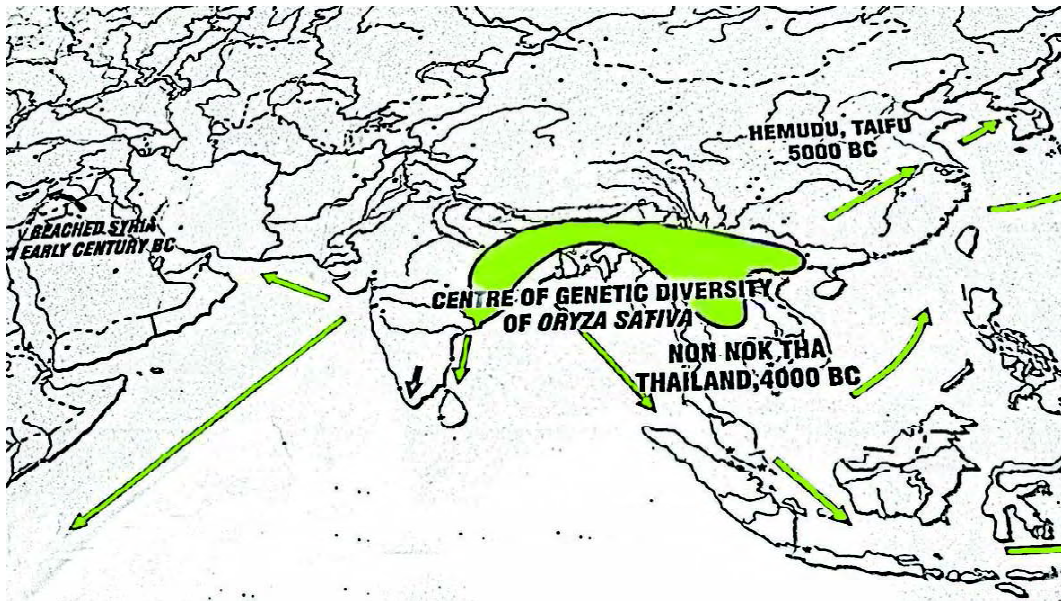


FOR PRIVATE CIRCULATION ONLY

WHERE IS *OUR* ORYZA?



**HYBRID RICE IN INDIA
AND ITS IMPACTS ON FARMERS' RIGHTS OVER
SEEDS**



This booklet '**Where is our Oryza?**' has been brought out by Living Farms with Development Research Communication and Services Centre (DRCSC). It has been made possible by the support of **Evangelischer Entwicklungsdienst (eed)**. The research and writing for this publication was done by **Shalini Bhutani**.

Shalini is trained in law and works on issues of trade, agriculture and biodiversity. She has worked in several national and international NGOs including the Centre for Environmental Law at WWF-India, Navdanya and GRAIN. Over the last 15 years she has interacted with several farmer groups and local movements across Asian countries that work for bio-diverse planet-sensitive people-centred food and farming systems. She can be contacted at emailsbhutani@gmail.com

The section on **High Yield Varieties** was contributed by **Dr. Debal Deb** and contains updated yield data based on his research on traditional rice landraces. He can be contacted at debaldeb01@yahoo.com

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1. J. P. Londo, Y-C. Chiang, K-H. Hung, T-Y. Chiang, and B. A. Schaal 2006. Phylogeography of Asian wild rice, *Oryza rufipogon*, reveals multiple independent domestications of cultivated rice, *Oryza sativa*. Proc. Natl. Acad. Sci. USA 103: 9578- 9583.
2. M. Sweeney and S. McCouch 2007. The complex history of the domestication of rice. Annals of Botany 100: 951– 957.
3. D.A.Vaughan & B-R. Lu and N. Tomooka 2008. Was asian rice (*oryza sativa*) domesticated more than once? Rice 1: 16–24.

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Address for correspondence:

Living Farms

Plot No.1181/2146, Ratnakarbag-2, Tankapani Road,
Bhubaneswar - 751018, Odisha, India
Tel: +91-674-2430176
email: livingfarms@gmail.com

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Preface ...

The Government of India's ambition currently centres around making hybrid rice a success in the country following the 'Chinese model' to increase productivity of rice by bridging yield gaps. It is being promoted through various government programmes viz. National Food Security Mission (NFSM), Bringing 'Green Revolution' to Eastern India (BGREI), System of Rice Intensification (SRI) etc. and crores of rupees are being allocated for each programme.

We are now witnessing the consequences of first green revolution – which includes a trend of reduction in the yield of high yielding varieties (HYVs), declining and degrading natural resources like land and water, shrinking biodiversity and adverse effect on human health and economy as well.

Still, policy implementation is in full gear to bring the eastern states, including Odisha, completely in the ambit of second 'Green Revolution'. Where will this lead us?

In this booklet, Shalini Bhutani puts forth the dynamics of hybrid rice scenario in Odisha, India and global context. Odisha is considered to be the centre of origin of rice and there are records mentioning the unique productive capacity, high nutrition content, medicinal values and local climatic appropriateness of the traditional varieties. It is sad that neither the wisdom of farmers who grew and nurtured these varieties is recognised, nor these varieties are explored for sustainable production enhancement. Dr. Debal Deb's view that '*in situ* conservation of the remaining landraces is the need of the day to ensure food security of the country's poor' sounds like an appropriate alert.

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To ensure food for our millions and to stop hunger, rice cultivation and production and rice lands must return to our peasant farmers and communities. It is in Rice that we reclaim our rights and the rights of our future generations to our culture, our livelihood, and freedom from hunger.

People's Statement on Saving the Rice of Asia

<http://www.panap.net/en/r/page/rice/383>

WHERE IS *OUR* ORYZA?

Shalini Bhutani

India story

Hybrid rice (HR) is one amongst the “modern” agricultural practices such as latest breeding tools, new genetic resources, advanced biotechnology, etc. that India is going after to supposedly increase its food production. The Government of India (GoI) has a target to bring 3 million hectares under HR varieties by 2012; and by 2015 hybrids are expected to cover at least 5 million hectares of the rice in India. To see that through the GoI in July 2010 constituted a central-level ‘Task Force on Hybrid Rice’, headed by an Additional Secretary in the Ministry of Agriculture¹.

The acceptance of HR by the officialdom makes two things evident. First, that the administration has not provided a supportive environment for farmers’ own agriculture. Hence, the reliance is on technology to ‘fix’ the problem. Second, that technology also has its limitations. There is admittance that yield levels of the so-called ‘high-yielding’ varieties of the 1960s and 70s have plateaued. The technological breakthrough of the ‘Green Revolution’ is now of little use. The experience with a technological approach should be a lesson learnt vis-a-vis adoption of other technologies.



Photo by Jyotirmayee Sarangi, Living Farms

Yet, the Indian Council of Agricultural Research (ICAR) started a focused HR research programme in 1989. In that year a HR research network comprising 12 centres across the country in the target states, as set up with the Directorate of Rice Research (DRR), Hyderabad as the hub. While the research started in India in the 80s, the first HR variety was released in Andhra Pradesh in the 1993-1994 rabi season. The network helped in the release of over 46 hybrids both from public sector and private sector.² The DRR itself developed 3 HR varieties: DRR H1 (1997), DRR H2 (2005) and DRR Sankar Dhan 3 (2009). For this the UNDP gave 'significant' support in two phases from 1991-1996 and then 1999-2002.³ Mahyco Research Foundation (MRF), a private R&D Foundation also extended some financial support since 1996.⁴

Overall the adoption rate of HR by farmers has been slow in India. Many farmers who grew the early hybrid varieties for one or two seasons started dropping out from HR cultivation in India (Janaiah 1995, 2000, 2002, Janaiah et al 1993, 2002).⁵ In 2004, the HR R&D strategy in India was re-oriented. Meanwhile, the 1st Basmati rice hybrid Pusa Basmati RH-10 was developed from a public-sector institution Indian Agricultural Research Institute (IARI) in 2006. This was for application in the states of

Punjab, Haryana and western Uttar Pradesh. Private seed companies entered into an agreement with IARI to access seeds of this hybrid from IARI, and produced a large quantity of F1 seeds. One might categorise the period of HR R&D in India into that of first-generation hybrids (1994-98), second-generation hybrids (1999-2003), and third-generation hybrids (2004 until now).

"The challenge for hybrid rice in India is as much in putting in place a supportive financial and market infrastructure as in creating awareness among farmers," said Pradip Mazumdar, India CEO of Crop Life International, a global research-based agri-industry organisation. "It is also a social and cultural challenge because there is a perception among many Indians that hybrid rice is different and not to their taste."

- From taste to yields, hybrid rice's many hurdles in India⁵

Global politics

The India story has to be placed in context of the big picture. The possibility of hybridising rice emerged from early work by Indian rice scientists (Sampath and Mohanty, 1954). The Japan and USA both attempted hybridisation of rice and dropped it. It is in China that HR was developed and its high-yield performance first demonstrated. Professor Yuan Longping, a Chinese agriculturist is regarded as the father of HR. In China, HR research started in 1964 and it was in 1974 that the first commercial rice hybrid was released there. And the Chinese communist state pushed the widespread adoption of HR by its farmers. In 1979 the HR technology was also transferred to the USA. The infamous US Rice Tec Co. became the first to commercialise HR in North and South America.⁷

HR has policy implications for other countries as Chinese foreign policy takes its HR abroad as it did in

Vietnam. Since then HR has also become a big business in China. Prof. Longping has even lent his name to a private enterprise for a stake in profits.⁸ Now the Yuan Longping consortium of companies is moving to bring genetically modified (GM) HR varieties to the market.⁹ The latest “super rice” breed has produced 13.9 tons per hectare above the Chinese national average of 6.3 tons per hectare.¹⁰ A national laboratory for HR research led by Prof. Longping has been set up in Changsha City, capital of Hunan, with the support of Hunan Hybrid Rice Research Center and Wuhan University in China.

The role of international organisations like the UN Food and Agriculture Organisation (FAO) and the Consortium of International Agricultural Research Centres – CGIAR, particularly the International Rice Research Institute (IRRI) in the spread of rice technologies in India

Patents granted by the US PTO to the Chinese ‘inventor’ of hybrid rice

No.	Inventors	Assignee	Date	For
1. 4305225 & 2. 4827664	Yuan; Long-Ping (Hunan Province, CN)	China National Seed Corporation (Peking, CN)	15/12/81 09/05/89	Methods for the production of seed for growing hybrid rice comprising the planting of rows of male parent seed interspersed with rows of female seed, synchronization of heading and pollination.

and other rice countries can not be understated. Soon after independence, India had become a member of the International Rice Commission (IRC) in 1948. The IRC pre-dates IRRI and works within the framework of FAO. In 1990 the IRC asked FAO to push its member countries to grow HR for food security. One of the projects was for India by FAO's Crop and Grassland Service that hosts the Secretariat of the IRC.¹¹

HR research at IRRI started when some leading hybrids from China (Shan You 6, Wei You 6, and Shen You 2) were introduced in 1978 and evaluated in 1979.¹² In 1993 the first rice hybrid developed at IRRI was released in the Philippines where IRRI has its HQ. In 1995, FAO, IRRI and national agricultural research systems (NARS) established the *International Task-Force for Hybrid Rice* (INTAFOHR).

In 1999, FAO and IRRI signed a *Memorandum of Understanding* (MOU) to strengthen the collaborative action aimed at promoting wider adoption of hybrid rice technology outside China. An IRRI project on HR funded by Asian Development Bank (ADB) was implemented since the late 90s in collaboration with FAO, Asia Pacific Seed Association (APSA) and China in six countries (Bangladesh, India, Indonesia,

Philippines, Sri Lanka and Viet Nam). The ADB requirements in communist Vietnam included prescriptions to dismantle government support and allow private players in hybrid rice.

Meanwhile, IRRI and China have walked the tight rope between competition and co-operation. In 2008, IRRI established a Hybrid Rice Development Consortium (HRDC).¹³ The HRDC coordinator is a hybrid rice breeder from China in IRRI's Plant Breeding, Genetics, and Biotechnology Division. IRRI plays the host, coordinator and secretariat of this public-private consortium. It comprises public sector institutes from over 15 countries and about a score of companies including all the big seed corporations. These corporations also sponsor international HR symposia (HRS). Five such have been held so far, since the series started in 1986:

1986 1st HRS in Changsha, China

1992 2nd at IRRI in the Philippines

1996 3rd in Hyderabad, India

2002 4th in Hanoi, Vietnam

2008 5th in Changsha, China

In 2009 the Japan International Cooperation Agency (JICA), from Tokyo pledged to enhance the capacity of the Alliance for Green

Revolution in Africa (AGRA) and the New Partnership for Africa's Development (NEPAD) to double the production of rice in the African continent. In May 2011 an IRRI-JICA training support package covering 2011 to 2014, over 150 Africans are expected to be 'trained' to use rice and that too hybrid rice.

So it must be understood that rice technologies have been a means to exercise and expand control over countries and peoples' (agri) cultures. The concerted effort to push and popularise HR in countries across the world must be seen in that light, including in India. Ironically HR is not something that farmers anywhere in the world asked for!

Rice business(es)

A large number of private companies engaging in R&D and seed production have in the last decade recognised the business potential of hybrid rice. The hybridisation technique is a tool for companies to cut-off their biggest competition, which is from farm-saved seed. Farmers who choose to buy and grow hybrids must buy new seed every year if they want the high(er) yields. These sales assure seed companies of their profits. So the technology in itself works like a biological patent. Intellectual property (IP) (such as patents and plant breeder rights) and other legal mechanisms (such as contracts) are other tools of control. Through them seed businesses claim proprietary rights over the planting material required for developing hybrid seeds. The International Seed Federation (ISF) even expressly states that proprietary parental lines of hybrids

should not be used by third parties for the purpose of breeding, except when agreed upon by the owner.¹⁴

Under the auspices of APSA a Special Interest Group on Hybrid Rice has also been set up. In India the private seed companies involved in HR include both domestic and foreign, such as Pioneer Overseas Corp., Hybrid Rice International (Bayer Bio Science), Paras Extra Growth Seeds Ltd., Parry Monsanto Ltd., Mahyco Ltd., JK Agri Genetics Ltd., Ganga Kaveri Seeds Pvt. Ltd., Metahelix Life Sciences Pvt. Ltd., Nath Biogene Ltd., Sri Ram Bioseed India Ltd., Indo-American Hybrid Seeds, Advanta India Ltd. and Syngenta India Ltd. The private sector also benefits from the slew of incentives and subsidies that governments have made available to promote HR. For instance, Syngenta India Ltd. has launched its own 'Green

Revolution in Eastern States' (GRES) project. For this the Swiss corporation will be drawing on funds from the Indian government for the promotion of its hybrid rice seeds and pesticides. Syngenta's project partners are the GoI's Department of Agriculture and Cooperation, West Bengal's Agriculture Department and CropLife India.¹⁵ Likewise, in the Philippines SL-8H, a rice hybrid produced by the largest hybrid seed company SL Agritech Corporation (SLAC), were distributed under the government's GMA Rice Program.¹⁶

A strong public-private partnership is considered key to the faster development and dissemination of this technology. Partnerships are happening both at the international and national level. For instance, IRRI and DuPont signed an agreement in 2009 to establish a new model for public-private sector collaboration called Scientific Know-How and Exchange Program (SKEP).¹⁷ Meanwhile, in India the CRRI has signed five MoUs with private seed companies for production of CRRI hybrid rice seeds and parental lines. And it is not the only one!

MoUs with private companies

Hybrid	Developed by	MoU with
DRRH-2	DRR, Hyderabad	Sampoorna Seeds, Pratham Biotech Ltd, Neo Seeds, Vicky's Agri Sciences Pvt. Ltd., Charoen Pokphand Seeds (India) Private Ltd., Bioseed Research India Pvt. Ltd.
Pusa RH-10	IARI, New Delhi	Indian Foundation Seed and Services Association, J.K.Agr Genetics, Nath Biogene (I) Ltd., Devgen Seed and Crop Technology Pvt. Ltd., Zuari Seeds Ltd, Advanta India Ltd, Yashoda Seeds Pvt. Ltd., Namdhari Seeds Pvt. Ltd., Amareshwara Agri. Tech Ltd., Bhavani Seeds Pvt. Ltd.
PSD-1 & PSD-3	GBPUAT, Pantnagar	Syngenta India Ltd.
CORH – 3	TNAU, Coimbatore	Rasi Seeds (P) Ltd.
KRH-2	UAS, Mandya	Namdhari Seeds Pvt.Ltd.

Source: *Hybrid Rice in India – Current Status and Future Prospects*¹⁸



श्रीमती. CHRISSA

© 94735

Memorandum of Understanding (MoU) between ICAR Institute/State Agricultural Universities and Private/Public sector seed Agencies

This MoU is signed between Central Rice Research Institute, Cuttack, Odisha, a constituent of Indian Council of Agricultural Research (ICAR)/Kisan Centre, a society registered under the societies Registration Act 1860 (hereinafter called "Licensor") AND Sansar Agropol Pvt.Ltd. Bhubaneswar (hereinafter called the "Licensee").

Whereas the Licensor has developed a rice hybrid, Rajasawal (CRRI 8) and the Licensee is interested to take up large scale commercial seed production and marketing in India. For this purpose, Licensor and Licensee have agreed to the terms and conditions given below.

- A. The LICENSEE will offer:
 1. Genetically pure breeder seeds of the parental lines (one kg each of CRMI 12 A, CRMI 12 B, and CRMI 24 A & B) of the long slender grain rice hybrid, Rajasawal along with the details of seed production technology and relevant information.
 2. Technical guidance for seed production may be provided by the Licensor at the Licensee's expense on seed bank.
 3. Hybrid rice breeder will monitor the hybrid for seed production programme and estimate the "T1" seed yield produced by the licensee. The cost for each hect (10-15000 in a cropping season) will be borne by the Licensee.
- B. The LICENSEE in turn will expect from the Licensor:

Handwritten signature

Extract from the MoU between CRRI and an Indian seed company Sansar Agropol Pvt. Ltd¹⁹

A gap area in the public sector that creates a further market for private seed companies is that of seed production. The National Seeds Corporation, State Farms

Corporation of India and State Seeds Corporations are in any case not able to fulfill the seed needs of the country's farmers.

The Odisha angle

Most of India's hybrid rice is grown in the country's north and east. With rice as the staple crop, the eastern Indian state of Odisha finds itself at the centre of the second Green Revolution (GR II). The use of hybrids is a key component of this 'revolution'. Odisha's branding as a food deficit state with a rice-eating society gives decision-makers enough justification to introduce rice technologies. Yet this is a State famed for the tribals of its Jeypore Tract who domesticated *aus* varieties of rice ten thousand years ago. The state of Odisha is historically regarded as the one of the hotspots of origin and domestication of rice, from where rice first moved to other parts of India. Even today several farmers are saving numerous traditional rice varieties that are locally adaptive, culturally acceptable and performing adequately. The rice wisdom of the local communities is being deliberately forgotten.

It is not by accident that Odisha is also home to the Central Rice Research Institute (CRRI), Cuttack. In fact it is pertinent to recall that CRRI was set up in 1946 against a backdrop of food shortages caused by the Great Bengal famine of 1943. Despite its existence and operation for over 65 years the food situation of the State has not dramatically improved. Instead of pursuing its public mandate, CRRI's research

agenda too is now moving to develop marketable hybrid varieties of rice.

CRRI has developed and released three rice hybrids i.e., Ajay, Rajalaxmi, and CRHR-32 for irrigated and coastal shallow lowlands. Rajalaxmi for irrigated areas of Odisha is claimed by CRRI to be superior to Gautam, IR 64, Krishna Hamsa and local rice in the boro areas. It has been recommended for use in Assam as well. CRRI's first long duration hybrid CR Dhan 701 (CRHR-32) has been recommended for release in the shallow lowlands of Bihar and Gujarat although similar indigenous varieties adopted to shallow lowland exist in different parts of the country. For its contributions – including developing the first shallow lowland hybrids Ajay and Rajalaxmi, the CRRI was judged as the best ICAR institute in 2008. CRRI's Vision 2030 lays emphasis on hybrid rice research.²⁰

CRRI has also been designated as the nodal agency for the Government of India project "Bringing Green Revolution to Eastern India (BGREI)". This was launched in the year 2010-11 in seven States of Eastern India namely Assam, Bihar, Chhattisgarh, Jharkhand, Eastern Uttar Pradesh, West Bengal and Odisha based on strategic action plans developed by these States.²¹ The idea is to shift rice-growing from the North Western states to the Eastern states.

Another large initiative to usher in

an agricultural 'revolution' in not only eastern India but South Asia is through the Gol's approval to the CGIAR's proposal of International Maize and Wheat Improvement Centre (CIMMYT) to establish a new state-of-the-art, international agricultural R&D centre in Eastern India - the Bourlaug Institute for South Asia (BISA)²² This will be based in Bihar, the state adjacent to Odisha. It will introduce elite wheat and maize germplasm, which will also be hybrid. So what will pan out in and around Odisha as it becomes a hybrid hub, will have implications for not only eastern India, but neighbouring countries in the South Asian region.

Proposed area coverage and seed requirement for hybrid rice under the kharif season

Odisha	2011	2012
Area (hectares)	40000	60000
Quantity (Metric Tonnes)	6000	9000

Source: Extracted from NSC PPT



The CRRI is promoting hybrid rice in several parts of Odisha and India.

Food 'security'

The justification given for the promotion of hybrid rice is that yields need to be increased to feed a growing number of people and that there is going to be less land to do that in future. Addressing this problem head-on should imply that more number of people be allowed to grow their own food, particularly when they have the know-how and the seed wisdoms as India's farmers do. Since the problem at the macro-level is more about distribution than the production of food. Such a non-centralised food production system with locally-adaptive varieties would also be more climate-friendly. Moreover, if governments are genuinely concerned about food security then they ought to stop the diversion of land for non-agricultural purposes. What can be more important than food, and with it, food sovereignty for its people? So pushing hybrid rice is more than just about bridging the yield gap. It is about control, both over *oryza sativa* and farmers in the name of food security.

The Gol went into mission mode through National Food Security Mission (NFSM). It has 3 components – rice, wheat and pulses.²³ This Mission handled by the Ministry of Agriculture is operational since 2007 in 17 states of the country including Odisha. Under the NFSM the hybrid rice seeds recommended for use in Odisha are:

1. KRH-2
2. PA 6201
3. PA 6444
4. PRH-122 (Ganga)
5. Suruchi
6. Raj Laxmi 1
7. Ajay
8. JKRH
9. Naveen

This is accompanied with an increased emphasis on extension. Demonstrations on Hybrid Rice Technology are planned (one demonstration of 0.4 hectare at every 100 hectares of rice area).²⁴ Besides the 15 districts identified in Odisha for NFSM, hybrid rice will also be introduced in Non-NFSM districts through Green Revolution II package. For this the Gol has made an allocation of Rs.62.62 crores (2011-2012) for Odisha.²⁵ Out of this Rs 3752.04 lakh is for conducting 52 block demonstrations of rice, each of 1000 hectares to be implemented in the four agro ecological sub-regions namely, rainfed uplands, rainfed shallow low land and irrigated rice (both HYV and hybrid).²⁶ During the period 2011-12, the Government of Odisha is implementing hybrid rice demonstrations in two districts, namely Puri and Sambalpur through GR II Package. This is couched in the language of increasing production to overcome food shortage.

Hybrid rice versus farmers' rights

To supplement the work of State Governments for increasing production, several Centrally sponsored programmes and schemes are run. Some of them too promote hybrid rice. For instance, the assistance to producers is offered under the Integrated Cereal Development Programme in Rice Based Cropping Systems (ICDP-Rice). On since 1995 this programme encourages the production and use of hybrid seeds and herbicides.

Advisors to the Government also recommend that HR be distributed through government nutrition schemes like ICDS & MDMS.²⁷ The Integrated Child Development Scheme (ICDS) has a provision for Take Home Ration (THR) for a certain age-group of children.²⁸ This is either dry or raw ration (wheat and rice) that lands up being consumed by the entire family. Likewise, the Mid Day Meal Scheme in India is the world's largest school lunch feeding programme reaching out to about 12 crore children.



Image downloaded from the Internet

Other state-level agriculture policies and plans aiming at increasing production for food could land up promoting hybrid rice. For example, Jharkhand's Draft Agriculture Policy 2011 plans to bring more area under new varieties and rice hybrids in a planned manner. Likewise, the Approved State Plan of Agriculture for Tripura (2009-2010) talks of giving subsidies for hybrid paddy.²⁹

While the food crisis in rural areas goes up it makes labour move out in search of both work and food. And states such as Tamil Nadu and Andhra Pradesh are witnessing an increase in seed replacement rate (SRR) in hybrid rice due to labour shortage.³⁰ More hands on the farm are needed to separate, package, process and dry seeds for the next planting season. Therefore, wealthy farmers simply prefer to buy hybrid seeds.

HR has made rice-growing a cash crop activity. Previously farmers used to grow their own rice primarily for their own consumption. This meant they could eat what they would not sell. High nutritional value of traditional varieties used to provide indigenous communities with basic nutrition and support local food cultures, even though it may not have got them more cash.

In 2004 a HR variety developed by the company Mahyco named Suruchi was released by the State Variety Release Committee. Mahyco's Suruchi is being promoted under NFSM.

Finally, a national Food Security Bill for the country is on the anvil.³¹ That too could be used to boost hybrid rice. The Food Corporation of India has already been asked to procure

HR. The Public Distribution System (PDS) could become a ready-made market for the hybrid rice uptake. This will translate into another subsidy for the private sector.

Farmers' rights

Small farmers were initially slow to move to hybrid rice in India and hesitant to keep cropping it. This is for good reason. Both the price and performance of hybrid seeds have been a factor. Surveys have shown that the seed cost for hybrid rice in all states is significantly higher than the seed cost of inbred rice, as much as six fold in Haryana. Due to the inferior grain quality HR grain fetched almost the same price as inbred rice grain in Uttar Pradesh and Haryana.³² It is only in last 5-6 years given more incentives by governments and enabling environment for seed companies that HR has picked up.

The ultimate test for any seed is in the farmers' field. Linked to that is the issue of 'if and how' a certain agricultural technology impacts farmers' rights to the seed. The idea of farmers' rights is still a developing one in India. A National Policy on Farmers was announced in 2007. It too talks of hybrid seeds being the

one's of 'quality', as against farmers' own seeds. Hence, it envisages that foundation seeds of new hybrids be provided to grassroot level seed growers and their groups such as cooperative societies and SHGs.³³ And in fact even the definition of 'farmer' in proposed seed legislation is one who keeps out of the formal seed market. And hybrid seed is very much a commercial crop.

By law in India today, the notion of rights of and for farmers is very much located in the intellectual property (IP) system. This is a highly questionable approach that is premised on the privatisation of planting material. The Plant Variety Protection and Farmers' Rights Act (PPVFRA), 2001 is the only law in the country, that even mentions 'Farmers' Rights'. But the list of farmer freedoms vis-a-vis seed and planting material that it provides could be rendered ineffective by hybridisation of seeds.

"Farmer" means any person who cultivates crops either by cultivating the land himself or through any other person but does not include any individual, company, trader or dealer who engages in the procurement and sale of seeds on a commercial basis;

- Section 2(9) of the Seed Bill, 2010

Also, if India is so keenly watching the 'China model' on HR, then perhaps decision-makers must also look more closely at the experience of Chinese farmers buying PVP-protected HR seeds. There is evidence to show how HR seeds are more expensive and that came in the way of technology availability to the small farmers. Equally important is its performance in China and the experience of Chinese farmers.³⁴ There is also evidence from other countries, like the Philippines to show that farmers are having problems with HR.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2001 is **Office of the Registrar, PVP & FR Authority, New Delhi - 110 012.**

Propriet data of the variety 25 P 25:

Applicant Pioneer Overseas Corporation
Address of the Applicant 3rd & 4th Floor, Bahukam's Millennium Centre,
 e- 1-1099/1100, Raj Bhavan Road, Somayyada,
 Hyderabad- 500 082, Andhra Pradesh, India
Nationality of Applicant Indian
Application details
 a. Number

E 23	OS 92	DR	326
------	-------	----	-----

 b. Date of receipt 03/04/2008
 c. Date of acceptance 13/04/2011
Crop (Taxonomical Lineage) Rice [Oryza sativa L.]
Denomination 25 P 25
Type of Variety Extant (Variety of Common Knowledge)
Classification of Variety Hybrid
Previously proposed denomination Not applicable
Name of Parental Material Male Parent: K 942
 Female Parent: R 818 F
Name of Reference Varieties IR 64 & Govinda

Variety Description:	
A. Group Characteristics	Remarks mentioned values, example varieties, etc.
Sausi Leaf Sheath colour	Green (Ran/Hera)

Rice is a self-pollinating crop with florets in which each plant pollinates and fertilises, producing itself in the same form of seeds of same variety. Hybridisation involves two separate parental lines. HR is the direct product of crossing two genetically different parents. So access to the two parent varieties – the seed



Photo by Jyotirmayee Sarangi, Living Farms

Pioneer Overseas Corporation's PVP Application accepted by India's PPVFR Authority

parent and the pollen parent are needed to be able to breed it. New seeds for planting the next season need to be produced through cross-pollination. The technology and the fact that it is controlled by someone else outside the farm has serious implications for farmers' rights. HR reduces farmers into merely being

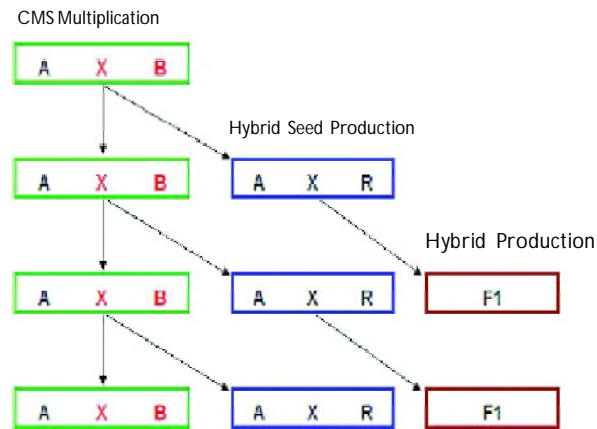
Hybrid rice versus farmers' rights

growers of someone else's proprietary seeds. Thus, the so-called 'farmers' rights' in domestic laws become meaningless if the government promoted hybrid seeds. In effect what the legislature gives via legislation the executive takes away by policy and practice (see table in adjacent page).

HR research in the public sector diverts research into marketable products, rather than public goods. This is a corruption of the intended objectives of the public sector NARS. This is true even of the international public sector, such as the CG centres.

The several thousand rice varieties collected from farmers' fields and stored in national and international gene banks are testimony to the folk knowledge of hereditary functional characteristics of rice. In fact India is the largest donor of rice germplasm to IRRI's Genetic Resources Centre. These are being used as base material on which formal sector breeders are developing products. They also seek IPR protection in the form of PVP. For example, the HR variety developed by Pioneer is before India's PVP Authority awaiting the PVP certificate.

Three-line hybrid rice cultivation



Source: http://www.knowledgebank.irri.org/ricebreedingcourse/Hybrid_Rice_Breeding_&_Seed_Production.htm

Farmers' rights to seeds are also violated if the natural environment favourable for the cultivation of seeds is destroyed in any way. Chemical-intensive farming damages the soil, increases inputs costs and has negative health impacts on both humans and animals. Yet the promoters of HR advocate the use of chemicals. See for instance,

Pioneer DuPont's *Hybrid Rice Production Guide* expressly that explicitly talks about the need for fertilisers, weedicides and ample irrigation.³⁵ Ongoing HR research is dealing with how to incorporate resistance to various pests and diseases. However, this research is being done mostly by private seed companies. And the R&D efforts are

underway to incorporate resistance to various pests and diseases are through developing transgenic rice varieties and hybrids.³⁶ GM poses another threat to farmers' vision of natural farming.

Our language needs to change to reflect that farmer-developed inbred rice is not 'ordinary' rice, as claimed by those selling hybrids! The letter of law and policy also has to create the space for farmers to strengthen

Law versus reality

PPV & FRACT, 2001 (legislation in force)	SEED BILL, 2010 (pending introduction in Parliament)	HYBRID SEEDS (being released and sold)
Farm produce including seed of a protected variety can be	Farm seed & planting material can be	
	GROWN	Farmer has to pay price for growing hybrid seeds.
SAVED	SAVED	No use saving seed from own harvest, hybrid rice is not self-pollinating
USED	USED	Seeds from F1 pointless to use as the resulting will not be uniform in height and in maturity. The farmer has to buy new seed every season.
EXCHANGED	EXCHANGED	Makes exchange pointless as other farmer/grower can't get reasonable yield.
SHARED	SHARED	Sharing amongst farmers is rendered meaningless.
SOWED	SOWED	The seeds obtained upon harvesting hybrid seeds will not give high yield as the hybrid vigour is lost resulting in lower yield and non-uniform crop stand
RESOWED	RESOWED	Resowing the seed is made redundant by the technology for reasons as above; because of reduction in hybrid vigour, yields could decrease by about 20% and hence, be even lower than those obtainable from non-hybrid inbred rice varieties.
SOLD, However SALE of branded seed of a protected variety IS PROHIBITED.	SOLD, but SALE of such seed or planting material under a brand name is PROHIBITED	Hybrid seeds are sold as proprietary products, which are either certified, registered and/or IPR-protected.

their 'alternatives'. And those do exist! Farmers themselves are returning to traditional paddy varieties. So the question is: why the

original rice of the people of India is not being officially encouraged.

Why hybrid rice?

Endnotes

1 Govt to form task force for promoting hybrid rice varieties <http://www.business-standard.com/india/news/govt-to-form-task-force-for-promoting-hybrid-rice-varieties/100926/on>

2 DRR Vision 2030 <http://www.drricar.org/DRR%20vision%202030.pdf>

3 www.hybridriceindia.org/undp.htm

4 Mahyco Research Foundation established in 1986 is known as the Barwale Foundation since 2005. It is the NGO arm of the Maharashtra Hybrid Corporation (Mahyco), India's largest hybrid seed company and the Indian face of the US MNC Monsanto Inc. www.barwalefoundation.org/

5 Janaiah A, Xie F. 2010. Hybrid rice adoption in India: farm-level impacts and challenges. IRRI Technical Bulletin No. 14. Los Baños (Philippines): International Rice Research Institute. 20 p.

6 <http://www.reuters.com/article/2011/08/22/india-rice-idUSL4E7JM1F320110822>

7 www.ricetec.com/Products/Hybrids/conventional# In 1997 the US MNC RiceTec sought a patent at the US Patent and Trademark Office on 'Basmati rice lines and grains' which are originally found in India and Pakistan. This case of 'biopiracy' had to be fought by NGOs and the Indian Government to compel the company to withdraw claims pertaining to 'novel rice grains' from its patent application. In August 2001 the US PTO only allowed the patent No.5663484 with five out of the original twenty claims to specific breeding lines created by RiceTec. It means that the company could neither claim the unique qualities of Basmati nor the unique name "Basmati" as its invention.

8 <http://www.lpht.com.cn/Channel.aspx?ChId=9>

9 The consortium consists of Hunan Longping High-tech Nongping Seeds Industry Co.,Ltd. Hunan Xiangyan Seeds Industry Co.,Ltd. Hunan Longping High-tech Cotton & Rape Seeds Industry Co.,Ltd. Agrochemical Development Company, Hunan Nongwei Science and Technology Co.,Ltd, Hunan Kangyida Science and Technology Co.,Ltd. and Hunan Longke Agricultural Materials Co.,Ltd. and other operating organisations. <http://www.lpht.com.cn/Column.aspx?ColId=57>

10 www.chinadaily.com.cn/china/2011-09/20/content_13737437.htm

11 www.fao.org/ag/agp/agpc/doc/field/commrice/comm/23.htm

12 S.S.Virmani and Ish Kumar, June 2004 Development and use of hybrid rice technology to increase rice productivity in the tropics

13 <http://hrdc.irri.org/>

14 International Seed Federation's Position Paper on 'Use of Proprietary Parental Lines of Hybrids. (2009) http://www.worldseed.org/cms/medias/file/PositionPapers/OnIntellectualProperty/Use_of_Proprietary_Parental_Lines_of_Hybrids_2009.pdf

15 *Syngentato enhance rice output in eastern states* <http://www.thehindubusinessline.com/industry-and-economy/agri-biz/article2388476.ece>

16 SLAC has a long-standing partnership with Yuan Longping High-Tech Agriculture Co. Ltd.

17 *DuPont and IRRI partner to boost rice yields* http://us.vocuspr.com/Newsroom/Query.aspx?SiteName=Dupontew&Entity=PRAsset&SF_PRAsset_PRAssetID_EQ=112044&XSL=PressRelease&Cache

- 18 www.rkmp.co.in/sites/default/.../Hybrid%20rice%20in%20India.pdf
- 19 Obtained through an application to the CRRI under the Right to Information Act, 2005.
- 20 CRRI's Vision 2030 http://crri.nic.in/crri_vision2030_2011.pdf
- 21 bgrei-rkvy.nic.in/Background/Background.pdf
- 22 In September 2009, the Union Cabinet approved the proposal of Ministry of Agriculture, Department of Agricultural Research and Education to accept the proposal of CGIAR's International Maize and Wheat Improvement Centre (CIMMYT) to establish an international institute, namely, Borlaug Institute for South Asia (BISA) in India with centres at Ludhiana in Punjab, Pusa in Bihar and Jabalpur in Madhya Pradesh. www.icar.org.in/node/3692
- 23 The National Development Council (NDC) in its 53rd meeting held on 29th May, 2007 adopted a resolution to launch a Food Security Mission comprising rice, wheat and pulses to increase the production of rice by 10 million tons, wheat by 8 million tons and pulses by 2 million tons by the end of the Eleventh Plan (2011-12). <http://nfsm.gov.in/>
- 24 http://nfsm.gov.in/NfsmMIS/StateProfile/State_Action_Plan.aspx
- 25 Guidelines for Extending Green Revolution in Eastern India, Dept of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India, March 2011
- 26 Presentation made by Sri Guru Prasad Mohanty, Asst. Director, Institution of Management Agricultural Extension (IMAGE), Bhubaneswar at a workshop at Patna, July 8-9, 2011.
- 27 See Ashok Gulati of IFPRI's PPT: *Learning from Hybrid Rice Story of China*, at the BGREI Workshop in Kolkata, West Bengal in July 2010
- 28 <http://wcd.nic.in/icds.htm>
- 29 <http://www.agritripura.in/Agriculture/Pages/ApprovedPlan10.pdf>
- 30 <http://indiarice.in/NewsEvents.aspx>
- 31 na.nic.in/foodsecurity/nfsb_final.pdf
- 32 Same as in footnote 5.
- 33 *National Policy for Farmers, 2007* agricoop.nic.in/NPF/npff2007.pdf
- 34 GRAIN 2007 *Killing fields the global rush for hybrid rice continues* www.grain.org/article/entries/642-killing-fields-the-global-push-for-hybrid-rice-continues
- 35 www.pioneer.com/home/site/philippines/farming/hybrid-rice-production-guide/
- 36 Grain and Feed Annual 230211 gain.fas.usda.gov/.../Grain%20and%20Feed%20Annual_New%20Del...

Did You Say 'High Yield'?

Dr. Debal Deb

Folk rice varieties versus modern HYVs and hybrids



Photo by Jyotirmayee Sarangi, Living Farms

In spite of all the hype and false promises, the yield of hybrid rice in India has seldom exceeded 6.5t/ha under irrigated condition on farmers' fields.¹ On marginal farms (e.g. rainfed drylands, submerged lowlands, and coastal saline farms), the yield of hybrid as well as any modern rice varieties remains abysmally poor. The reason is simple: none of the hybrids can withstand adverse environmental conditions, especially drought and salinity, on marginal farms.

In contrast, there is a plethora of folk varieties (also called 'landraces') that are perfectly adapted to marginal farm conditions and local environmental vagaries. Many of these folk varieties evince amazing yield performance on farm fields. The table on the next page describes some yield characteristics of a few selected indigenous rice varieties grown every year on Basudha farm in West Bengal and Odisha. The data presented here are based on the current year's (2011-12 Kharif) plot-wise harvest from Basudha farm. As the data indicates, the performances of these rainfed folk varieties are yet unachieved by any modern varieties (including hybrids) on two counts: (a) zero inputs of agrochemicals and (b) long term yield stability. Even on coastal saline soil of the Sunderban islands in eastern India, the grain yield of a few salt-tolerant landraces is 4t/ha – considerably higher than some of the best lowland high yielding varieties (e.g. Sabita, Lalat) introduced into the coastal districts. Conversely, no modern variety can practically survive on coastal saline farms receiving tidal waters.

The mean yield of numerous lowland landraces often exceeds the mean yield of the best modern HYVs. A good example is Bahurupi, whose average yield generally exceeds 6 t/ha in southern West Bengal. With adequate rainfall (but no irrigation), its yield can exceed the Chinese

average of 6.3 t/ha – after subtracting the loss due to sterile (unfilled) grains. While Bahurupi marks the crown of yield among the high-yield landraces, there exist several lowland folk varieties (Table in next page) which outperform modern high input-responsive varieties in similar environmental conditions. One among this select group of high-yield landraces is that of Baigana Manjia of Odisha – over 5.6 t/ha, which is substantially greater than the so-called HYVs tested in Odisha under identical edapho-climatic conditions. In the table in the following page we have compared the yield of two modern varieties released by CRRI, Cuttack². All these landraces also prove to be resistant to different insect pests and pathogens.

High grain yields are generally more common among lowland folk varieties, owing to obviously greater water availability to the former than to upland varieties. However, farmers' selection of yield-related traits, bred over generations, has produced a considerable number of upland varieties that yield reasonably high—despite zero chemical inputs. Dhankadi Deepa, an upland-adapted landrace from Tamil Nadu, is a case in point. If the rain is not too late or too scanty, this variety does not require irrigation for a moderate grain output. If the rain is timely and generous – as was the 2011 monsoon – its yield can reach up to 5.10 t/ha.

Yield characteristics of selected rice landraces

Landrace	Origin	Panicle Density	1000 Grain Weight (g)	% Sterile Grains	Yield (t /ha)
Upland					
Basumati	Odisha	313.00	15.95	6.00	4.82
Dhankadi deepa	Tamil nadu	304.33	24.30	8.80	5.10
Jhanjhi aush	West Bengal	215.00	21.25	6.10	5.04
Lal boro	West Bengal	227.33	22.05	5.00	3.70
Pitti Hidsk	Chhattisgarh	172.33	15.20	4.80	3.25
Lowland					
Bahurupi	West Bengal	573.20	20.90	4.30	6.34
Baigana manjia.	Odisha	493.08	16.05	4.67	5.61
Bishmoni	West Bengal	341.67	24.60	6.47	5.72
Bourani	West Bengal	412.70	24.20	3.30	5.51
Ghora-sal	West Bengal	312.67	27.75	5.10	5.58
Saline land					
Lal Getu	West Bengal	230.80	24.25	11.20	3.61
Nona Khirish	West Bengal	206.33	33.20	5.60	3.73
Talmugur	West Bengal	200.00	31.25	5.40	4.34
Modern HYV (Lowland)					
Lalat	CRR1	172.20	28.30	10.50	4.80
Sabital	CRR1	139.53	30.20	7.90	5.60

Source: Data from Basudha Farm (2011)

The examples given here are only illustrative. Basudha farm conserves a large number of similar high-yield landraces, which subverts the myth that modern HYVs are 'high yielding' by definition, whereas folk rice varieties are low yielding. The new frenzy with hybrid rice varieties seeks to reiterate this myth by obliterating all local landraces from the country's farm fields. A huge number of incredibly high yielding landraces have already been lost from farmers' fields under the impact of agricultural modernisation. *In situ* conservation of the remaining landraces is the need of the day to ensure the food security of the country's poor. Furthermore, an intensive search for locally-adapted landraces is more urgent than introducing new hybrids with uncertain outputs on marginal farms.

Endnotes

1 B.C.Viraktamath,B.C.2011.*Hybrid Rice in India- Current Status and Future Prospects*, Directorate of Rice Reseach, DRR,Hyderabad, See page 10,Available at <http://14.139.94.99/sites/default/files/ris/research-themes/Hybrid%20rice%20in%20India.pdf>

2 CRRI 2005, *Miracle Rice Varieties of India*, Central Rice Research Institute, Cuttack

Photo by Jyotirmayee Sarangi, Living Farms



Dr. Debal Deb did his Ph.D. in ecology, and postdoctoral research in human ecology (Indian Institute of Science, Bangalore) and ecological economics (University of California- Berkeley). He has been conserving and characterising indigenous rice genetic diversity over the past 17 years, and has founded Vrihi, the only non- govt. indigenous rice seed bank for rural farmers in eastern India.

On his Basudha farm in West Bengal & Odisha he grows and experiments with rice, using organic methods, and teaches these methods to other farmers as an alternative to using modern high yielding/hybrid/ genetically modified rice varieties. Currently he is conserving (in situ) 920 folk rice varieties.

Our publications

Books

1. Genetic Engineering in Agriculture, its dangerous impacts
(Language: Odia, pages-40, Jan 2008)
2. Cotton cultivation in Orissa and probable dangers due to introduction of Bt Cotton (Language: Odia, pages-28, May 2008)
3. Community Pesticide Action Kits – 4 volumes
 - a. Warning: Pesticides are Dangerous to your Health!
 - b. Breaking the silence! Plantations & Pesticides
 - c. Profiting from Poison – Pesticide Industry
 - d. Drop pesticides! Build a Sustainable World(Language: Odia, Oct 2007)
4. Home Garden – Why & How *Nutrition Improvement & Income Generation through Home Garden*
(Language: Odia, Pages-28, Oct.2008,)
5. Citizen's Guide to Climate Change & Transformational Action (*Be part of global transformation to save the planet*)
(Language: Odia, Pages-38, May 2010)
6. Monsanto-isation of Indian Agriculture
(Language – English, pages – 32, Nov 2010)
7. Millets – Future of Food and Farming
(Language: Odia, pages – 20, Feb 2011)
8. A booklet on BRAI (Biosafety Regulatory Authority of India) Bill, 2011
(Language – Odia & English, pages -12, Oct 2011)

Posters

Posters on Contract farming, Genetic engineering, Crops-highly nutritious but vulnerable to extinction, Right to our seeds, Sustainable agriculture
(Language: English & Odia)

News Letter: Ama Chasa Katha

(Language: Odia, Bimonthly)

DVDs available with us

Poison on the Platter (English & Hindi)-Directed by Mahesh Bhatt, this movie highlights the impending danger on food safety in India if GM FOOD gets introduced.

World according to Monsanto(English)- An eye opener for the entire planet as it covers the deeper politics that the corporations like Monsanto is engaged with, whose focus is solely profit maximization.

In God's own country, The Living Dead, Prayer for Rebirth, Ban endosulfan (English)- This talks about the havoc that a highly toxic pesticide-Endosulfan wreaked in Kasargod in Kerala destroying lives of innocent villagers.

Cotton in my shroud (English) and As you sow, so you reap(English,Odia)- This brings forth the heart rending reality which lead to devastation of farmers and their families due to BT Cotton cultivation.

Deconstructing supper (English)-A journey of a restaurateur around the world to find out the different kinds of food consumed in different parts and tracking their changes due to the ever changing standards of the food corporations.

Address

LIVING FARMS
Plot no- 1181/2146, Ratnakar Bag-2,
Tankapani Road, Bhubaneswar-18,
Orissa, India
Ph: (0674)2430176
Email: livingfarms@ gmail.com
Website: www.living-farms.org

Living Farms

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