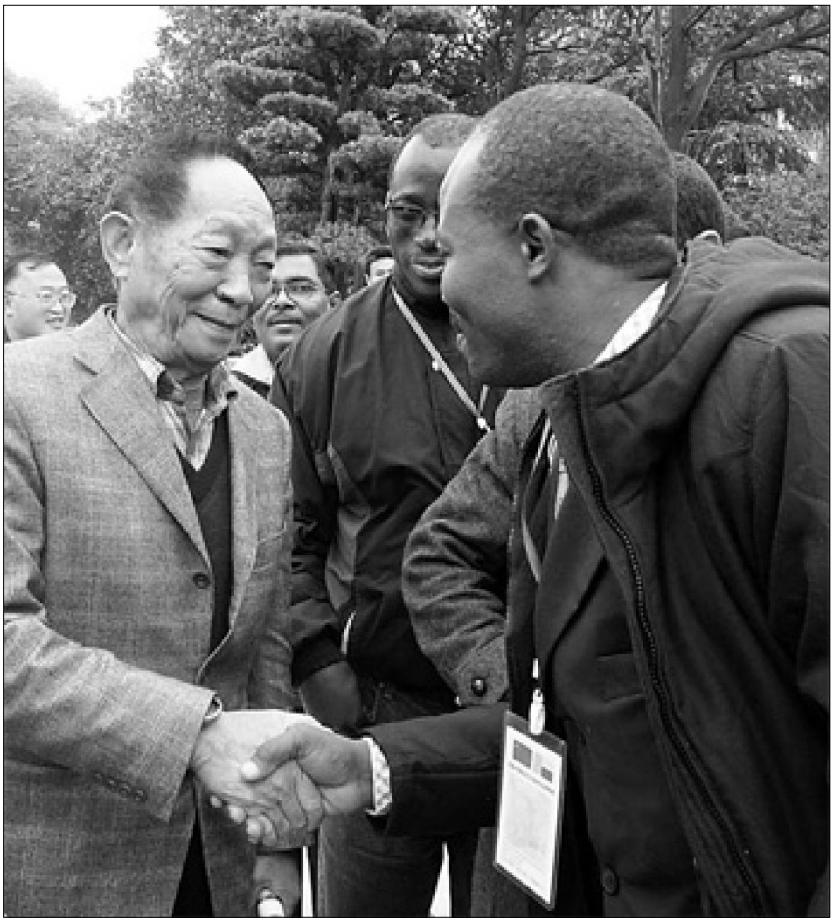
Feeding the corporate coffers:

why hybrid rice continues to fail Asia's small farmers



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Introduction

For decades now, hybrid rice has been promoted across Asia as a silver bullet for hunger. It is hailed as a “super rice” that can resolve years of stagnating yields in the world’s rice farms. In 2000, several Asian governments decided to place their bets on hybrid rice to meet the UN's Millennium Development Goal of halving poverty. With little success. In fact by 2005 hectarage devoted to hybrid rice in Asia started to decline and commercial adoption was still confined to a few countries (outside China) – Bangladesh, Philippines, Vietnam. The reason: hybrid rice was failing to produce the promised results and farmers were getting disillusioned and opting out of it.

Malaysian farmers inspecting BPH infested rice fields

So how come today the push for hybrid rice is stronger than ever? What explains the sudden rush by seed companies to invest in the hybrid rice seed market, and why are there more and more government-led programmes promoting hybrid rice across Asia, and now even in the Pacific, Latin America and Africa? If farmers aren’t benefiting from hybrid rice, someone else must be.

This Briefing looks at who is profiting from hybrid rice. It examines how hybrid rice continues to fail Asia's small farmers and why it is being pushed. As a leading hybrid rice plant breeder from IRRI said a decade ago: “This technology is not for farmers who are still struggling at the level of 2 or 3 tonnes [per hectare]”. The vast majority of the world’s rice farmers fit into this category, and those words are still very much true today. Hybrid rice is for a different kind of rice farmer – the corporate investors trying to take control of the world’s rice farms and the world’s rice supply, from the seed up.

What is hybrid rice?

Hybrids are produced by crossing two inbred – genetically fixed – varieties of a particular crop. Hybrids are special because they express what is called "heterosis" or hybrid vigour. The idea is that if you cross two parents which are genetically distant from each other, the offspring will be "superior", particularly in terms of yield. However, the heterosis effect disappears after the first (F1) generation, so it is pointless for farmers to save seeds produced from a hybrid crop.

In 1970, inspired by the success of hybrid maize in North America, Chinese researchers embarked on the task of developing hybrid rice. They discovered a male sterile rice plant growing naturally within a population of wild rice (*Oryza sativa f. spontanea*) on Hainan Island. This plant had a particular cytoplasm – the material surrounding the cell nucleus – that induces male sterility through interaction with the nucleus. The plant was named "wild rice with abortive pollen" or WA for short. Scientists in

China then began crossing WA with other rice varieties to determine whether this male sterility could be passed on to subsequent generations. Those that came out male sterile, called maintainer lines, were then repeatedly back-crossed until a stable sterile plant was achieved. This plant is called a "cytoplasmic male sterile" or CMS line. CMS lines form one of the parental lines for producing hybrid rice seeds. The other is known as the restorer line, as it restores fertility to the CMS line when it is crossed. The seeds from this cross are the F1 hybrid seeds, which is what farmers can sow. The plants grown from F1 seeds show hybrid vigour, which theoretically translates to higher yield, although the second generation (F2) will normally not perform as well.

Researchers are now experimenting with new methods of hybrid rice production. One is called "environment-sensitive genetic male sterility", which uses either photoperiod-sensitive genetic male sterility (PGMS) or thermo-sensitive genetic male sterility (TGMS). PGMS lines are sterile lines that regain fertility with daylight fluctuations. Therefore, they can be used only in temperate zones. TGMS lines regain fertility when the temperature fluctuates, which means that they can be used in the highlands of the tropics. These methods are known as two-line systems since they do not require maintainer lines and any fertile line can be used as a pollen parent. Proponents maintain that this offers a wider choice of parental lines, but both PGMS and TGMS suffer from limitations similar to those of the CMS lines.

New push for hybrids

In April 2008, just a few months after food riots broke out in different parts of the world, the Philippine government unveiled its self-sufficiency plan. It was a US$ 1 billion programme aimed at increasing total paddy production to 19.8 million tons by 2010, from 16.2 million tons in 2007. More than a fifth of this budget would go to subsidising the provision of hybrid rice seeds. In Africa, at around the same time, a Libyan sovereign wealth fund announced investments in three new large-scale rice projects in Mali, Liberia and Mozambique. While the Libyan government decried the stranglehold of multinational traders over the food supply and talked of investing in Africa''s rice self-sufficiency, the promoters of its African rice projects proudly announced that they would not be using local varieties but Chinese hybrid rice varieties supplied by the Chinese multinational company Yuan Longping Hightech Agriculture Co. (LPHT).

Head of Chinese delegation (R) explaining hybrid rice technology to Liberian president (L)

The food crisis has given new currency to the otherwise faltering phenomenon of hybrid rice. Since the crisis began, more “food security programmes” – often with the same packages of fertilisers, pesticides, irrigation, machinery and hybrid rice seeds – have been instituted by governments across Asia and Africa (and parts of the Pacific), driven largely by the private sector, and involving use of

Chinese hybrids.

China has not been a passive player in all of this. In recent years, Beijing has established numerous overseas hybrid rice programmes around the world, as part of its international cooperation (see Table 1). It also runs an international hybrid rice training centre in Hunan, which has already provided 30 training courses and trained more than 2,000 government officials and agro-technicians from 50 countries since 1999. This programme will now be extended under an agreement announced during a meeting in May 2009 of the UN's Economic and Social Commission for Asia and the Pacific (ESCAP). Beijing and ESCAP's Asian and Pacific Centre for Agricultural Engineering and Machinery (APCAEM) will join forces in a multi-year project to "transfer technology" and "extend hybrid rice cultivation to selected experts of 12 countries in the region". The project was launched in September 2009, and will focus initially on Laos, Cambodia and Indonesia.

Table 1: Some countries where China operates hybrid rice training programmes

Brunei, Burma, Cameroon, East Timor, Laos, Cambodia, Guinea-Bissau, Indonesia, Liberia, Madagascar, Mali, Mozambique, Nigeria, Pakistan, Papua New Guinea, Philippines, Sierra Leone, Uganda, Uzbekistan, Venezuela, Tanzania

It is often not realised that China's international hybrid rice activities are almost always led by private Chinese seed companies, and mostly often by one company – LPHT. This company was originally set up by Professor Yuan Longping, China's most important hybrid rice plant breeder, together with the China National Hybrid Rice R&D Centre and the Hunan Academy of Agricultural Sciences. Over the years, with the support and blessing of the government, this state-owned company has grown into a major multinational corporation, with 26 subsidiaries, and a listing on the Shenzhen stock exchange, with a large stake now owned by the world's fourth- largest seed company, Vilmorin / Limagrain of France.[1] LPHT in fact runs China's Hunan training programme, as well as the overseas hybrid rice development and training programmes, such as those in East Timor, Liberia and Uzbekistan. It has also been tasked with implementing the aforementioned APCAEM hybrid rice programme in the Asia-Pacific region.[2]

Chinese scientists meeting Timor Leste's Ministry of Agriculture

1 Vilmorin purchased a 46.5 % stake in Changsha Xindaxin, a Chinese company, owned by Hunan Xindaxin, that is the controlling shareholder of LPHT, with a 22.22% stake. Under the agreement with Hunan Xindaxin, Vilmorin can increase its stake in Changsha Xindaxin if changes to Chinese laws allow for greater foreign participation in Chinese seed companies. See: https://balo.journal-officiel.gouv.fr/pdf/2008/0229/200802290802055.pdf

2 UNAPCAEM "Regional Training of the Trainers Programme on Hybrid Rice Cultivation Technology Held in

Hybrid rice is big business for China, and it is seen as crucial to Beijing's new policy of developing its own multinational agribusiness corporations. Much of the hybrid rice seed sold in Asia is imported from Chinese companies or based on parental lines licensed from Chinese companies. The Indonesian government admits that over half of the seeds needed for its hybrid rice programme will be imported from China. Bangladesh and Pakistan import most of their hybrid rice seeds from China, as does Burma. Vietnam has invested heavily in developing a national hybrid rice seed industry, but it too imports most of its hybrid rice seeds from China. Even the local seed company in the Philippines, SL Agritech, which exports seeds to Bangladesh, Indonesia, Vietnam and Nigeria, also sources some of its seeds from China and licenses its parental lines from LPHT.

China delegation in Uzbekistan

For China, however, the hybrid rice gambit is not just about seeds. The Chinese government is interested in expanding its overall control of rice production beyond its borders, both to secure national rice supplies and to feed its growing teams of Chinese labourers working for national companies on mining, oil and infrastructure projects around the world. While the government dropped a proposal from its Ministry of Agriculture to give official support to a policy of offshore land acquisition by Chinese companies, such investment is happening at an informal level, seemingly with Beijing's approval.[3]

No complete study of overseas acquisitions of land for food production by Chinese investors exists, and, if Beijing has this data, it has not released it publicly. The countries where such land acquisitions have taken place or are being proposed for rice production – that have been reported – include: Cameroon, Laos, Liberia, Mexico, Nigeria, the Philippines, Russia, Tanzania, and Uganda. In other instances, Chinese companies are being hired by foreign investors to supply the technology and management of their large-scale rice projects. This is the case for the Libyan projects elsewhere in Africa. Venezuela too is negotiating with Chinese hybrid rice companies for assistance for its own rice projects.

China" September 4, 2009, http://www.unapcaem.org/Act_detail.asp?id=389

3 Jamil Anderlini, "China eyes overseas land in food push" Financial Times, May 8, 2008, http://www.ft.com/cms/s/0/cb8a989a-1d2a-11dd-82ae-000077b07658.html?nclick_check=1

Replacing food culture in the Pacific

The Ramu Valley in Papua New Guinea (PNG) is not the kind of place where you would expect to find fields of hybrid rice. The people there, like the rest of PNG, have no tradition of growing or eating rice. But last year some local communities in Ramu, as well as Usino/Bundi and parts of the Rai Coast areas of Madang province, started planting hybrid rice seeds imported from China. A Chinese-owned mining company, Ramu Nico Management Limited, in-charged of the massive Ramu Nickel Project, introduced hybrid rice cultivation to villagers in the mining impact areas to supply its Chinese work force.

Rice farmers in Usino, PNG, near the mine

By way of Ramu Nico's assistance, villagers of the Kurumbukari special mining lease are currently engaged in large-scale rice farming using hybrid rice. Ramu Nico is believed to have assisted 33 farmers in the Kurumbukari area with bags of hybrid rice seeds. The company is also reportedly going to build a rice mill for the farmers. Since the Nickel Project started operation, Ramu Nico has built a road and helped landowners to cultivate rice in large quantities to supply the mine.

"I know Chinese eat a lot of rice. That is why I want to plant more rice and sell to them," says Tuma Rugei, a farmer from Danagari village. Danagari and Miavi are two of the relocation centres where families displaced from the mine are encouraged to grow hybrid rice to sell directly to the miners. Hao Zhaochun, assistant manager of Ramu Nico, said that this initiative is meant to provide livelihoods for the displaced families while the mine is in operation. The Ramu Nickel Project will supposedly have a life span of more than 40 years. At this early stage, there are suspicions as to whether the rice-growing initiative is a genuine goodwill project, or just a scheme to justify more local displacement.

Timor Leste's Prime Minister, harvesting hybrid rice

The Ramu Valley communities are primarily subsistence farmers, which means that the core purpose of crop cultivation is to support their food needs and livelihoods using local species that have cultural and traditional significance. Subsistence farmers in PNG enjoy the variety and diversity of food crops that suits the conditions of the tropical climate, seasons, soil types and vegetation. These include such crops as taro, bananas, sago, yam and sweet potatoes.

“With the hybrid rice project, the locals are forced into a new culture of cash-crop farming completely at odds with their traditional practices and food system. To the locals, rice can thus pose a real threat to their local crops and culture,” according to the Bismarck Ramu

Group (BRG) a Madang-based local NGO that has been monitoring the rice project.

China is also involved in establishing rice plantations in Timor Leste, not so far from PNG, through a project called the China-East Timor Agricultural Cooperation on Hybrid Rice Technology which commenced in 2008. Technical support is being provided by the Chinese government, through the Longping High-tech International Exchange Center. The cooperation aims not only to replace what is traditionally grown in East Timor (fruits, rootcrops, and so on) but to introduce within two years advanced Chinese hybrid rice technology and farm machinery by means of technical demonstration and training.[4] As the project is ending in 2010, an agreement has been signed by the two countries to extend the project and move ahead to the second phase, which is to promote the use of hybrid rice to farmers.[5]

Landgrab and hybrid rice

China's scientists discussing hybrid rice with Uzbekistan officials

China is not alone in outsourcing business for rice. Corporate investment in rice production is rising dramatically, especially in Africa. Brazilian investors are setting up large-scale rice farms in Guyana and Ghana. Charoen Pokphand, Thailand's largest agribusiness conglomerate, was in Nigeria in early 2010 exploring opportunities for investment in rice production, while Thailand's leading rice exporter, Riceland International, was doing the same in Ghana. Singapore's Olam International is engaged in a massive contract rice-growing scheme in Nigeria. Another Singaporean company, VitaGrain is leasing large areas of land in Mauritius and Mozambique for the production of hybrid rice.

Similarly, a team of Vietnamese scientists, led by Professor Vo Tong Xuan, rector of An Giang University, has been in Sierra Leone since at least 2007 to test the productivity of 50 Vietnamese varieties. Later this year, 20 Vietnamese farmers from the Mekong Delta will go to Sierra Leone to train local farmers on Vietnamese rice farming techniques. According to the website of the Government of Sierra Leone, 300,000–1 million hectares of land have been reserved for this "co-operation" project with Vietnam. Xuan, who is also the senior adviser to one of Vietnam''s leading rice companies, Minh Cat Tan Company Ltd., says that, under the project, a stock company will be set up that will also seek to replicate the model in other countries. He says that Vietnam is expected to

4 International Exchange Center, "China-East Timor Agricultural Cooperation on Hybrid Rice Technology" July 31, 2009, http://www.hybrice.com/en/IntroItem.asp?IntroID=12

5 " Chinese companies interested in East Timor's electricity sector" Macauhub, March 17, 2010, http://www.macauhub.com.mo/en/news.php?ID=9103

become Sierra Leone's main supplier of rice seeds in the future.

Rice farm lands in Asia are also a significant target for this new round of corporate investment, and most Asian governments are welcoming these investments with open arms. Investors from the United Arab Emirates are negotiating for as much as 800,000 hectares of land in Pakistan for the production of wheat and rice to be exported to the UAE. The Saudi Bin Laden Group is pursuing plans to invest US$4.3 billion in rice farming in Merauke, Papua province, Indonesia. Kuwait is in negotiations to lease large areas to produce rice in Laos and Cambodia, while the Australian-based investment firm, BKK Group, is embarking on a US$600 million investment in crop production in Cambodia that will include rice and will cover around 100,000 ha.

Asia's biggest agribusiness corporations are also jumping into rice production, such as the CP Group in Thailand, Sime Darby in Malaysia, and San Miguel in the Philippines. San Miguel joined forces with Malaysia's Kuok Group in 2008 through a massive US$1 billion dollar joint venture called "Feeding our Future". The project would involved the Philippines' Agriculture and Agrarian Reform departments, which have jointly identified 3.6 million ha of potential lands, including use of the country's existing community-based forestry management (CBFM) areas. San Miguel's president, Ramon Ang, disclosed that their priority crops "are always rice, corn, sugar, and coconut" adding that rice would be used for beer fermentation. San Miguel Corporation is the largest food, beverage and packaging company in the Philippines, and has a near-monopoly of the local market for beer. Meanwhile, the joint venture might also consider "other crops like palm", according to Ang. Kuok Group owns Wilmar, one of the world's largest palm oil traders and processors.[6]

Philippine president (R) and Agriculture Secretary (M) inspecting rice stocks; the country is importing all time high 2.2 million tonnes of rice this year (Source: http://www.news.nfo.ph/)

These investors are trying to redraw the map of global rice production and remake the model of rice farming. What is being planned is a complete shift to corporate rice farming, with companies either operating vertically-integrated contract production or taking direct control over land and farming, with the collusion of governments. These investors clearly have no interest in the seeds that small farmers have carefully developed and nurtured to suit their local conditions and cultures. They want varieties tailored to their model of production – large-scale, mechanised, chemical input agriculture, for export. In some instances, they will be able to source inbred varieties that meet these requirements from the public

6 Albert Castro "San Miguel, Kuok Group in $1B farm venture" MALAYA, July 4, 2008, http://www.malaya.com.ph/jul04/busi1.htm

sector. But the reality is that most public sector breeding programmes are being privatised – and few are producing much in the way of “public” varieties anymore.

Privatisation of public breeding

Today the private sector is taking control of rice plant breeding and the rice seed market. In recent years, the big multinational seed corporations, such as Bayer and DuPont, have been investing billions of dollars to get into the rice seed market, with nearly all of this money flowing into hybrid rice. It''s not the performance of hybrid rice that attracts seed companies. It''s the fact that farmers cannot save seeds from these varieties, thus guaranteeing the companies a captive market. In 2007, all of the top 5 global seed companies announced major moves in Asia''s hybrid rice seed industry. And alongside these major multinational players, there are a number of Asian-based companies that are active in the hybrid rice seed market, such as CP, SL Agritech and Shendong Seeds (see Table 2).

Apart from China, IRRI is another prime mover of hybrid rice. An IRRI official (L) in an international hybrid rice symposium (http://beta.irri.org/news/bulletin/2008.37/bullimg/)

Public sector programmes are increasingly turning to partnerships with the private sector for funding, and there is less and less difference between the two. As a result, the “public” rice seed programmes are increasingly focused on hybrids, and support for developing inbred varieties or improvement of native land races that are more resilient to different agro-climatic conditions, is disappearing.

For its part, the International Rice Research Institute (IRRI), which has been at the forefront in developing hybrid rice for the tropics since the late 1980s, has been leading this merger of public and private agendas. Last year, it launched its Hybrid Rice Development Consortium (HRDC), a platform for partnerships with the private sector in hybrid rice that unifies research and development between the public and private sectors and ensure that a percentage of royalties are channelled back to IRRI. The HRDC not only gives private companies privileged access to publicly held germplasm, but also makes it easier to commercialise publicly developed hybrid rice lines. Early last year, it also signed an exclusive partnership with US-based DuPont, the world's second largest seed company and owner of Pioneer Hi-bred International, to develop new hybrid rice lines that DuPont will market, with some portion of royalties likely to flow back to IRRI.

Table 2: Corporations selling hybrid rice seeds

Company	Home	International hybrid rice presence	Alliances, joint ventures, subsidiaries
Advanta	India	India, Indonesia,	IRRI - HRDC

		Philippines, Vietnam	
Bayer	Germany	Brazil, Burma, China, India, Philippines, Indonesia, Thailand, USA, Vietnam	Granja 4 Irmãos (Brazil), Burma's Ministry of Agriculture, Lu Dan (China), Nong Ke (China), China National Rice Research Institute, Hybrid Rice International (India), ProAgro (India)
BRAC	Bangladesh	Bangladesh	
Devgen	Netherlands	India, Indonesia, Kenya, Philippines	Leads Agri (Philippines), Mahyco (India), Monsanto (USA), PT (Persero), Sang Hyang Seri (Indonesia), ,
DuPont	USA	India, Indonesia	SPIC-PHI (India), IRRI
Heilongjiang Beidahuang Seed Group	China	Philippines	AgriNurture (Philippines)
Hubei Seed	China	China, Bangladesh, Pakistan	Wuhan Qingfa-hesheng Seed Co (China), Supreme Seed Company (Bangladesh), Origa Group (Pakistan), Haji Sons (Pakistan)
HyRice Seed Technology	Philippines	Philippines	A joint venture between Cornworld and East-West Seed Co.
Origin Agritech	British Virgin Islands	China	Denong Zhengcheng (China), Origin Agritech (China)
RB Biotech	Malaysia	Malaysia, Brunei	Sunland (Singapore)
Rice Tec	USA	Argentina, Brazil, Guyana, USA, Uruguay	BASF
Shriram Bioseed Genetics (DSCL)	India	India, Philippines, Vietnam	Bioseed Research Philippines
Sichuan Guohao Seed Company	China	China, Indonesia	Artha Graha / Sumber Alam Sutera (Indonesia)
Sichuan Nongda	China	Burma, Ethiopia, Guinea, Vietnam	Burma's military government, Koba Farm (Guinea)
Sichuan Shennong Seed Co., Ltd	China	Bangladesh, India, Pakistan, Russia	All Russia Rice Research Institute, Bangladesh Rice Research Institute, Bashundhara Group (Bangladesh), Guard Rice (Pakistan), and Nath Bio-Gene (India) Ltd.
Sime Darby	Malaysia	Malaysia	CAAS (China)
SL Agritech	Philippines	Bangladesh, Cambodia, Indonesia, Nigeria, Philippines	Yuan Longping High-tech (China), Sang Hyang Seri (Indonesia), Sunland (Singapore)
Syngenta	Switzerland	China, India, Indonesia, Japan, Philippines	Sanbei (China), Orynova (Japan)
Takii Seeds	Japan	Indonesia	PT Takii (Indonesia)
United Phosphorous	India	India	Advanta
VitaGrain	Singapore	Mauritius, Mozambique	
Yuan Longping High-Tech Agriculture (LPHT)	China	Bangladesh, Brunei, China, East Timor, Indonesia, Liberia, Malaysia, Mali, Pakistan, Philippines, Sierra Leone, Uzbekistan	Vilmorin/Limagrain (France), China National Hybrid Rice R&D Centre (China) Hunan Academy of Agricultural Sciences (China), Pt Bangun Pusaka (Indonesia), SL Agritech (Philippines), Guard Rice (Pakistan), Aftab Bahumukhi Farm/Islam Group (Bangladesh), CGC Green Company (Nigeria), Sigar & Simon Co (Brunei), 26 subsidiaries in China including AVA Seeds (China)

The national rice programmes are taking the same route. In March 2009, Indonesia's Centre for Rice Research, Balai Besar Penelitian Padi (or BB Padi), struck an agreement with DuPont. BB Padi will collaborate with DuPont on research and development for new hybrid rice varieties, with DuPont taking responsibility for the marketing. BB Padi is Indonesia's premier public hybrid rice breeding programme. But its public status has not stopped it from licensing a number of its most promising hybrid lines to private seed companies, including Syngenta and DuPont. Indeed, both of its most recent varieties, which are still in the registration process (Hipa 7 and Hipa 8), are licensed to DuPont. DuPont now gets "the exclusive right to commercialize any new selected material" , and in return it has pledged to pay BB Padi US$100,000 and a portion of the royalties it collects.[7]

Decline of public breeding, rise of hybrid rice plantation

Malaysia's forays into hybrid rice started in 1984, led by the Malaysian Agriculture Research and Development Institute (MARDI) in cooperation with IRRI. Over the years, MARDI had evaluated hundreds of experimental hybrids from China and IRRI but failed to produce locally adaptable varieties. The Institute abandoned its hybrid rice research in 1997. One of MARDI's plant breeders, Dr. Othman bin Omar, expressed concerns that MARDI was having to sacrifice resources for other research in order to work on hybrid rice for a few companies.

"In Malaysia, companies do very little breeding work, mostly just testing varieties of the parent company," according to Dr Othman. He is worried about the public sector losing ground to the private sector, which, he says, is interested only in hybrids. Consequently, Malaysia's public plant breeding has been drastically cut back over the years.[8]

In 2006, RB Biotech, a subsidiary company of the Malaysian conglomerate Road Builder Group, declared that it wanted to commercialise hybrid rice in Malaysia. Their target is to open 250,000 hectares of hybrid rice area across the country, for which they have launched the "Siraj" hybrid variety. Another company, Puncak Kaji, is pushing Hubei Hybrid (HSHZ-1 and HS-98) from China's Hubei Provincial Seed Company, and plans to produce hybrid rice seed in Tok Bali (Kelantan), Tambun Tulang (Perlis) and Bumbung Lima and Seberang Perai (Penang). Trials of the HH variety are being carried out by MARDI, and there is work in progress to try seed drilling using a Vietnamese-made manual seed drill.

Yet the performance of hybrid rice has been largely disappointing. In a field trial of Siraj variety alongside several MARDI inbred varieties, the hybrid Siraj was devastated by panicle blast, while those not exposed to the disease had yields still considerably below that of the MARDI inbred variety.[9] Farmers who have tried hybrid rice also find it much "weaker" in resistance compared to inbreds, and find that it does not perform well under direct seeding. Many of the hybrid rice varieties tested have been found to be extremely susceptible to blast, bacterial leaf blight and bacterial leaf streak.[10]

Dr. Othman calls hybrid rice a "luxurious crop" that is "much weaker" compared to inbreds. The big problem, as he sees it, is that it doesn't perform well under direct seeding, because the seed rate needs to be reduced drastically. This can be done with high-tech machinery, not available to most farmers. He

7 SeedQuest, "DuPont partners with Indonesian Center for Rice Research to advance hybrid rice," March 16 2009, http://www.seedquest.com/News/releases/2009/march/25482.html
8 Ibid.
9 Ibid.
10 From "Hybrid rice in Malaysia" a presentation by PANAP at the "Harnessing Diversity: A Regional Strategy Workshop on Hybrid Rice and Farmers Seed Alternatives" held in Diliman, Quezon City, Philippines on Oct 14-16, 2009.

says that the companies involved are “plantation people" and thus they are approaching hybrid rice under a plantation model.

This indeed seems to be the case with Sime Darby’s project in Kedah. Sime Darby, one of Malaysia’s largest corporations, was commissioned by the government to draw up a blueprint for the development of a Northern Corridor Economic Region (NCER), where Malaysia’s “rice bowl” (Kedah) is located. It has signed a research and development agreement with the Chinese Academy of Agricultural Sciences (CAAS), to develop jointly a hybrid rice variety for Malaysia. It is developing a 16-hectare seed centre in the agricultural state of Perlis, and plans to put in place a large-scale contract farming (guaranteed buy-back) system for its hybrid rice.

Big hype, little success

The hype around hybrid rice is to be expected: there is a lot of money to be made from it. But this is not from the harvests of Chinese farmers in the Yuanyang terraces, or Vietnamese farmers around the Red River Delta, or Filipino farmers in Central Luzon. Rarely has that happened. Instead, while farmers are being used as guinea pigs for this experiment, causing brutal damage on their farms, and governments are pumping in subsidies, seed and agrochemical companies are the ones raking in the profits.

In SL Agritech Corporation’s financial report in 2008, it listed the Philippines Department of Agriculture (DA) as its biggest market. Total sales of hybrid seeds and agrochemicals sold by SLAC to the DA in 2006 amounted to PhP 436,705,978 million (US$ 9.1 million) representing almost 99 percent of its total sales that year, and PhP 464,584,076 (US$ 9.7 million) in 2007.[11] Essentially, the 50 percent seed subsidy on hybrid rice that the Philippine government provides to farmers goes straight into the coffers of seed companies like SLAC.

Empty rice grains in Nueva Ecija, Philippines. Farmers grew SLAC's SL8H variety whose yield failed.

Yet the same company is responsible for most of the troubles of hybrid rice in the Philippines. In February 2009 farmers in different parts of Nueva Ecija province, the country’s major rice granary, reported abnormal growth in their rice crop. Early signs of flowering and eventual production of panicles with empty rice grains caused a number of farmers to lose their harvest that season. The story involves the use of SL8H, a rice hybrid produced by the private seed company SLAC, and distributed under the government’s hybrid rice programme.[12]

11 From “Continuing failures of hybrid rice in the Philippines and farmers’ alternatives to hybrid rice” a presentation by SEARICE at the “Harnessing Diversity: A Regional Strategy Workshop on Hybrid Rice and Farmers Seed Alternatives” held in Diliman, Quezon City, Philippines on Oct 14-16, 2009.

12 DA orders tests on hybrid rice seeds amid complaints about stunted growth” GMA News TV, February 18, 2009, http://www.gmanews.tv/story/149435/DA-orders-tests-on-hybrid-rice-seeds-amid-complaints-about-stunted-growth

The Philippines is one of the earliest adopters of hybrid rice technology, having been IRRI's host country for the last 50 years. But as early as 2000, the majority of farmers were unwilling to plant hybrid rice, despite the subsidies, because they find it more difficult to cultivate and inferior in terms of grain price, profitability, consumer demand, and head rice recovery.[13] In 2003, data from the Department of Agriculture's provincial office in Isabela, in the north-west of the country, show that for every hectare of hybrid rice that yielded above the national average for conventional inbred varieties, seven hectares of the same variety yielded miserably below it.[14] Despite this, the push for hybrid rice continued, heavily driven by subsidies. In fact the highest adoption rate was achieved in 2006, during the peak of government's seed subsidy. Ironically, with hybrid rice purported to lift the Philippines' rice production level, the country not only continued to be a net rice importer but also became a rice seed importer (from India and China). This has been the trend since the hybrid rice programme started in the early 1990s.[15] For this year, the government has secured all-time high rice imports of 2.2 million tons.[16]

Farmers in a fact-finding mission, inspecting SLAC's SL8H

In China, where hybrid rice originated, farmers' experience with hybrid rice is utterly at variance with the glossy advertisements found in nearly every seed shop in town. In different parts of Yunnan and Sichuan, two leading rice-growing areas, hybrid rice has caused very little, almost negligible, change in the economic status of Chinese farmers. The increase in yield, achieved mostly by farmers with access to irrigation and resources to spare for necessary inputs, was not spectacular, and far from the potential promised. The hybrid "yield advantage", achieved by most farmers in Yuanyang and other areas of Yunnan, was generally modest. On average their yield was only 500–1,000 kg per hectare more than it would have been with conventional or traditional varieties. This was similar to the experiences of the farmers in China''s second major hybrid rice growing region, Sichuan. In the village of Wenxiang, one farmer said that his annual income from growing hybrid rice was only about 80 RMB (US$10) more than he was earning two years ago, when he was still using traditional varieties

13 Cheryll B Casiwan, Aldas Janaiah, Sergio R Francisco, Mahabub Hossain, Josephine Narciso, Ellaine Cabrera, Flordeliza C Hidalgo**, "**Hybrid Rice Cultivation in the Philippines: Early Farm-Level Experiences," *Economic and Political Weekly*, June 21, 2003

14 GRAIN, "Fiasco in the field – an update on hybrid rice in Asia," March 2005, http://www.grain.org/briefings/?id=190

15 From "Continuing failures of hybrid rice in the Philippines and farmers' alternatives to hybrid rice" a presentation by SEARICE at the "Harnessing Diversity: A Regional Strategy Workshop on Hybrid Rice and Farmers Seed Alternatives" held in Diliman, Quezon City, Philippines on Oct 14-16, 2009.

16 Luzi Ann Javier "Philippines May Lose 400,000 Tons Rice Output, Official Says" Bussinessweek, January 18, 2010, http://www.businessweek.com/news/2010-01-18/philippines-may-lose-400-000-tons-rice-output-official-says.html

(Zhenzhuai and Guipigu).[17]

Even when farmers had increased their yields by growing hybrid rice, they had not consistently exceeded the national average of seven tonnes per hectare. For the yields vary greatly, depending on location and conditions, making the high-yield "guarantee" almost meaningless. Interestingly, the farmers who had long experience of growing hybrid rice said that, despite the claims made for them, the yields of the current hybrid varieties do not seem to be any higher than those of the first hybrids. So it seems that almost three decades of research – and the experience of planting 15 million hectares with different hybrid varieties – have achieved very little. Some farmers said that they had experienced no change at all in yields when changing from traditional varieties to hybrids, while others claimed that their yields had fallen.[18]

TNCs behind the hybrid rice hype

Thailand, known to the world for its top export Jasmine rice, is not the place one would expect to see hybrid rice. But its very own Charoen Pokphand (CP), one of the largest conglomerates in the region, has big ambitions for hybrid rice. In fact, CP advertised that its hybrid rice would yield 20-50 per cent more than the other conventional varieties on the market, with a yield potential of more than 9 tonnes per hectare. It also said that farmers would get higher incomes and would use less chemical inputs.

In 2008, between February and May, a Bangkok-based NGO, Biothai, conducted its own survey of nine farmers test-growing CP's hybrid rice in Kamphanpet and Audtraradit provinces. They found that the average yield for the farmers was only around 6 tonnes per hectare – 36 per cent below what CP was advertising. More importantly, while the CP hybrid rice did yield slightly higher than the average for conventional varieties grown in the same area (by about 15 per cent), this was cancelled out by the increased costs of production. The costs of seeds for the CP hybrids were 5 times the cost for conventional varieties, and the costs for both fertilisers and pesticides doubled. The net income for farmers growing conventional rice was in fact 60 per cent higher than those growing CP hybrids.[19]

The farmers surveyed by Biothai also said that the quality of the CP rice was poor, and not suitable for the local food markets. According to Biothai, CP buys the hybrid rice from farmers, processes it into parboiled rice and ships it to Africa. CP manages its hybrid rice seed business and its rice trading activities through its subsidiary CP Intertrade. Biothai says that CP's hybrid rice push is already advancing at the local level. The local agricultural officers are acting as if they were promotional agents for CP, and the rural banks are telling farmers that they won''t lend them money unless they use hybrid rice seeds.[20]

17 GRAIN, "Hybrid rice in China - A great yield forward?" January 2007, http://www.grain.org/seedling/?id=455
18 Ibid.
19 Thailand: Biothai crashes CP's party" Hybrid rice blog, September 2008, http://www.grain.org/hybridrice/?lid=206
20 From "Hybrid rice in Thailand" a presentation by Biothai at the "Harnessing Diversity: A Regional Strategy Workshop on Hybrid Rice and Farmers Seed Alternatives" held in Diliman, Quezon City, Philippines on Oct 14-16, 2009.

Vietnamese farmers growing traditional variety; they find hybrid rice poor-yielding as it is susceptible to pests

Vietnam is considered the next “success story” in hybrid rice adoption, after China. But despite its targets of 7.5 million hectares in production in 2010, more and more farmers are in reality becoming disillusioned and critical of hybrid rice, because of its yield, cost and susceptibility to pest. Many of them continue to plant hybrids simply because they have no other options. They are reliant on what is supplied by the seed dealer.

Many farmers in the Red River Delta, a major hybrid rice growing region in Vietnam, prefer to plant a conventional variety called Khang Dan, which they acknowledge is not great when it comes to eating quality, but is high-yielding. The yield ranged from 4.2-8.4 tons per hectare, which surpasses that of hybrids in many areas. This variety also requires less inputs and investments. In Thai Binh province, the centre of rice production for the north of the country, some farmers also reported good results from a conventional variety called VO, which, they said, yields around 7-8.4 tons per hectare. Some are also growing a conventional variety called V10, for animal feed, and several local Tam varieties (sticky rices) for home consumption. Farmers tend to save seeds from these. Many farmers have stopped growing hybrid rice. They tried it earlier, but its small yield increase was not worth the extra cost of inputs.[21]

A study carried out last year by researchers at the Centre for Agricultural Research and Ecological Studies (CARES) at Hanoi University of Agriculture, into hybrid rice in Vietnam further corroborated farmers’ accounts. The study found that yields of hybrid varieties were not significantly different from

21 Vietnam: the high stakes of hybrid rice for farmers” Hybrid rice blog, October 2008. http://www.grain.org/hybridrice/?lid=209

inbred varieties.[22] The farmers they surveyed reported an average increase in yield with hybrid varieties of only 2.1 per cent. Their findings contrast with the statistics provided by the Ministry of Agriculture and Rural Development (MARD), which have consistently shown a yield for hybrid rice of around 30 per cent over inbreds. The researchers found that the positive impact of hybrids on the income of the farm households surveyed was insignificant.[23]

The study also pointed out that based on the MARD data, there has been almost no improvement in yield for hybrid rice since the country began producing it in the early 1990s. From 1992 to 2006 the yields of hybrid rice increased by only 0.1 per cent annually, whereas the yields of inbreds have increased over the same period by 2.4 per cent annually. In a test for hybrid rice seed carried out in 2008, the researchers reported that 46 out of the 219 samples tested failed to meet the national quality standards.

But perhaps the most damning aspect of the study was their finding that farmers used more chemical fertilisers when planting hybrids than they did with inbreds – about 30 kg more per hectare. Hybrid rice's thirst for fertiliser is indeed a major concern. It raises costs for farmers, especially with fertiliser prices still an all-time high, and causes soil erosion and greenhouse gas emissions. The use of high-levels of fertilisers also increases pests and diseases – most alarmingly with planthoppers. Hybrid rice's susceptibility to planthoppers is well-known, and leading rice entomologists are now linking the resurgence of these pests to the expanding production of hybrid rice (see Table 3).

Table 3: Some cases of reported planthopper outbreaks in hybrid rice fields

Country	Location
Bangladesh	Shariatpur, Rangpur, Tangail, Memensingh, Irajganj, Natore, Gazipur, Sherpur, Bhola, Nowgaon, Rajshahi, Bhairab and Nilphamari districts
China	Yunnan, Hainan Island, Zhejiang, Guangdong / hybrid rice
Malaysia	Tanjung Karang
Philippines	Sta. Cruz, Laguna
Vietnam	Red River Delta, large areas in Nghe An and around Hanoi

Source: Ricehoppers.net http://ricehoppers.net/reports-from-the-field/planthopper-outbreaks-in-2009/

In Bangladesh, a study done by a local NGO, UBINIG, found that bacterial leaf blight emerged in an epidemic form in the areas where hybrid rice was grown, and that the hybrid rice varieties appeared to be more susceptible to the disease than local varieties.[24] In April 2008, at least 24 outbreaks of bacterial leaf blight disease were reported in different parts of Bangladesh, severely damaging hybrid rice crops during that season. The seeds, which some experts believed were of low quality, were reportedly said to have been imported from Thailand and China.

22 The researchers Tran Duc Vien and Nguyen Thi Duong Nga of the the Center for Agricultural Research and Ecological Studies at the Hanoi University of Agriculture conducted a survey of 100 farm households in Ha Tay and Nam Dinh provinces of the Red River Delta in the spring and summer seasons of 2007. The Red River Delta, in the north of Vietnam, is the main hybrid rice growing region in the country.

23 Tran Duc Vien and Nguyen Thi Duong Nga, "Economic impact of hybrid rice in Vietnam an inintial assessment," Hanoi University of Agriculture, 2009, http://www.cares.org.vn./webplus/Article/ECONOMIC%20IMPACT%20OF%20HYBRID%20RICE%20IN%20VIETNAM.pdf

24 UBINIG "HYBRID Boro Rice: Profit Versus Yield and Ecological Concerns" June 2008, http://www.grain.org/hybridrice/?id=405

The government of Bangladesh has been relying for more than a decade on imported hybrid rice seed, which it backs with aggressive promotion strategies. These include coupling hybrid rice growing with micro-credit, which has mired many Bangladeshi farmers neck-deep in debt, as most of the imported hybrid seeds performed very poorly. Despite this, acreage for hybrid rice reached one million in 2008. During this period, 60 hybrid rice varieties were released in Bangladesh, including two developed by the Bangladesh Rice Research Institute, six from India, one from the Philippines, and 51 from China.

But by 2009, the Bangladeshi farmers had had enough of the poor yield, quality and adaptability of hybrids, and started rejecting hybrid rice. Despite efforts by the government and concerned agencies to extend the subsidy, they were able to push only about half the target of 10,000 tons of hybrid rice seeds on farmers. The acreage declined considerably as a result.

The failures of hybrid rice come as no surprise to one of Indonesia's most highly respected rice scientists, Professor Dr Kasumbogo Untung, an entomologist at the Universitas Gadjah Mada in Yogyakarta. He and his colleagues have long been familiar with the problems of hybrid rice, especially its susceptibility to pests and diseases. In fact, he says that he often uses it to teach his students, because it is the only variety that gives them direct access to pests and diseases that, in Indonesia, are otherwise seen only in textbooks. Now he worries that the large-scale introduction of hybrid rice will lead to a resurgence of pests such as brown planthopper. Dr Kasumbogo says that it is "very regrettable" that the government is promoting hybrid rice, because it will undo the advances made with integrated pest management in the country, and will cause farmers to increase their use of pesticides and chemical fertilisers.[25] "Hybrid rice is a luxurious variety that needs more care than a baby," says Dr. Kasumbogo.

Fields ruined by hopperburn in Chainat, Thailand

In January 2007, Indonesia''s central government launched a major hybrid rice programme, to the tune of US$651 million, to distribute 2,000 tons of free seeds and convert over 135,000 ha of prime rice land to hybrid rice production. Although local studies found that hybrid rice did not improve production, and an initial pilot programme produced disastrous results for participating farmers, the government went ahead distributing free seeds to farmers. By October 2007, the farmers who had signed up for the scheme experienced major problems. The yield they were getting was far from that advertised. Some of them had complete crop failures, and burned their fields in desperation. Farmers

25 Op.cit.

in Gorontalo Regency who planted Arize variety (produced by Bayer) reported that the taste was no good, and that, apart from higher production cost incurred, they also noticed that hybrid varieties are very vulnerable to insect pests.[26]

"We are like a lottery as the government tests its variety," said one farmer from the village of Dusun Karang Duwet, about 25 km south of Yogyakarta City, Central Java. One of the farmers' groups there, Ngupoyo Bogo, also received subsidised hybrid rice seeds from the government, and devoted seven hectares of their lands to planting Sumber Alam Sutra''s Bernas Super variety. But because of labour shortage in the area, the farmers had some difficulties following the guidelines to transplanting the seedlings. The seedlings were transplanted 20 days after sowing (instead of 15, as recommended by the extension officer). After about two month, their crop was abruptly ravaged by pests and diseases. In the end, the farmers uprooted the crops. Later, a staff member of Biotani, an Indonesian NGO who visited the site identified black bug and leaf-roller/leaf-folder in the farmers' fields.[27]

BPH ravaged fields in Ciherang Sukamandi, West Java

In 2008, the government expanded its programme, and many more unsuspecting farmers were drawn into using hybrid rice, with miserable consequences. Through the farmer fields school (FFS) in the community of Samben (Argomulyo Village, Sedayu), 36 farmers were given free seeds to trial Intani-2, a variety marketed by PT Bisi, a subsidiary of the Thai multinational company Charoen Pokphand. Enticed by the offer and the company promise that the variety would yield 13 tonnes/ha, the farmers agreed to allocate 5 ha of the 16 ha managed by their school to the trial. At harvest time, the yield proved to be somewhat disappointing. The crop yielded only 9.6 tonnes/ha, 3.4 tonnes short of what was promised. It also suffered attacks – albeit minor – from stem borer, and there was a consensus among the local farmers that hybrid rice is was highly susceptible to pests and diseases. Most of all, the farmers were bothered by not being able to save seeds after paying such a high price – Intani-2 seeds cost 50,000 Rp/kg, while the commonly grown IR-64 costs only 6,000 Rp/kg. The subsidised trial did not convince them to continue with hybrid rice.[28]

At another rice farming area outside Yogyakarta, the same black bug devastated the rice field of a

26 From "Hybrid rice in Indonesia" a presentation by AGRA at the "Harnessing Diversity: A Regional Strategy Workshop on Hybrid Rice and Farmers Seed Alternatives" held in Diliman, Quezon City, Philippines on Oct 14-16, 2009.

27 Indonesia: More hype than hope on hybrid rice" Hybrid rice blog, October 2007, http://www.grain.org/hybridrice/?lid=196

28 Op.cit.

farmer growing a Pioneer/DuPont variety of hybrid rice on 1.5 ha, in the Mingas Baru hamlet, Klaten regency. His field was in brutal shape. No amount of insecticide managed to save him from losses. He had been told that he could get 13-15 tonnes/ha – twice his normal yield – so he decided to buy it even at a price of 45,000 Rp/kg. This was the first time in 12 years that he had pest problems like this, and the first time his rice crop had failed.[29]

Stop hybrid rice, stop the industrial food system

The idea of using hybrid rice technology to feed humanity has certainly paid off for the companies behind it: they are getting a huge return from seeds and agrochemical sales. It is best suited to the kind of large-scale, high-tech, plantation-style agriculture that local and foreign investors are currently interested in. It is no secret that the chief appeal of hybrid rice for private investors is not its performance but the control it offers over farming. Farmers who plant hybrid rice have to return to the company every cropping to buy new seed. Full control, big profit. That's what it's all about. It is a big business that has little to do with agricultural development. National governments must be getting a very good slice of the pie for not wanting to stop it.

However, reason dictates that more than a decade of investment in this poorly performing rice is enough. Hybrid rice, by any means necessary, must be stopped. Starting from the conscious act of rejecting the use of rice hybrids, it should also be denounced in the context of resisting the global, industrial food system that has destroyed farmers' livelihoods and the environment. The food crisis that resurrected hybrid rice from its approaching demise was a result of this very industrial food system that feeds on the plantation-type, corporate agriculture that marginalises small food producers. As the resurgence of planthoppers show, hybrid rice monoculture is a recipe for disaster. The push for hybrid rice will not solve, but rather worsen the problem of food insecurity.

The need to "de-globalise" the industrial food system is clear. It has to be reversed by strengthening local food cultures and rebuilding local food production and distribution systems. It means a determined shift from mono to multi-cropping, and an organised fight to take control of productive resources, starting from the seeds. It also requires that lands be kept in the hands of local communities, by implementing meaningfully land redistribution that would give those communities complete access to the land itself and its resources. It is only with communities' full control of the land that farmers will be able to control the entire production system. Only this can farmers truly have seed alternatives that can re-orient agriculture, restructure the market, and rediscover the wealth of cultural dietary norms based on biodiversity.

29 Op.cit.

This 2010 collaborative Briefing looks at the current push for hybrid rice, and examines how it continues to fail Asia''s small farmers. It draws from the presentations, analyses and discussions at the *Harnessing Diversity: A Regional Strategy Workshop on Hybrid Rice and Farmers' Seed Alternatives*, held in Diliman, Quezon City, Philippines on Oct 14-16 October 2009, co-organised by KMP, MASIPAG and GRAIN, and supported by ASTM. This document was collectively written, edited and published as a joint undertaking by: AGRA (Indonesia), BIOTHAI (Thailand), BKF (Bangladesh), BRG (PNG), GRAIN, KMP (Philippines), MASIPAG (Philippines), PANAP, SAEDA (Laos), SEARICE, and UBINIG (Bangladesh).