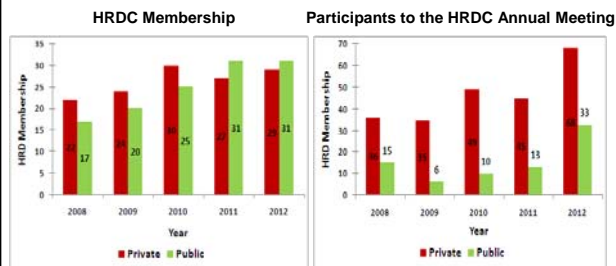


**Hybrid Rice Development Consortium
Annual Meeting
(March 27, 2012)**

HRDC is Growing

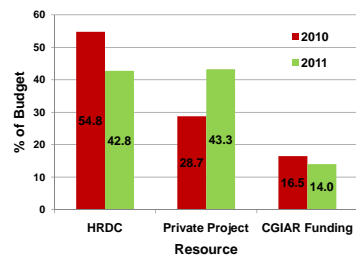


HRDC Organization (March 15, 2012)

| Country | Private | Public | Country | Private | Public |
|--------------------|---------|--------|-------------|---------|--------|
| Bangladesh | 2 | 2 | Malaysia | 1 | 2 |
| Belgium | 1 | | Mali | | 1 |
| Benin | | 1 | Myanmar | | 1 |
| China | 1 | 7 | Nepal | | 1 |
| Colombia | | 1 | Pakistan | | 1 |
| Dominican Republic | | 1 | Philippines | | 1 |
| Egypt | | 1 | Singapore | 1 | |
| Germany | 1 | | Sri Lanka | | 1 |
| India | 20 | 3 | Thailand | | 1 |
| Indonesia | 1 | 1 | USA | 1 | 2 |
| Iran | | 2 | Vietnam | | 1 |

Total: Private = 29, Public = 31

Budget of IRRI Hybrid Rice Program

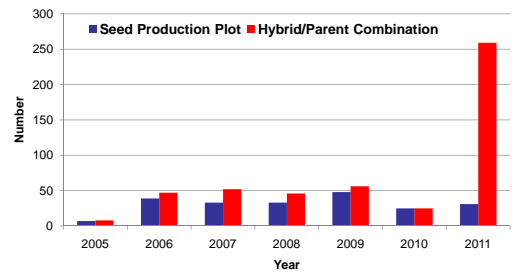


| | 2010 | 2011 |
|-------------------|------------|------------|
| Total Expenditure | \$ 601,578 | \$ 797,198 |

Hybrid Rice Breeding Materials

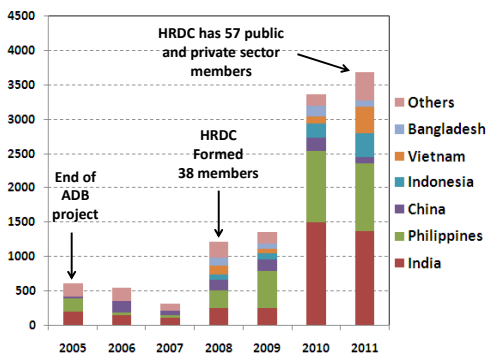
| Materials | 2010 | 2011 |
|-------------------------------|---------------|---------------|
| New Crosses for breeding | 182 | 252 |
| New Hybrids Tested | 2886 | 2249 |
| F2 Population | 72 | 127 |
| AxB Pairs | 1203 | 950 |
| Breeding Lines > F2 | 8743 | 8324 |
| Total Breeding Lines | 13,086 | 11,902 |
| Stage IV (AYT) Hybrids Tested | 200 | 220 |

Parent and Hybrid Seed Production



Seed Production Plot = small scale of seed production
Hybrid combination = hybrids > Stage 1

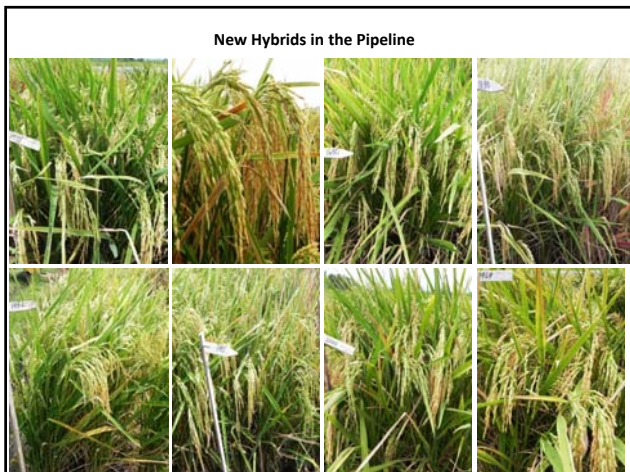
IRRI hybrid rice germplasm shared with partners



On-going Hybrid Rice R & D at IRRI

- Regular breeding for parents & hybrids





On-going Hybrid Rice R & D at IIRI

- Developing hybrid rice parents & hybrids using molecular marker technologies
 - **Heterotic group of IIRI Hybrid Rice Parents (174)**
 - Parents clustered by SNP into groups
 - Hybrids between and within groups were evaluated in multi-location
 - Heterosis: between groups > within group
 - Strong yield heterosis was found between specific groups
 - **Groups of IIRI and Chinese southern *indicas* (215)**
 - **Groups of IIRI, Asian, South America germplasm (736)**

On-going Hybrid Rice R & D at IIRI

– **Bacterial blight resistance**

- Xa4, xa5, Xa7, xa13, Xa21, and Xa23
- IR68897B, IR58025B, IR 93559B, IR93560B, IR93561B
- Inoculums + Field screen + MAS
- BC2F1 (2012DS)

PCR product Bandings using Xa21 marker, a 1400 bp band (R) for IRBB21 & a 1200 bp band (S) for IR24
 M: DNA size standard; Lane 1–7: IR24, IRBB66, IR93561B, IR93560B, IR93559B, IR58025B, IR68897B; Lanes 8–26: BC1F1's

On-going Hybrid Rice R & D at IIRI

– **Submergence tolerance**

- Submergence + MAS
- IR68897B & SRT3R
- BC2F1

On-going Hybrid Rice R & D at IRRI

- **Drought tolerance:** Transfer drought-tolerant QTLs identified at IRRI to hybrid rice parents using conventional and MAS
- **Low chalk:** Using low chalk QTLs to improve parents
- **TGMS:** Line selection and breeding
- **Outcrossing:** Conventional screening and using wild rice
- **SNP markers:** Convert and confirm SNP markers for *Rf*, sub-1, BLB, Blast, Amylose genes

JAAS-HRDC Hybrid Rice Training (2011, 14 Participants)



HRDC Hybrid Rice Training

Rationale

- Requested by HRDC members in every year
- Jointly training with JAAS, China in 2010 (7 participants) and 2011 (14 participants)

Operation

- Full cost recovery from participants & estimated cost = **\$4,882** PAX for the local expenditures
- **10%** of financial support (\$488) from HRDC/IRRI for the **local expenditures**;
- Date: 14 days (**July 1 – July 15, 2012**);
- Minimum # of participants is 10 (cost efficiency)
- Registration deadline: **March 27, 2012**

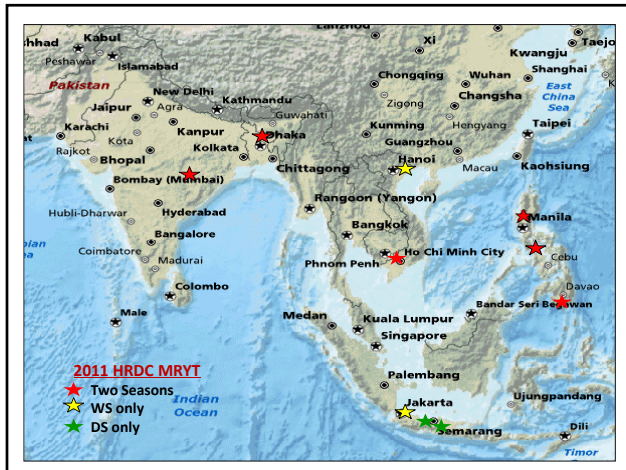
Breeding Parents Resistant to Bacterial Blight

Plan 1 - Both Breeding and Molecular Screening at IRRI :

- SKEP with IRRI for **your IP line** improvement with BB Resistance;
- Breeding and MAS at IRRI with targeted Xa genes;
- Improved lines/populations back to the original partner;

Plan 2 – Genotyping at IRRI, but Breeding at your own facilities

- IRRI provides BB resistant donor to you and you do your own breeding;
- Send the DNA samples of targeted breeding lines to IRRI for **molecular screen** – full cost recovery and data back to you;
- You do your own field evaluation and screening;



2011HRDC-MRYT Location

41 entries (not every location had a full entries)

| # | Location | Country | Site Provider | Latitude | Longitude | Planting Date | |
|----|---------------------|-------------|------------------|-----------|-------------|---------------|-----------------|
| | | | | | | 2012 DS | 2011WS |
| 1 | Gazipur | Bangladesh | BRAC | 23° 99'N | 90° 42' E | 2010-12-09 | 2011-07-28 |
| 2 | Raipur | India | JK Agri Genetics | 21° 24' N | 81° 64' E | 2010-12-18 | 2011-07-08 |
| 3 | Thanh Tri, Hanoi | Vietnam | FCRI | 20° 93' N | 105° 84' E | | 2011-07-14 |
| 4 | Nueva Ecija | Philippines | PhilRice | 15° 72'N | 120° 90'E | 2010-12-29 | 2011-06-27 |
| 5 | Los Baños | Philippines | IRRI | 14° 17' N | 121° 25' E | 2010-12-01 | 2011-06-11 |
| 6 | Binh Thanh, Long An | Vietnam | Bioseed | 10° 58' N | 106° 41' E | 2011-01-18 | 2011-07-11 |
| 7 | General Santos | Philippines | Bioseed | 6° 14' N | 125° 19' E | 2010-12-18 | 20/08/2011 |
| 8 | Kediri | Indonesia | BISI | 7° 82' S | 112° .01' E | 2010-12-27 | |
| 9 | Sepatan, Gondang | Indonesia | Pioneer | 8° 10' S | 111° .85' E | 2010-12-06 | |
| 10 | Sukamandi | Indonesia | ICRR | 6° 71' S | 107° 62'E | | 2011/5/17 (dir) |

Thanks for those members provided the location and service for the MRYT

Result of 2011 MRYT

ANOVA for Hybrid Yield by Location (2011 DS & WS)

| Location | Country | Yield | N | t Testing |
|----------------|----------------------|-------|-----|-----------|
| Sukamandi | Indonesia | 8341 | 102 | A |
| Long An | Vietnam | 7413 | 164 | B |
| Nueva Ecija | Philippines | 6962 | 213 | C |
| Kediri | Indonesia | 6275 | 105 | D |
| Gazipur | Bangladesh | 6271 | 216 | D |
| General Santos | Philippines | 6028 | 222 | E |
| Los Baños | Philippines | 5945 | 182 | E |
| Raipur | India | 5780 | 210 | F |
| Gondang | Indonesia | 4404 | 99 | G |
| Hanoi | Vietnam | 3778 | 108 | H |
| | Mean | 6194 | | |
| | R² | 0.98 | | |
| | CV% | 8.83 | | |

Result of MRYT

ANOVA for Hybrid Yield by Location (2011 DS)

| Location | Country | Yield | N | t Testing |
|----------------------|-------------|-------------|-----|-----------|
| Nueva Ecija | Philippines | 9301 | 111 | A |
| Raipur | India | 7350 | 108 | B |
| Long An | Vietnam | 7327 | 96 | B |
| Gazipur | Bangladesh | 7308 | 111 | B |
| Los Baños | Philippines | 6896 | 114 | C |
| Kediri | Indonesia | 6275 | 105 | D |
| General Santos | Philippines | 5952 | 111 | E |
| Gondang | Indonesia | 4404 | 99 | F |
| Mean | | 6865 | | |
| R² | | 0.93 | | |
| CV% | | 8.68 | | |

ANOVA for Hybrid Yield by Location (2011 WS)

| Location | Country | Yield | N | t Testing |
|----------------------|-------------|--------------|-----|-----------|
| Sukamandi | Indonesia | 8341 | 102 | A |
| Long An | Vietnam | 7475 | 96 | B |
| General Santos | Philippines | 6103 | 111 | C |
| Gazipur | Bangladesh | 5175 | 105 | D |
| Nueva Ecija | Philippines | 4416 | 102 | E |
| Los Baños | Philippines | 4351 | 68 | E |
| Raipur | India | 4117 | 102 | F |
| Hanoi | Vietnam | 3778 | 108 | G |
| Mean | | 5496 | | |
| R² | | 0.94 | | |
| CV% | | 10.16 | | |

ANOVA for Yield by Hybrid (2011 DS & WS)

| Hybrid | Yield | N | t Testing | Hybrid |
|----------|-------|----|-----------|-----------|
| HRDC1106 | 7162 | 35 | A | IR82386H |
| HRDC1114 | 6872 | 45 | B | |
| HRDC1105 | 6773 | 44 | B C | |
| HRDC1104 | 6646 | 43 | B C D | IR82363H |
| HRDC1113 | 6605 | 47 | B C D E | |
| HRDC1112 | 6538 | 47 | C D E F | |
| HRDC1121 | 6528 | 42 | C D E F | |
| HRDC1131 | 6505 | 47 | C D E F | Mestizo 3 |
| HRDC1123 | 6473 | 44 | C D E F | |
| HRDC1129 | 6448 | 28 | C D E F | |
| HRDC1135 | 6425 | 47 | D E F G | IR82372H |
| HRDC1133 | 6371 | 44 | D E F G | IR80228H |
| HRDC1120 | 6352 | 44 | D E F G | |
| HRDC1137 | 6342 | 44 | D E F G | IR82301H |
| HRDC1132 | 6341 | 46 | D E F G | PSB Rc R2 |
| HRDC1128 | 6339 | 44 | D E F G | |
| HRDC1109 | 6286 | 44 | E F G | |
| HRDC1107 | 6276 | 47 | E F G | |
| HRDC1130 | 6222 | 36 | F G | |
| HRDC1117 | 6212 | 46 | F G | |
| HRDC1104 | 6210 | 44 | F G | |
| HRDC1126 | 6206 | 41 | F G | |
| HRDC1115 | 6190 | 36 | F G H | |
| HRDC1138 | 6098 | 47 | G H I | IR83199H |
| HRDC1101 | 6092 | 44 | G H I | |
| HRDC1138 | 6087 | 44 | G H I | |
| HRDC1110 | 5874 | 44 | H I J | |
| HRDC1108 | 5841 | 47 | I J | |
| HRDC1102 | 5830 | 47 | I J | |
| HRDC1111 | 5813 | 44 | I J | |
| HRDC1119 | 5782 | 44 | I J | |
| HRDC1141 | 5743 | 6 | J | Mestizo 7 |
| HRDC1125 | 5731 | 45 | J | |
| HRDC1127 | 5661 | 36 | J | |
| HRDC1116 | 5658 | 47 | J | |
| HRDC1103 | 5606 | 44 | J | |
| HRDC1122 | 5600 | 47 | J | |
| HRDC1106 | 5590 | 47 | J | |
| HRDC1124 | 5556 | 3 | J | |

| ANOVA for Yield by Hybrid (2011 DS) | | | | | ANOVA for Yield by Hybrid (2011 WS) | | | | |
|-------------------------------------|-------|----|-----------|-----------|-------------------------------------|-------|----|---------------|-------------|
| Entry | Yield | N | t Testing | Hybrid | Entry | Yield | N | t Testing | Hybrid |
| HRDC1106 | 7162 | 35 | A | IR82386H | HRDC1105 | 6517 | 21 | A | IR82386H |
| HRDC1114 | 6872 | 45 | B | | HRDC1114 | 6232 | 22 | A B | |
| HRDC1105 | 6773 | 44 | B C | | HRDC1116 | 6203 | 32 | B C | |
| HRDC1104 | 6646 | 43 | B C D | IR82363H | HRDC1117 | 6086 | 23 | B C D | |
| HRDC1113 | 6605 | 47 | B C D E | | HRDC1115 | 6070 | 13 | B C D E | |
| HRDC1112 | 6538 | 47 | C D E F | | HRDC1112 | 5893 | 24 | B C D E F | |
| HRDC1121 | 6528 | 42 | C D E F | | HRDC1120 | 5865 | 21 | B C D E F G | |
| HRDC1131 | 6505 | 47 | C D E F | Mestizo 3 | HRDC1123 | 5823 | 21 | B C D E F G H | |
| HRDC1123 | 6473 | 44 | C D E F | | HRDC1113 | 5813 | 24 | B C D E F G H | |
| HRDC1129 | 6448 | 28 | C D E F | | HRDC1114 | 5796 | 20 | B C D E F G H | IR82363H |
| HRDC1135 | 6425 | 47 | D E F G | IR82372H | HRDC1109 | 3754 | 21 | C D F G H I | |
| HRDC1133 | 6371 | 44 | D E F G | IR80228H | HRDC1135 | 5647 | 24 | D E F G H I J | IR82372H |
| HRDC1120 | 6352 | 44 | D E F G | | HRDC1121 | 5622 | 19 | E F G H I J | |
| HRDC1137 | 6342 | 44 | D E F G | IR82301H | HRDC1131 | 5603 | 24 | F G H I J | Mestizo 7 |
| HRDC1132 | 6341 | 46 | D E F G | PSB Rc R2 | HRDC1124 | 5556 | 3 | F G H I J | |
| HRDC1128 | 6339 | 44 | D E F G | | HRDC1101 | 5527 | 21 | F G H I J | |
| HRDC1109 | 6286 | 44 | E F G | | HRDC1118 | 5518 | 21 | F G H I J K | |
| HRDC1107 | 6276 | 47 | E F G | | HRDC1111 | 5495 | 21 | F G H I J K | |
| HRDC1130 | 6222 | 36 | F G | | HRDC1138 | 5489 | 24 | F G H I J K | IR83199H |
| HRDC1117 | 6212 | 46 | F G | | HRDC1107 | 5479 | 24 | F G H I J K | |
| HRDC1104 | 6210 | 44 | F G | | HRDC1137 | 5451 | 21 | F G H I J K L | IR82301H |
| HRDC1126 | 6206 | 41 | F G | | HRDC1128 | 5418 | 21 | F G H I J K L | |
| HRDC1115 | 6190 | 36 | F G H | | HRDC1104 | 5390 | 21 | G H I J K L M | |
| HRDC1138 | 6098 | 47 | G H I | IR83199H | HRDC1110 | 5387 | 24 | G H I J K L M | |
| HRDC1101 | 6092 | 44 | G H I | | HRDC1116 | 5383 | 24 | H I J K L M N | |
| HRDC1138 | 6087 | 44 | G H I | | HRDC1132 | 5277 | 23 | I J K L M N O | PSB Rc R2 |
| HRDC1110 | 5874 | 44 | H I J | | HRDC1180 | 5225 | 21 | J K L M N O | |
| HRDC1108 | 5841 | 47 | I J | | HRDC1108 | 5248 | 24 | J K L M N O | |
| HRDC1102 | 5830 | 47 | I J | | HRDC1102 | 5244 | 24 | J K L M N O | |
| HRDC1111 | 5813 | 44 | I J | | HRDC1115 | 5221 | 22 | J K L M N O | |
| HRDC1119 | 5782 | 44 | I J | | HRDC1126 | 5196 | 18 | K L M N O | |
| HRDC1141 | 5743 | 6 | J | Mestizo 7 | HRDC1106 | 5043 | 24 | K L M N O P | |
| HRDC1125 | 5731 | 45 | J | | HRDC1122 | 4987 | 24 | L M N O P | |
| HRDC1127 | 5661 | 36 | J | | HRDC1119 | 4930 | 21 | M N O P | |
| HRDC1116 | 5658 | 47 | J | | HRDC1103 | 4909 | 21 | N O P | |
| HRDC1103 | 5606 | 44 | J | | HRDC1127 | 4883 | 21 | O P | |
| HRDC1122 | 5600 | 47 | J | | HRDC1139 | 4643 | 13 | P Q | |
| HRDC1106 | 5590 | 47 | J | | HRDC1141 | 4214 | 3 | Q | Q Mestizo 7 |
| HRDC1124 | 5556 | 3 | J | | | | | | |

DS MEAN = 6885 * **WS** MEAN = 5496

- Question/issues related to MRYT:**
1. Not enough location in **India** and **Bangladesh** – need volunteer locations;
 2. Field Management – should be **standard protocol** provided by HRDC;
 3. Traits investigated – Should be **standard protocol** provided by HRDC;
 4. Breeding for Season? - **IRRI** hybrids relatively stable
 5. High-yielding potential trail – Location, field management protocol;
 6. Seed quality and shipment in time

Announcement

The 6th International Hybrid Rice Symposium

Sept. 9 – 11, 2012

Hyderabad, India

<http://ricecongress.com/main/>