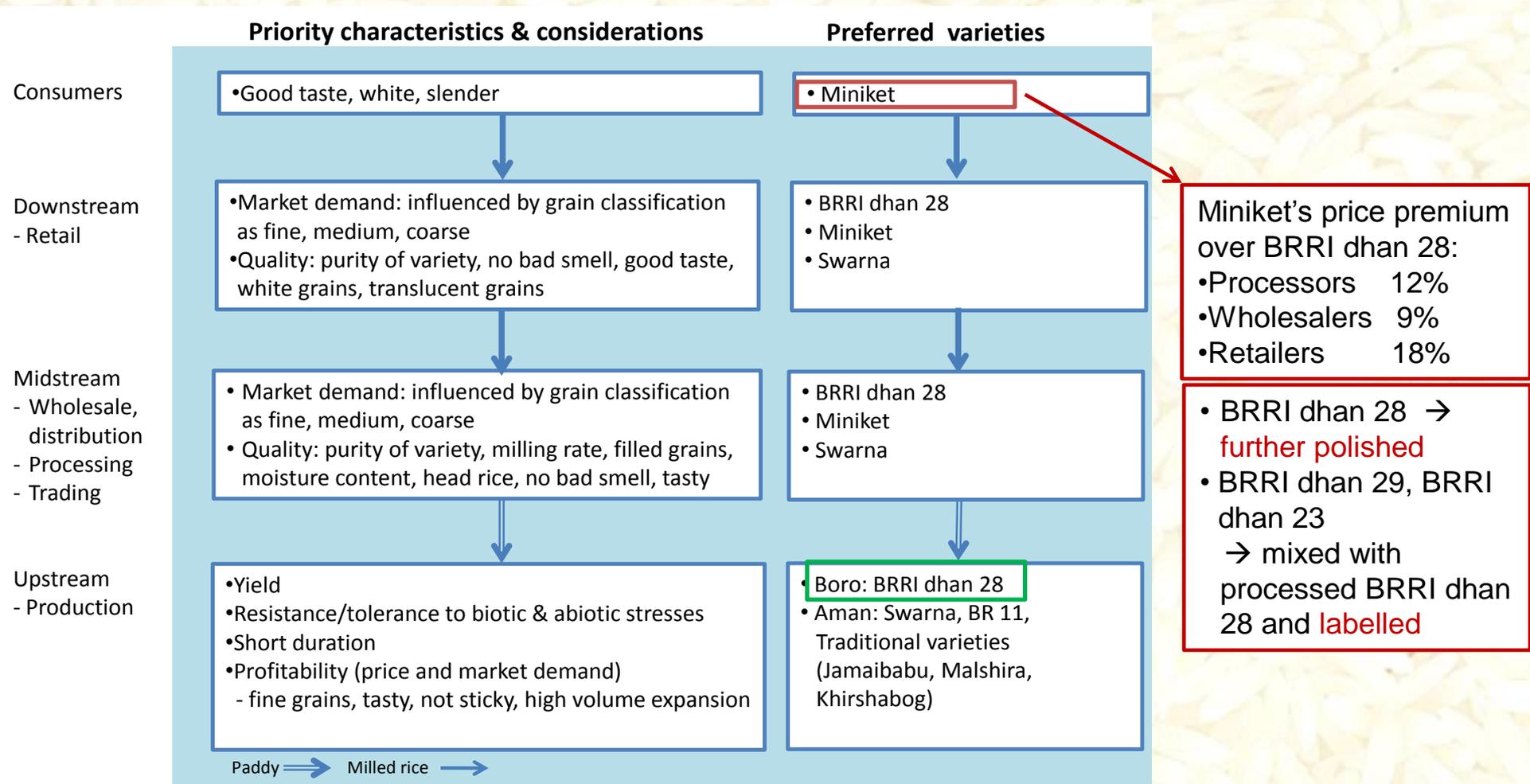
Bangladesh: Inter-mediationally long rice value chains



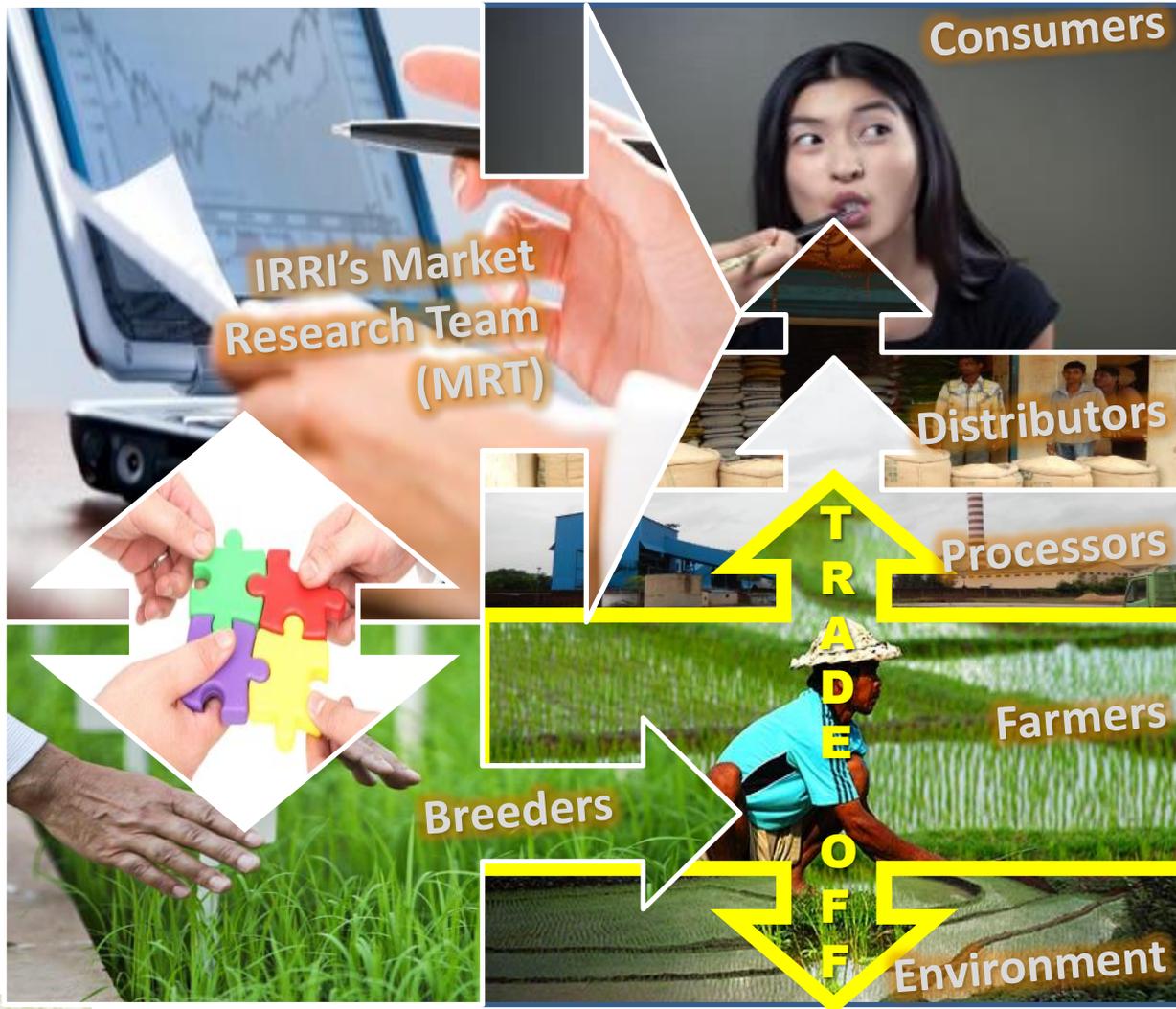
Vietnam: Emerging vertical integration and coordination



Transmission of varietal trait preferences along VC: Case of Bangladesh



Where would farmers invest if they were donors?



INVESTMENT GAME APPLICATION (IGA)



Instruction: Create your ideal variety by investing 100 Rupees in a model rice variety and adding your preferred combination of varietal trait improvements.

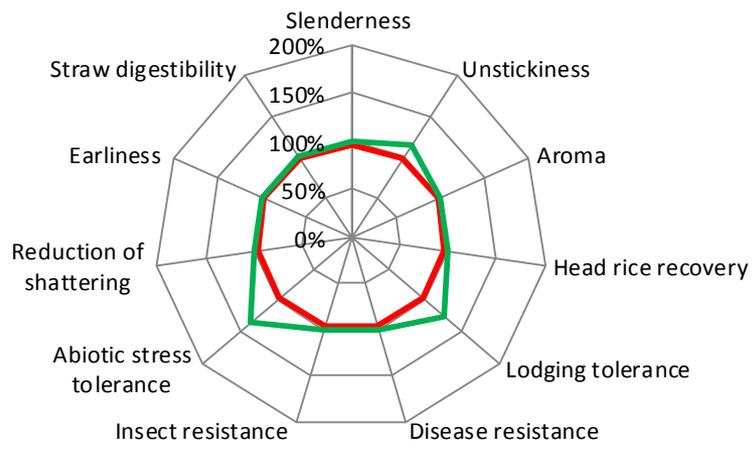
Slenderness	Unstickiness	Aroma	Head rice recovery	Lodging tolerance	Disease resistance	Insect resistance	Abiotic stress tolerance	Reduction of shattering	Earliness	Straw digestibility
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INR 9										

Benchmark:

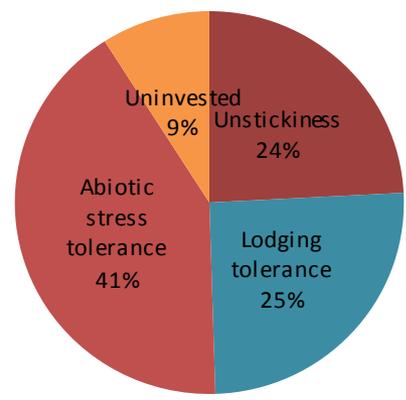
Season: Kharif

Return:

INR 1,000



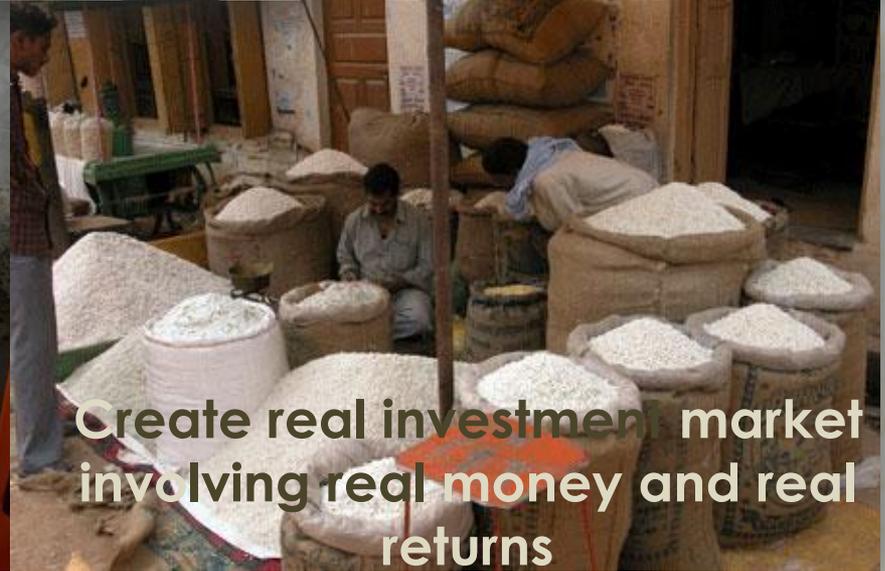
Product profile relative to benchmark



Investment portfolio

PURPOSE OF THE EXPERIMENT

IRRI



IGA EXPERIMENT IN EASTERN INDIA

IRRI



Experiment Sites



IGA EXPERIMENT IN EASTERN INDIA

IRRI



Recruitment of participants

IGA in ACTION

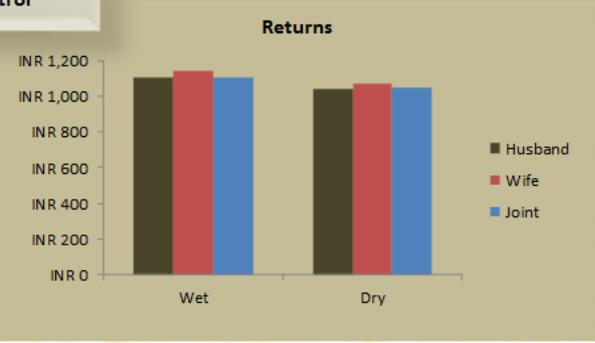
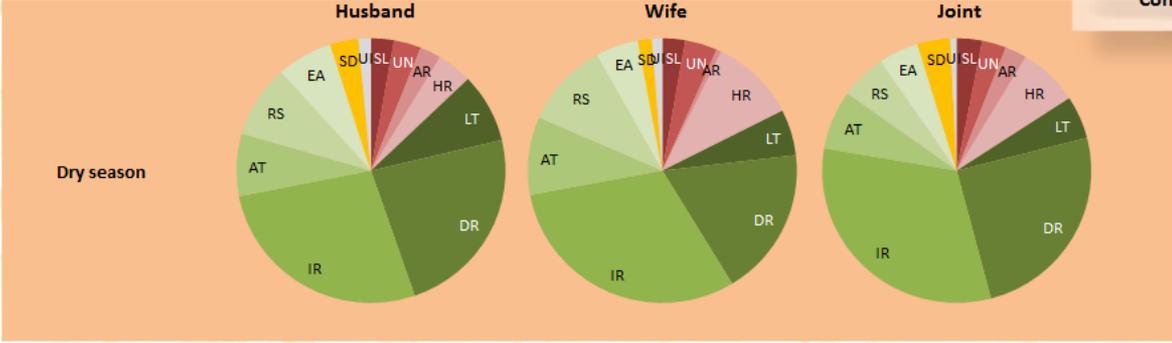
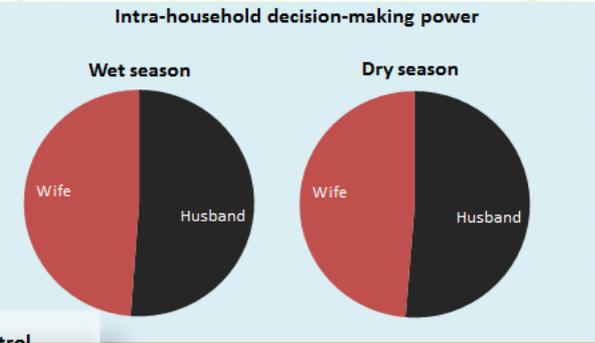
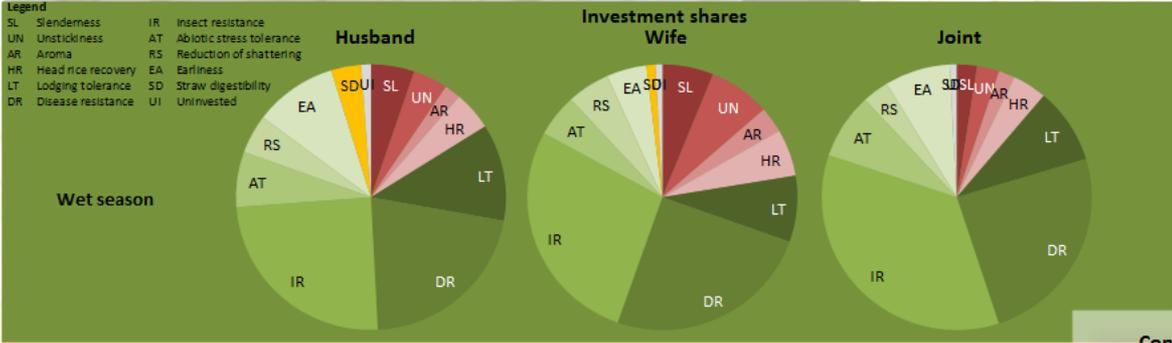
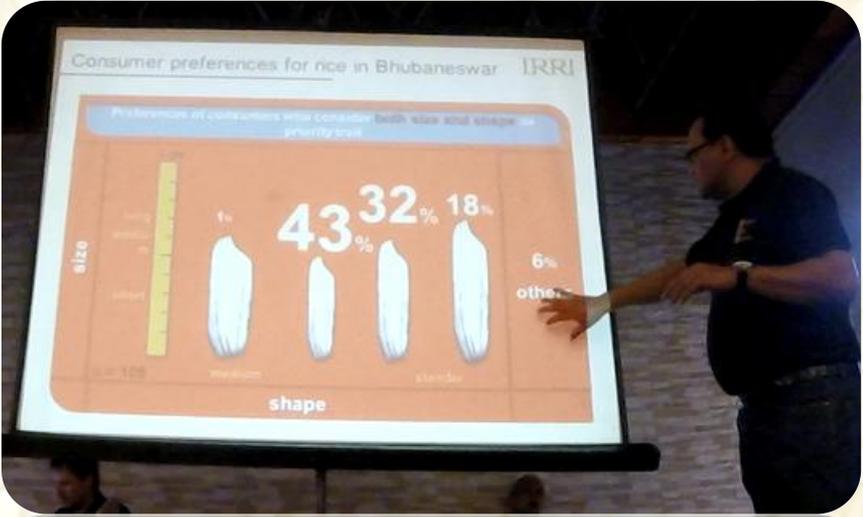


IGA in ACTION

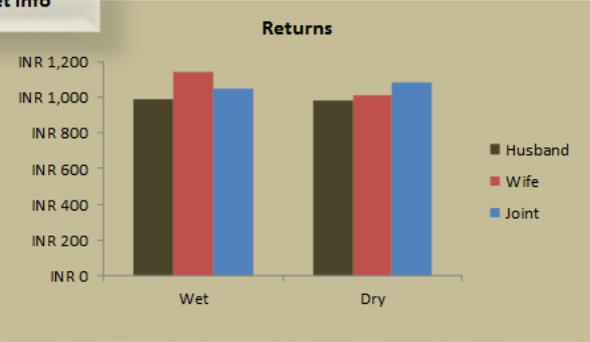
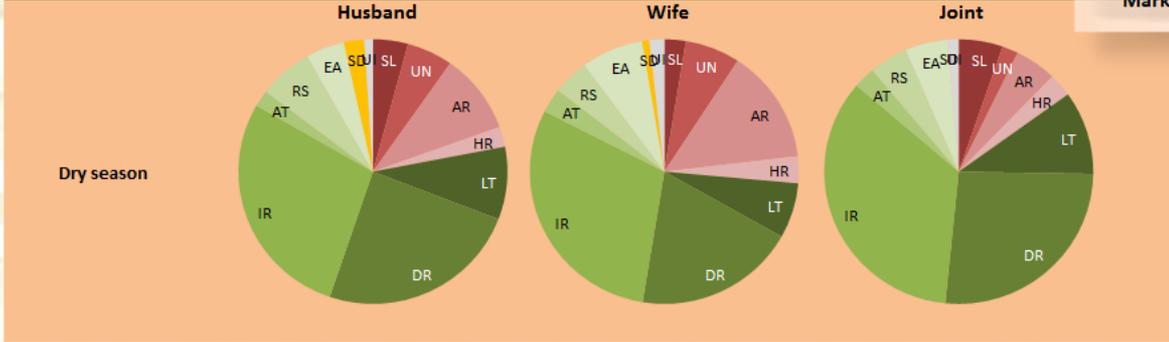
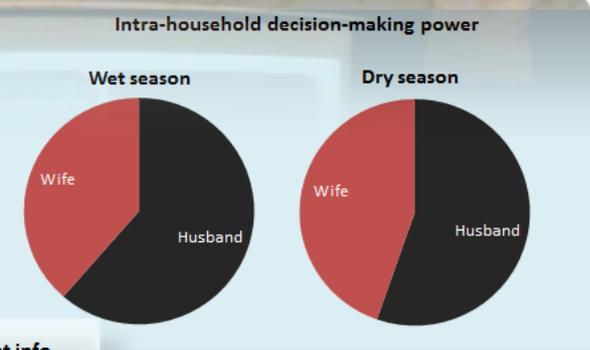
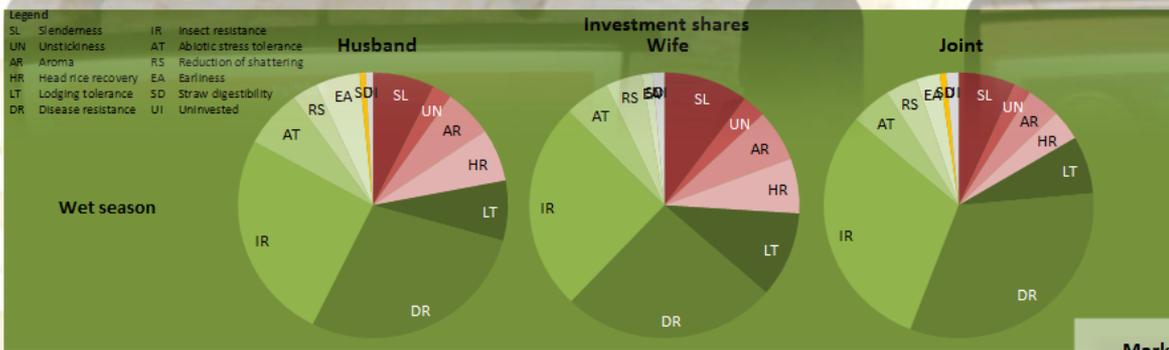
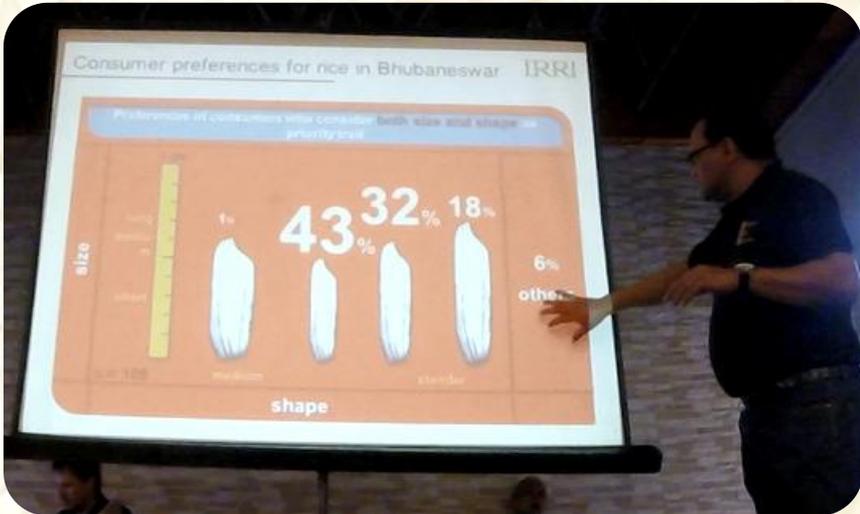
IRRI



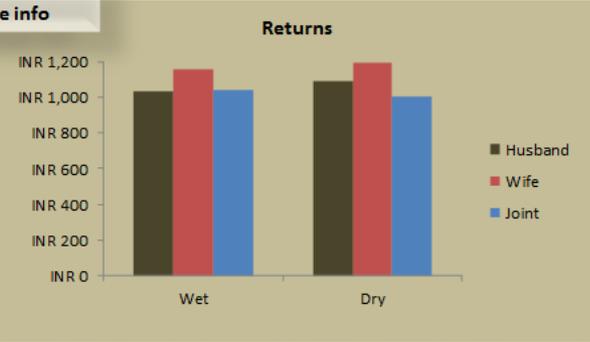
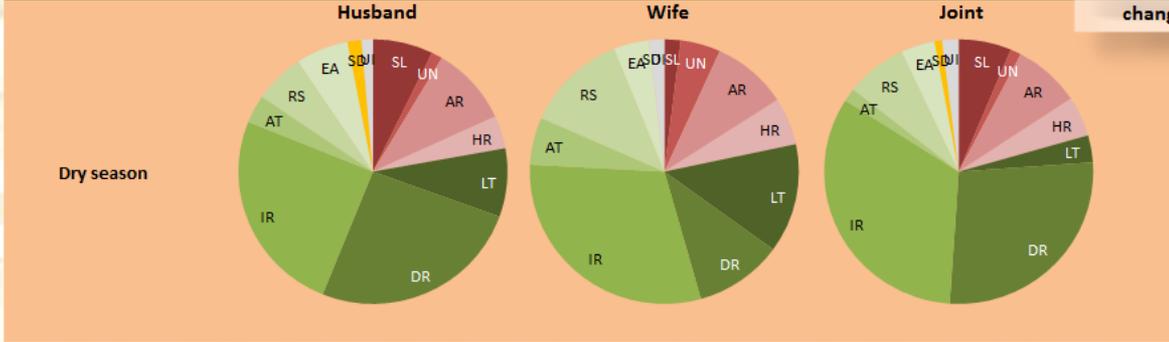
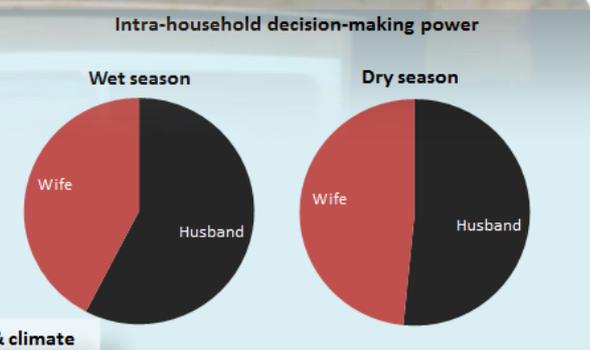
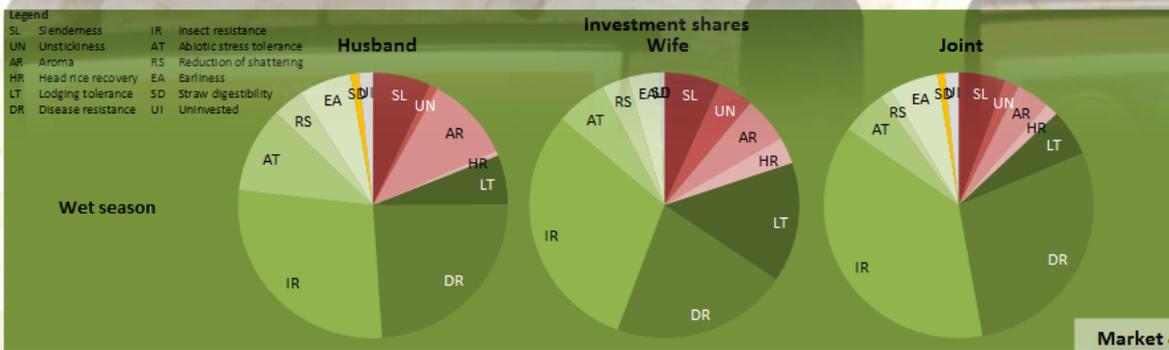
IGA RESULTS



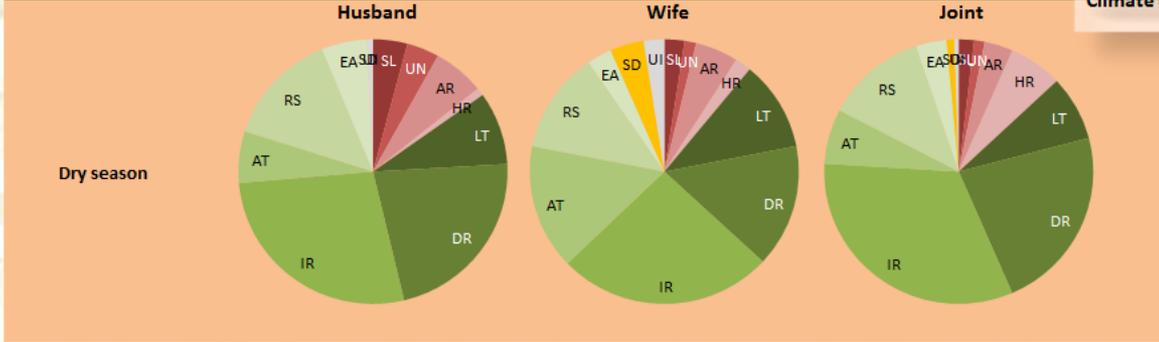
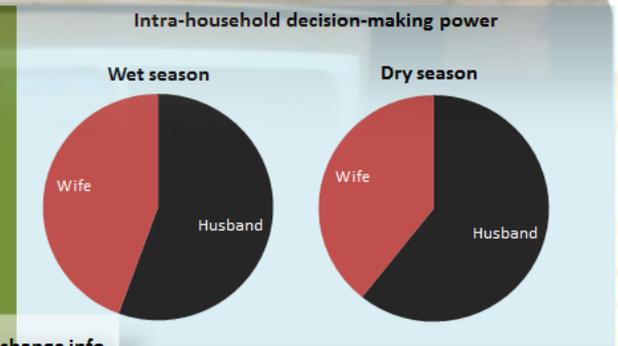
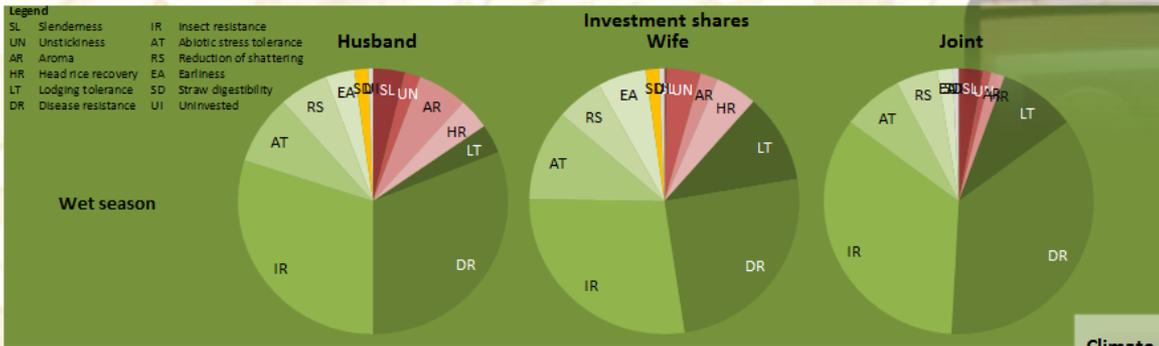
IGA RESULTS



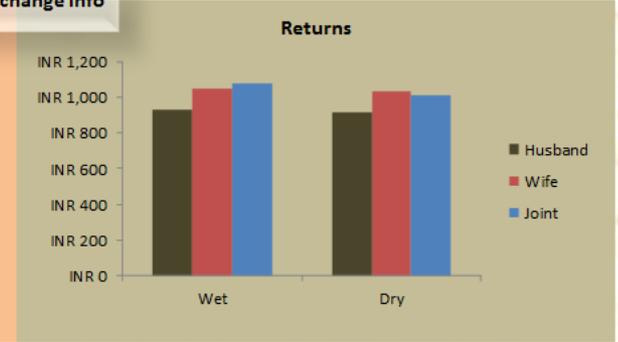
IGA RESULTS



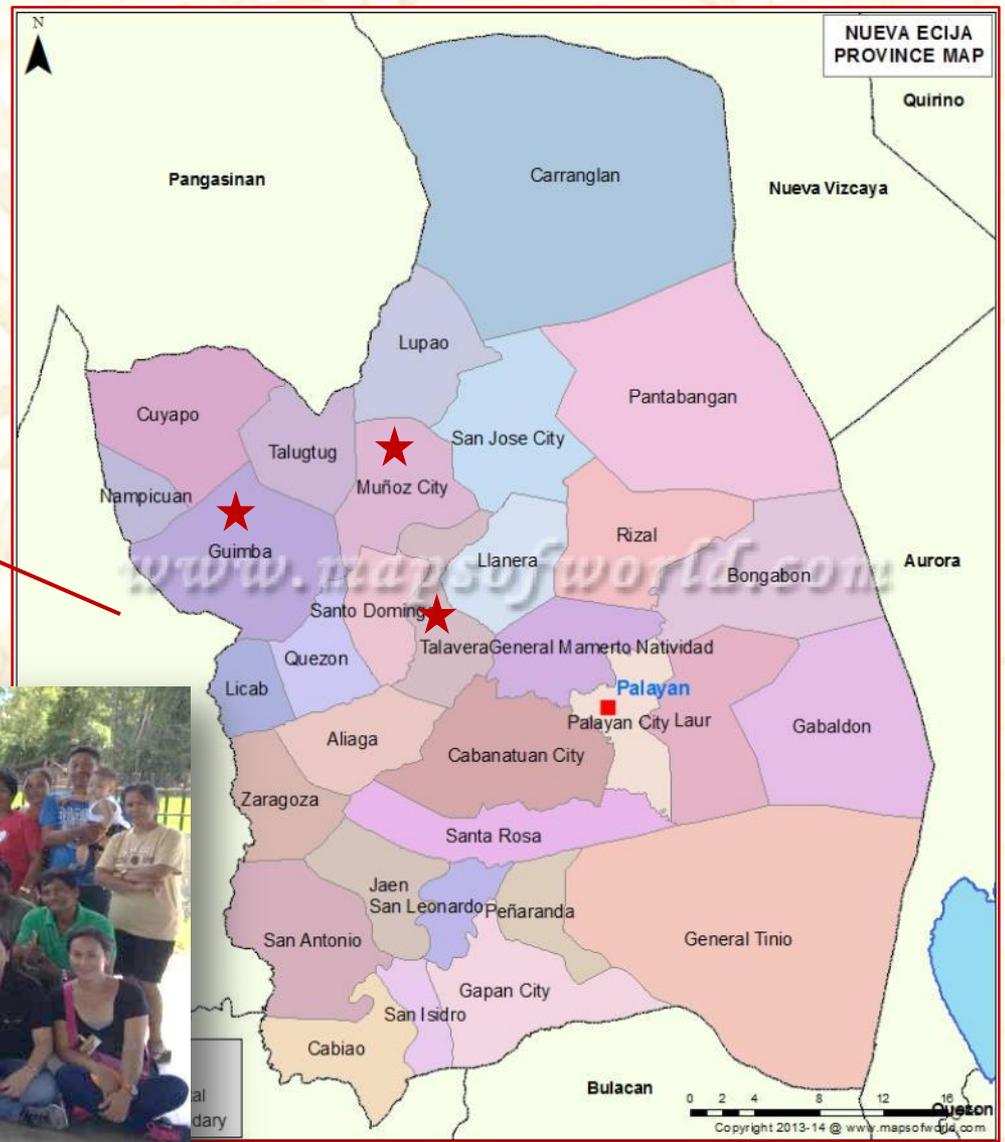
IGA RESULTS



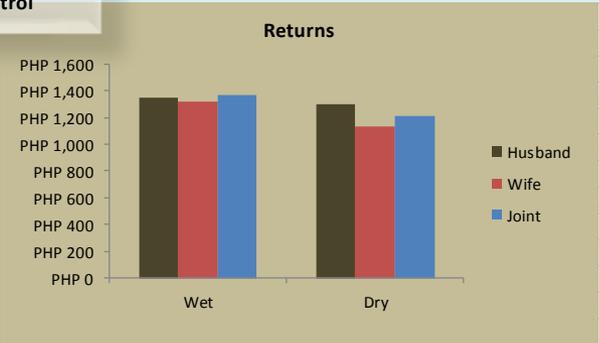
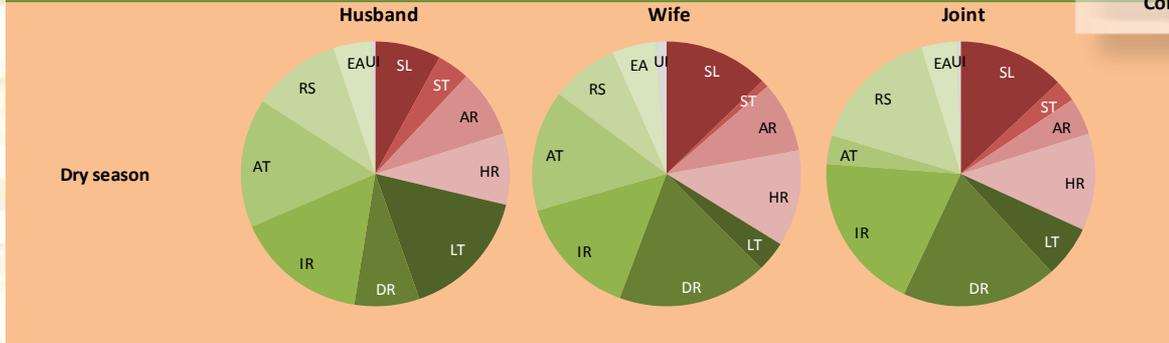
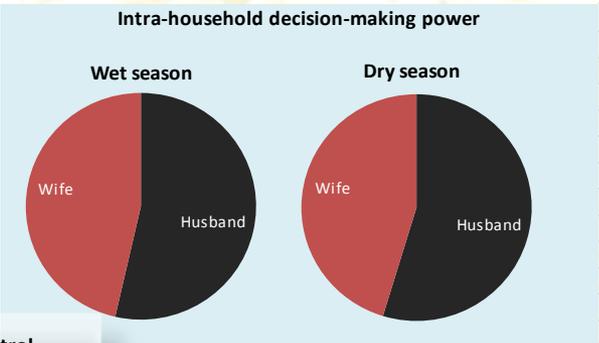
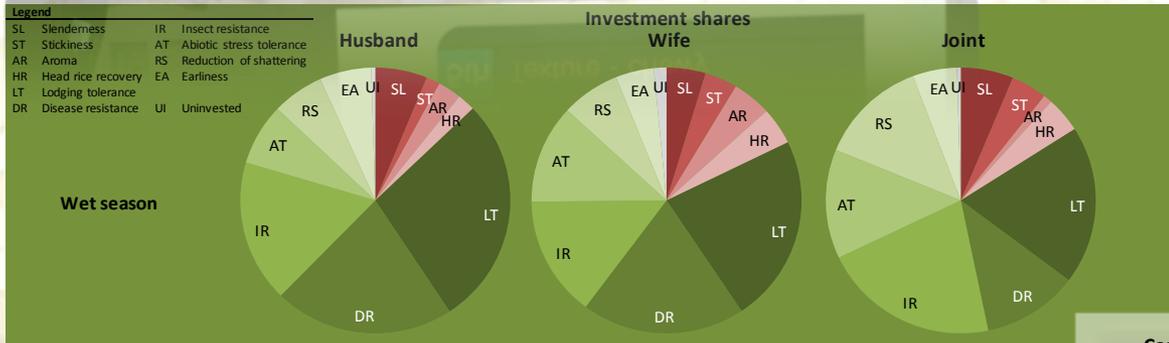
Climate change info



IGA EXPERIMENT IN PHILIPPINES



IGA RESULTS



IGA RESULTS



Top most important rice trait in NCR

Rice traits	
1st	Aroma
2nd	Color - White
3rd	Texture - Soft
4th	Volume Expansion
5th	Texture - chewy

Consequences

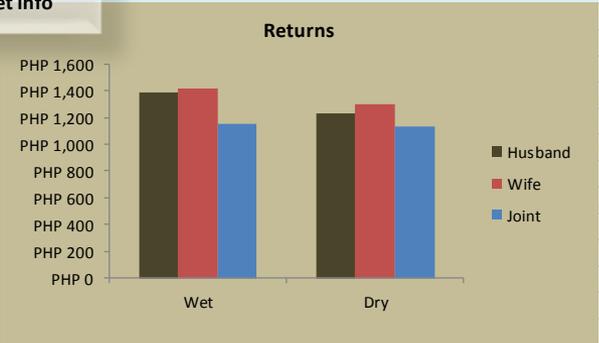
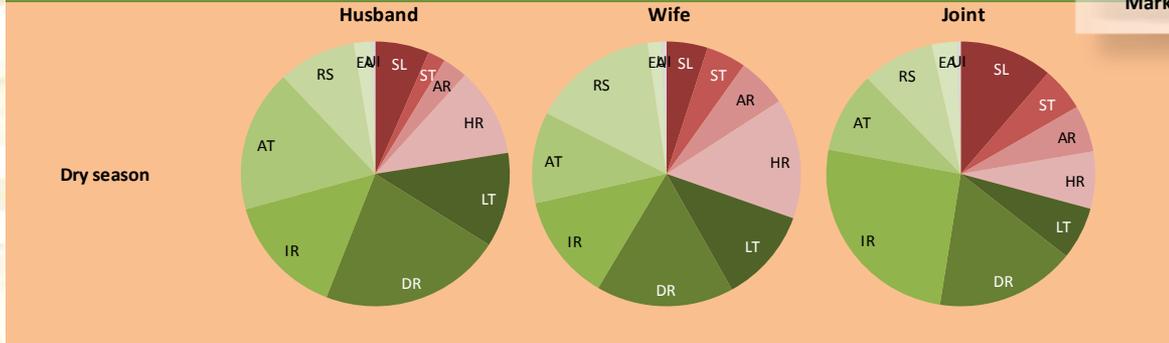
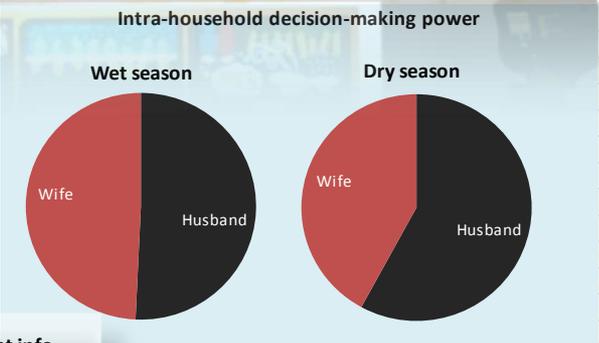
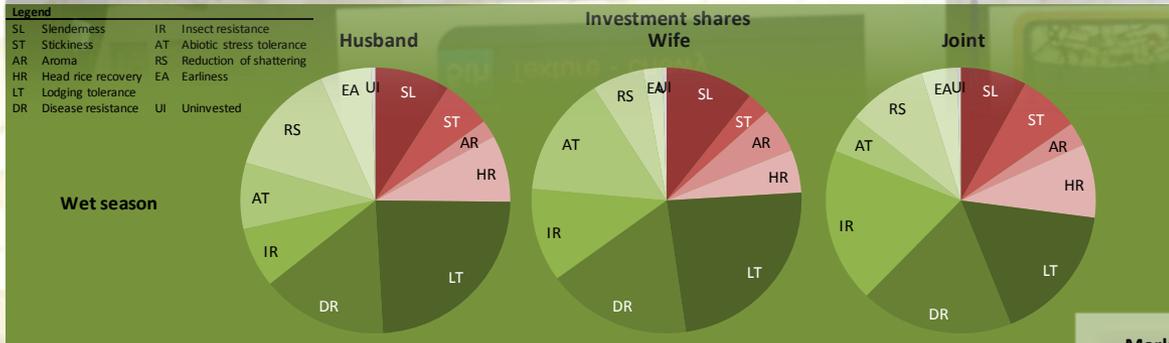
Frequency of extreme weather events is going to rise

More frequent droughts

More frequent floods

More uncertainty when rainy season starts

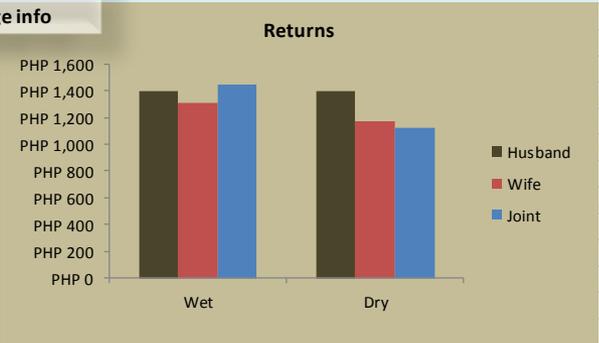
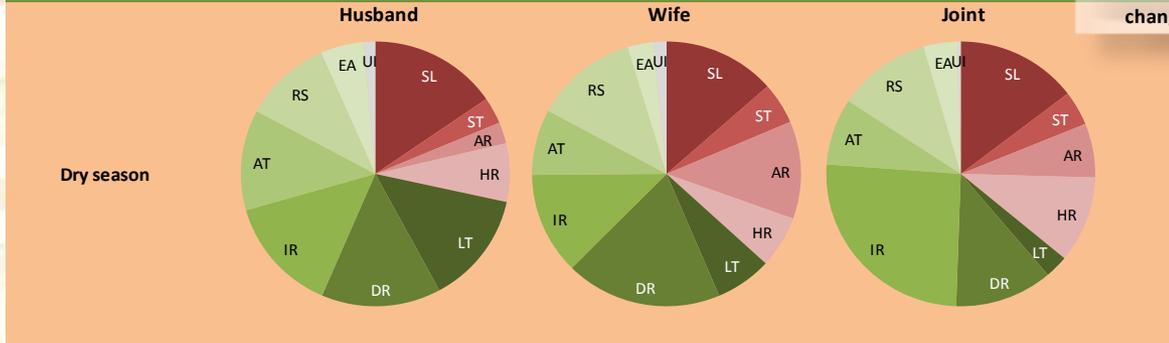
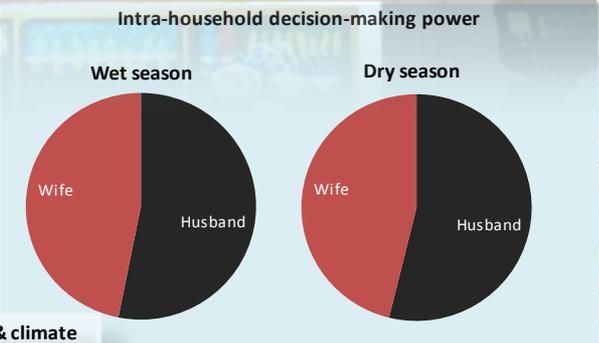
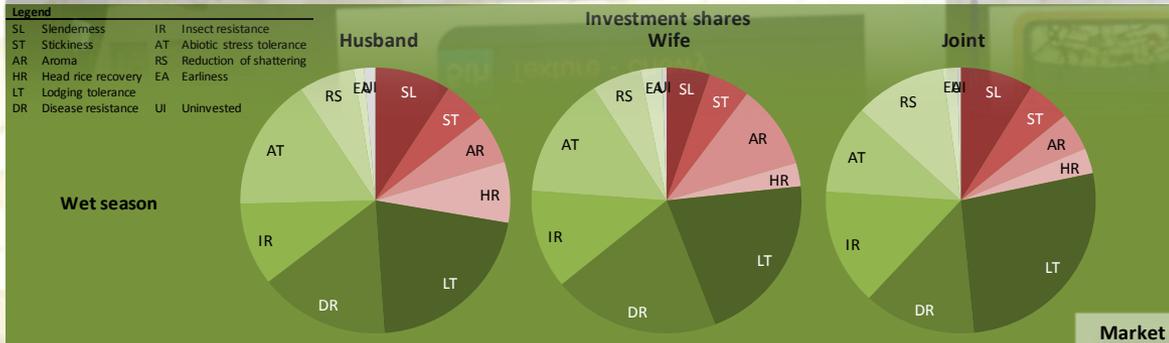
- Legend**
- SL Slenderness
 - ST Stickiness
 - AR Aroma
 - HR Head rice recovery
 - LT Lodging tolerance
 - DR Disease resistance
 - IR Insect resistance
 - AT Abiotic stress tolerance
 - RS Reduction of shattering
 - EA Earliness
 - UI Uninvested



IGA RESULTS



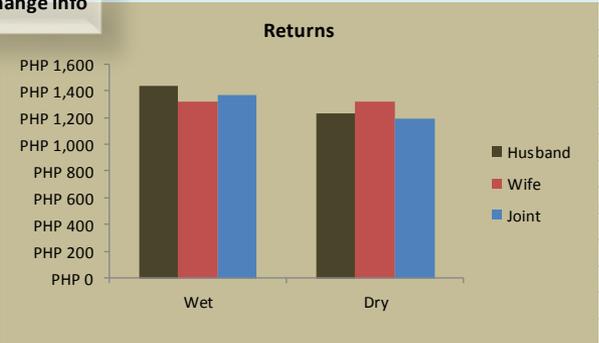
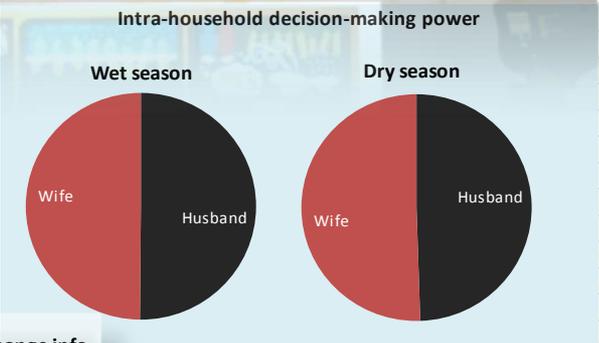
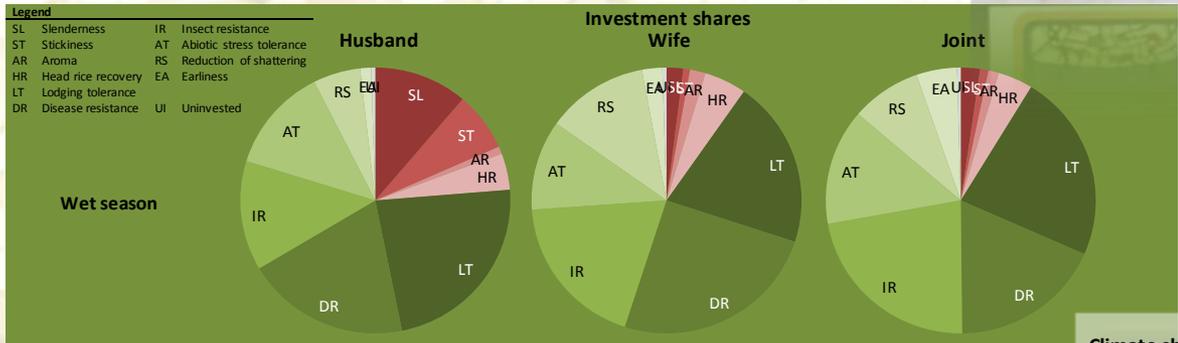
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IGA RESULTS



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Climate change info

IGA RESULTS

INBRED



HYBRID



e.g. SL-7/8/9/12, Bigante (Plus), PHB 81

BRINGING EVERYTHING TOGETHER



I4Rice: Information on agroecologies, environments, markets and preferences for rice



Irrigated			Rainfed		
No. of rice	Cropping pattern		No. of rice	Cropping pattern	
1-IR	Single	IR rice, no other crop	5-RF	Single	RF rice, no other crop
2-IR/Other	Double	IR rice / IR other	6-RF/RF	Double	RF rice / RF rice
3-IR/IR	Double or triple	IR rice / IR rice / IR other	7-RF/RF/Other	Double	RF rice / RF other
4-IR/IR/Other	Triple	IR rice / IR rice / IR other	8-RF/Dryupland	Single	RF rice, not banded

Rice area by agroecology (ha)

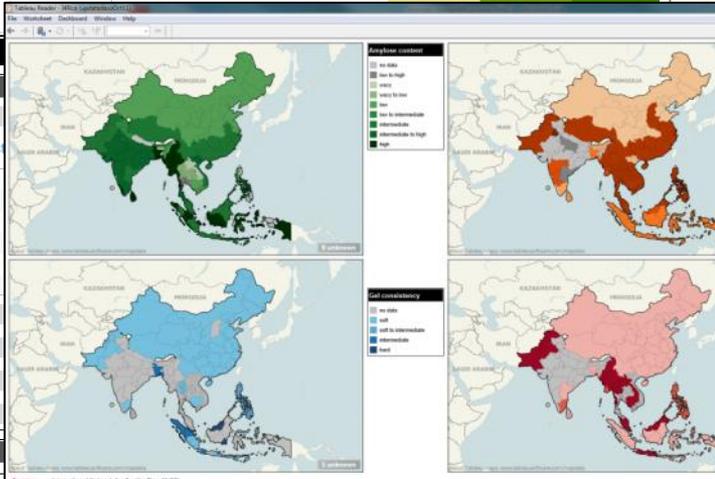


Data inventory

- Production by AEZ
- Stress profiles
 - Biotic: BLB, blast, brown spot, sheath blight
 - Abiotic: Drought, salinity, submergence, cold
- Top rice varieties planted and characteristics
- Rice consumption and preference
- Cropping pattern
- Rice calendar
- Population (total, poor, urban/rural)

Subregion	Season	Name	Month													
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		
Barisal	Major	Aus					p	gp	gp	gp	h					
	Minor	Aman										p	gp	gp	gp	h
	Late	Boro	p	gp	gp	h										
Bhola	Major	Aus								p	gp	gp	gp	gp	h	h
	Minor	Aman									p	gp	gp	gp	h	h
	Late	Boro		p	gp	h	h									
Borgona	Major	Aus						p	gp	gp	h					
	Minor	Aman										p	gp	gp	gp	h
	Late	Boro														
Jhalakati	Major	Aus							p	gp	gp	h				
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	gp	h									
Patuakhali	Major	Aus							p	gp	gp	h				
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	h	h									
Pirojpur	Major	Aus								p	gp	gp	h			
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	gp	h									
Bandarban	Major	Aus							p	gp	gp	h				
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	gp	h									
Brahmanbaria	Major	Aus							p	gp	gp	h				
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	gp	h									
Chandpur	Major	Aus								p	gp	gp	h			
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	gp	h									
Chittagong	Major	Aus								p	gp	gp	h			
	Minor	Aman											p	gp	gp	h
	Late	Boro		p	gp	gp	h									

Release	Breeding institution	Line designation / pedigree	Target ecosystem
	PhilRice	PR26645-B-7 (A)	Irrigated Lowland
	IRRI	IR64683-87-2-2-3-3	Irrigated Lowland
	IRRI	IR77186-122-2-2-3	Irrigated Lowland
	IRRI	IR51672-62-1-1-2-3	Irrigated Lowland
	PhilRice	PR26703-3B-PJ25	Irrigated Lowland



Information system designed to provide easy access and visualization of data

Thank you!



About us

Consumer preferences and VC assessment

Preference prioritization

Varieties

Characterization

I4Rice

Blog



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