

# **Fiasco in the field**

## **An update on hybrid rice in Asia**

**GRAIN**  
**March 2005**

In the early 1990s, it looked as if hybrid rice was on the way out. Companies drawn in by dreams of creating a hybrid seed market for rice akin to the North American hybrid maize market, were exasperated by years of investment without any returns. The International Rice Research Institute (IRRI), the agency leading the research effort, had not produced a single successful variety despite years of trying. China was the only country with a significant area planted to hybrid rice, but this too seemed to be in danger of decline as the state started to claw back its direct subsidies and support.

But by the end of the decade, hybrid rice was making a comeback. An Asia Development Bank (ADB) financed project, led by the UN Food and Agriculture Organisation (FAO) and IRRI, was resurrecting hybrid rice from the ashes. Hybrid rice was commercialised in several countries, transnational seed companies renewed their interest, and the area sown to hybrid rice was, according to the FAO and IRRI, on the rise across Asia.

In 2000, a number of groups in Asia issued a collaborative report warning that the push for hybrid rice was stronger than ever.<sup>1</sup> It documented how this push was really about setting up a lucrative rice seed industry and a stepping-stone to genetically modified (GM) rice. It revealed the actors involved in this push, from the multinational corporations to the international agencies (FAO, IRRI, and ADB) to the national governments and even local NGOs. The report pointed out that hybrid rice was a pretty useless technology for farmers, that hybrid rice seeds are expensive and cannot be saved from year to year, that they are susceptible to diseases and pests, and are of low quality, fetching a lower price in the market. If the area of hybrid rice was growing, as its proponents claimed, this was only because of major subsidies and because other options were not being pursued.

This is an independent update on the 2000 report. We look at changes to the area under hybrid rice and the shifting dynamics and ambitions of those pushing hybrid rice in the region. We also zoom in on the national level to get a better picture of how hybrid rice is impacting farmers in various countries in Asia.

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<sup>1</sup> Devlin Kuyek, "Hybrid rice in Asia: An unfolding threat", Biothai (Thailand), GRAIN, KMP (Philippines), MASIPAG and Dr Oscar B. Zamora (Philippines), PAN Indonesia, Philippine Greens and UBINIG (Bangladesh), Dr Romeo Quijano, March 2000: <http://www.grain.org/briefings/?id=136>

## A snapshot of hybrid rice in Asia

The overall hybrid rice area in Asia has not changed much since 2000. Acreage in China, by far the world's biggest producer of hybrid rice, has been in decline since 1997 and remains confined to the southeast and south central parts of the country.<sup>2</sup> In India, where hybrid rice has been on the market for nearly ten years, hybrid rice cultivation has fallen off in the initial areas where it was introduced and is currently confined to small areas where there are government and seed industry "on-farm demonstration programmes".<sup>3</sup> In 2000, it looked like hybrid rice might make inroads in Pakistan, Indonesia, Malaysia and Sri Lanka, but at present there is little or no hybrid rice planted in these countries. There is no market for hybrid rice in Thailand either, one of Asia's leading rice producers. FAO's efforts to develop hybrid rice for Burma appear to have faltered, with only small pockets of land in the country being sown to hybrid rice seeds imported from China. The same appears to be happening in Laos. In Bangladesh, the hybrid rice seed market has not lived up to expectations. It remains small and dominated by imported Chinese and Indian varieties, not adapted to local conditions.<sup>4</sup>

Vietnam and the Philippines are the only countries with major increases in hybrid rice production since 2000. Yet hybrid rice production in Vietnam is confined to the North of the country and still dominated by seed imported from China. There may be more local hybrid rice seed production in the Philippines, but it survives on state subsidies and support, and the 170,000 ha planted in 2004 falls far short of the 400,000 ha the government was aiming for.<sup>5</sup>

**Table 1: Production of hybrid rice in Asia**

Country	Area cultivated with hybrid rice (ha)			Hybrid rice as % of total rice area
	1997	2001	2003	
China	17,708,000	15,821,000	15,210,000	52%
Vietnam	187,000	480,000	600,000	8%
India	120,000	200,000*	< 200,000*	< 1%
Philippines	500	90,000	107,000	3%
Bangladesh	0	20,000	49,655	< 1%
Burma	0	10,000	unknown	-
Pakistan	0	0	field trials	-

Source: Data from 1997 and 2002 are from FAO; data from 2003 is based on official national figures except where indicated.

\* The figures circulated by IRRI are 200,000 ha and 280,000 in 2001 and 2003 respectively and are based on the figures given by hybrid rice seed breeders. However, there are no official figures for 2003 and, according to one of India's leading researchers on hybrid rice adoption, Aldas Janaiah, hybrid rice production is currently confined to small areas where there are on-farm demonstrations.

<sup>2</sup> Interview with Yuan Longping, 9 November 2004

<sup>3</sup> Email communication from Janaiah Aldas.

<sup>4</sup> UBINIG, "Undesired promotion of hybrid rice in Bangladesh", Dhaka, Bangladesh, forthcoming.

<sup>5</sup> Figures from the Philippines Department of Agriculture.

## The push continues

The slow, and at times negative, growth rate of the hybrid rice area in Asian rice-producing countries hasn't deterred its proponents. The FAO still advocates for hybrid rice and gave it special attention during 2004, the "Year of Rice". IRRI, with support from ADB, also continues to be a central actor, providing new parental lines, technical assistance and help to the industry in getting governments to adopt favourable regulations.<sup>6</sup> IRRI recently considered a proposal from the Asia Pacific Seed Association (APSA) to adopt a consortium model of partnership with private companies, where each company pays a membership fee to get exclusive rights to IRRI's hybrid rice lines for a certain period of time.<sup>7</sup> IRRI says that its management rejected the industry's proposal, but is now developing an alternative arrangement.<sup>8</sup>

Meanwhile, the private sector is more determined than ever to get hybrid rice off the ground. More seed companies and more NGOs are now involved, even though many of them are either distributing imported seeds or producing hybrid seeds with imported parental lines that they've licensed from foreign companies, particularly from China. Only a handful of companies are involved in breeding work, and they are aggressively building up their regional presence. Most of these are US and European transnationals, but there are a couple of Chinese and Indian companies with a significant presence as well.

**Table 2. Major hybrid rice seed companies in Asia**

<b>Company</b>	<b>Subsidiaries and joint ventures</b>
Bayer (Germany)	Hybrid Rice International (India)
Dupont/Pioneer (USA)	SPIC (India)
East-West Seeds (Netherlands)	HyRice Corporation (Philippines)
Monsanto (USA)	MAHYCO (India)
Shriram Bioseed Genetics (India)	
Syngenta (Switzerland)	
Yuan Longping High-Tech Agriculture (China)	<ul style="list-style-type: none"> <li>▪ SLAC (Philippines)</li> <li>▪ Guard Rice (Pakistan)</li> <li>▪ PT Bangun Pusaka (Indonesia)</li> <li>▪ Aftab Bahumukhi Farm/Islam Group (Bangladesh)</li> </ul>

Source: Company websites, reports and press releases

India and China are shaping up as the main hubs for the hybrid rice seed industry in Asia. These countries have the best conditions for the production of hybrid rice seed: big potential markets, a suitable climate, lax seed regulations, strong public research programmes open to partnership with the private sector, and cheap labour.

India is home to the main hybrid rice seed operations for Bayer, DuPont, Monsanto, Shriram Bioseed and Syngenta. They are eager to tap into the country's big potential market and to use it as a base to export seeds to Bangladesh, Indonesia and Vietnam. DuPont, which already derives nearly half of its seed revenues in India from rice, told the Times of India:

<sup>6</sup> Minutes of the meeting of the Asia Pacific Seed Association's Special Interest Group on Hybrid Rice, 19 November 2003, Bangkok.

<sup>7</sup> Minutes of the meeting of the Asia Pacific Seed Association's Special Interest Group on Hybrid Rice, 19 November 2003, Bangkok.

<sup>8</sup> Interview with S.S. Virmani, IRRI, 1 September 2004.

Our calculations are simple. Paddy farmers today are buying just 1,900 tonnes hybrid seeds annually. This translates into just 0.3 per cent hybridisation in India. In the 12m hectares (ha) we'd like to initially focus on, this means just 1 per cent of the area under rice. In comparison, China has more than half its paddy fields under hybrid rice. Helping India move into that direction is a tremendous opportunity for us.<sup>9</sup>

Yet DuPont and the other seed giants are experiencing many bumps along the way. So far they haven't produced a hybrid rice variety that Indian farmers will pay for. The hybrid rice area in India is shrinking because farmers that try it once are not interested in trying it again.<sup>10</sup> They also face public hostility to their efforts to move in and control the market. Syngenta had to back away from a controversial deal with the Indira Gandhi Agricultural University in Raipur that would have given the company commercial rights to over 19,000 rice varieties held by the university that were collected from local farmers in the 1970s. Syngenta had planned to draw on the collection for its hybrid rice breeding programme and would have marketed new hybrids developed under the collaboration upon payment of royalties to the university. But widespread public protest broke out when news of the deal was leaked to a local newspaper in November 2002 and the deal eventually collapsed.<sup>11</sup>

The Philippines is desperately trying to fashion itself as a player in the hybrid rice seed industry as well. Monsanto has breeding operations in the country that it purchased from Cargill, as does East West Seed Company's subsidiary HyRice Corporation, which works with parental lines from IRRI. Nevertheless, seed production conditions in the country are so deficient that the government is basically bribing farmers to produce seed by buying seeds at a subsidised rate and offering cash (US\$180) and freebies like bacterial leaf blight stoppers or organic fertilisers on top of the subsidies, credit packages and heavy promotion it already provides to the farmers buying the seed. Despite all of this government support, hybrid rice seed donations continue to come in from China.

China remains the heavyweight of the hybrid rice seed industry and in recent years it has changed from a completely domestic industry to a global player, with activities spread across the Americas and Asia. The Chinese companies differ from their American and European counterparts, in that they are tightly linked to the state and most of their international activities are limited to licensing arrangements, joint ventures or even donations. But the situation in China is changing, as China begins to let foreign seed multinationals in and as it builds up seed multinationals of its own.

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<sup>9</sup> Nidhi Nath Srinivas, "Hybrid rice potential has MNCs drooling," Times of India, 2 October 2003.

<sup>10</sup> P. G. Chengappa, Aldas Janaiah, and M. V. Srinivasa Gowda, Profitability of Hybrid Rice: Karnataka Evidence, *Economic and Political Weekly*, 21 June 2003, 38(25), 2531-2534; Aldas Janaiah, "Hybrid Rice in Andhra Pradesh", *Economic and Political Weekly*, 21 June 2003, 38(25), 2513-2516; C. Ramasamy, A. Janaiah, K.N. Selvaraj, and M. Hossain, "Hybrid Rice in Tamil Nadu", *Economic and Political Weekly*, 21 June 2003, 38(25), 2509-2512.

<sup>11</sup> Walter Smolders, Syngenta, "Access and benefit sharing: Analysis of some case studies," 11 August 2004, New Delhi; GRAIN, Trouble in the Rice Bowl, *Seedling*, April 2003: <http://www.grain.org/seedling/?id=235>

## Box 1: The Yuan Longping consortium

*"It is the great aspiration of the Chinese scientists that the people of all races under the sun will be fed on our hybrid rice"*

- Dr. Yang Jubao, consultant on hybrid rice to the FAO (Xinhua, 16/04/2004)

China's hybrid rice efforts centre on Yuan Longping, the "Father of Hybrid Rice." Yuan was the first to identify a source of cytoplasmic male sterility that made large-scale hybrid rice seed production a possibility. Although ridiculed at first, the state eventually came around to his ideas and by the end of the 1980s his hybrid varieties occupied half of China's rice growing area. Yuan is now a national hero and one of China's wealthiest individuals. He has won countless awards, been the subject of a commemorative stamp and is set to be immortalised by a giant statue in the proposed [Multinational Rice Park](#) of Huaihua City, Hunan Province.<sup>12</sup>

Yuan is the figurehead for an extensive national consortium of scientists, research centres, and private companies working on hybrid rice in the country. He is the Director General of the China National Hybrid Rice Research and Development Centre (CNHRRDC), by far the world's largest research centre devoted to hybrid rice. The main private arm of the Yuan Longping consortium is the Yuan Longping High-Tech Agricultural Company, which is 5% owned by Yuan himself. There is also the Yuan Longping Hybrid Rice International Company, a diversified seed joint venture between the CNHRRDC, the China Business Group of the US and RiceTec, the US's leading hybrid rice seed company.<sup>13</sup>

The consortium's operations extend across Asia. In the Philippines, it operates a joint venture with local billionaire Henry Lim Bon Liong called SL Agritech and co-operates with the Philippine-Sino Centre for Agricultural Technology that was set up by the Chinese and Philippine governments to test the adaptability of Chinese hybrids in the archipelago. All of the 40 Chinese hybrids the Centre evaluated in 2004 were named after Yuan Longping. SL Agritech's *SL8* hybrid rice variety is marketed with a poster saying: "For the welfare of mankind, from L.P. Yuan."<sup>14</sup> But Yuan and his consortium are not giving their hybrid rice technologies away. They work mainly with private seed companies. In the Philippines, their partner, SL Agritech (also known as Hybrid Rice Seed Enterprises), has received provisional approval for plant variety protection -- a kind of patent -- on four hybrid rice varieties. In Bangladesh, Yuan is involved in a licensing arrangement with Aftab Bahumukhi Farm of the Islam Group and it has joint ventures with Guard Rice in Pakistan and PT Bangun Pusaka of the Putera Group in Indonesia.

In Malaysia, where previous experiments with hybrid rice failed miserably, Yuan Longping signed a deal in August 2004 with the national research agency (MARDI) and a local foundation of the Yayasan Tuanku Syed Sirajuddin to set up a hybrid rice research centre in Perlis. The centre will import Chinese hybrid parental lines to produce seed, thereby avoiding Malaysian regulations that prevent the import of rice seeds for sale.<sup>15</sup> The CNHRRDC will make their parental lines available to the centre "subject to existing intellectual property restrictions. . . After the research is completed, Malaysia will be granted an exclusive right to use the new selected hybrid rice seed combination and to have joint-ownership of patents on any new hybrid varieties, techniques, process, procedures and inventions."<sup>16</sup> Yuan Longping already has two patents covering hybrid rice production in the US, both held by the China National Seed Company, and another one for hybrid rice production held by the Life Science College Hubei University.

The Yuan Longping consortium is now moving to bring GM hybrid rice varieties to market. It has already submitted varieties of GM rice to the Chinese government for approval. "We have forwarded a proposal to the government and hope it could be approved at an early date," Yuan told the Shenzhen Daily. He shrugged off concerns over the safety of GM rice. "We hope the government will be more open on the issue, it [GM] poses no big danger," he said.<sup>17</sup>

<sup>12</sup> <http://www.mendiseasestcm.com/yuanlongping.htm>

<sup>13</sup> "HRRRC Forms Venture to Market Hybrid Rice," Asia Pacific Biotech News, Vol. 2, No. 1, 1998.

<sup>14</sup> June Kintanar "Kintanar: New rice variety and food security", *Sun-Star Cebu*, 23 April 2003

<sup>15</sup> Loh Foon Fong, "Roots of super rice hybrids", *The Star*, Kuala Lumpur, 30 August 2004

<sup>16</sup> Bernama.com (Malaysia), "Yayasan Tuanku Syed Sirajuddin Signs MoA On Hybrid Rice Production", 16 August 2004

<sup>17</sup> Scientist calls for approval of GM rice, *Shenzhen Daily*, March 9, 2004:  
<http://www.szed.com/szdaily/20040309/ca815820.htm>

## Hybrid rice on the farm

The beautiful photos of scientists standing in fields of hybrid rice that circulate in the media can't hide the fact that, on the farm, hybrid rice just isn't working in Asia and farmers are rejecting it. The seed is expensive to produce (up to US\$2,000 per ha), so heavy subsidies are needed for farmers to be able to afford it. Hybrid rice remains susceptible to disease, and eating quality is still a big problem in many countries. Farmers regularly receive lower prices for hybrid rice than their traditional varieties. In China, the market price for hybrid rice can be a third of the price for conventional rice, and some farmers are now shifting back to traditional rice varieties that are of higher quality and higher market value.<sup>18</sup>

One recent study even suggests that if yield is the objective then there's no need for the headaches involved in producing hybrid seeds. Researchers in Greece were able to continuously select from an F1 generation of hybrid rice and produce a variety that was equally high-yielding but of better grain quality and, most importantly, that farmers could save from year to year without problem (see Box 2).<sup>19</sup>

### Box 2: Is heterosis in rice inheritable?

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 that are genetically distant from each other, the offspring will be "superior", particularly in terms of yield. However, the so-called heterosis effect disappears after the first (F1) generation, so it is pointless for farmers to save seeds produced from a hybrid crop. This makes it very profitable to go into the seed business, since farmers need to purchase new F1 seeds every season to get the heterosis effect (high yield) each time.

Between 1989 and 1995, two researchers with Greece's National Agricultural Research Foundation and the Aristotelian University of Thessaloniki undertook an experiment to see if they could generate high-yielding varieties from the progeny of a single variety of F1 hybrid rice seeds purchased in the local market.<sup>20</sup> Through the use of two well-known selection methods, the researchers had no problems developing a number of lines with yields equal to or higher than the original hybrid and with superior quality as far as total milling yield, grain vitreosity, grain length, and grain length/width ratio. According to their report, "It was concluded that application of combined selection for yield and quality could lead to the isolation of recombinant inbred lines with equal yielding ability and quality equal to or higher than the F1 hybrids." In other words, the heterosis of hybrid rice is "fixable" and there's no need to go through the elaborate practice of hybrid rice seed production or of forcing farmers to purchase seed every year. The researchers' conclusion: "hybrid breeding in rice is not justified either genetically or economically"!

<sup>18</sup> "Rice price being monitored closely," *China Daily*, March 05, 2004 : [http://english.peopledaily.com.cn/200403/05/eng20040305\\_136575.shtml](http://english.peopledaily.com.cn/200403/05/eng20040305_136575.shtml) ; PLEC China Cluster, "Final Cluster Report: Summary of Results and Achievements from 1998-2001": <http://www.unu.edu/env/plec/country/china/index.htm#contactchina> ; and, Aldas Janaiah, M. Hossain, C. B. Casiwan and T. T. Ut, "Hybrid Rice Technology for Food Security in the Tropics: Can the Chinese Miracle be Replicated in the Southeast Asia?" Presented to the International Symposium Sustaining Food Security and Managing Natural Resources in Southeast Asia- Challenges for the 21st Century, Chiang Mai, Thailand, 8-11 January 2002

<sup>19</sup> D.A. Ntanos and D.G. Roupakias, "Rice F1 hybrids: the breeding goal or a costly solution?" *Australian Journal of Agricultural Research* 2003, 54: 1005-1011.

<sup>20</sup> D.A. Ntanos and D.G. Roupakias, "Rice F1 hybrids: the breeding goal or a costly solution?" *Australian Journal of Agricultural Research* 2003, 54: 1005-1011.

## *Philippines: Hybrid rice fails farmers again...and again*

On 17 April 2004, while China's Ambassador Wu Hongbo was making a short stop at the Philippine Rice Research Institute (PhilRice),<sup>21</sup> the Philippine government and the FAO launched the Hunger-Free Philippines Programme (HFPP).<sup>22</sup> Rice, the staple food for more than 68 million Filipinos, is inevitably central to the programme. "Next year, the country will be self-sufficient in rice, there will be no more importation if I remain President," claimed re-election hopeful Gloria Macapagal-Aroyo during the launching ceremony.<sup>23</sup> The government says that by 2005 it intends to attain rice self-sufficiency by increasing national rice production through its hybrid rice programme.

But critics point out that the government tried the same thing a few years ago with the Department of Agriculture's (DA) Hybrid Rice Commercialisation Programme, which sought specifically to abate poverty by increasing production and employment. But that programme failed to produce the expected rural job creation and failed to reduce rice imports,<sup>24</sup> which reached 1.13 million metric tonnes in 2004.<sup>25</sup> And despite projections of a record rice harvest for 2005, the DA plans to import 700,000-900,000 metric tonnes of rice to meet the shortfall, which may cost the government as much as P12.6 billion (US\$224 million).<sup>26</sup> Poverty and unemployment are also on the rise.

Some policy analysts observe that the major flaw of the government's programmes on hybrid rice is the huge cost of subsidies. Last year, the government allocated P550 million (US\$9.8 million) to subsidise seed production on top of the money spent developing and promoting hybrid varieties. It is estimated that the government spends US\$118 per hectare on subsidies. This includes P6,100 (US\$109) for the production and distribution of every 20kg bag of hybrid rice seed, enough for one hectare<sup>27</sup> and about P500 (US\$9) on free fertilisers, soil analysis, bactericides and zinc for farms deficient in this nutrient.<sup>28</sup> This means that for the 600,000 ha target for cropping year 2004-2005 ending in April 2005, the government would have had mobilised about US\$71 million.

The other, more obvious, flaw of the programme is with the hybrid rice technology itself and the rice hybrids that it produces. The lead agency, PhilRice, now has three *Mestizo* varieties on the market. There's also a private hybrid rice seed sector, stimulated by the subsidies, with several companies now marketing their own varieties: Monsanto (*Magilas*), SL Agritech Corporation (*Doña Maria SL8H*), HyRice (*Rizalina 28*) and Bayer Crop Science (*Bigante*). But while some commercial farmers may have increased their yields, the average yield increases are certainly not enough to justify the added expenses, which as much as doubled

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<sup>21</sup> "New Chinese Ambassador visits PhilRice" by Josephine G Cruz, 5 March 2004, PhilRice, <http://www.philrice.gov.ph/newsroom.php?newsTag=572>

<sup>22</sup> Officially launched during the National Rice Festival in Narciso Ramos Sports Complex, Lingayen, Pangasinan. In the same program winners also received the Unlad Ani Awards. The Unlad Ani Program is an incentive system for local government units that have achieved high level of productivity in hybrid rice production. A winning province receives P500,000 worth of rice-related agricultural project while a municipality gets P150,000 of the same.

<sup>23</sup> <http://www.news.ops.gov.ph/archives2004/apr17.htm>

<sup>24</sup> Hetty Alcuitaz, "Hybrid Rice Commercialisation Program, Inherently Flawed", Education for Development vol. 1, no. 12, December 2002, p. 4

<sup>25</sup> <http://english.sina.com/news/business/7339736.shtml>

<sup>26</sup> "Dept of Agriculture: government to import rice worth P12.6 billion next year" by Paolo Romero and Rocel Felix, 01/11/2004, Philippine STAR.

<sup>27</sup> "Will Hybrid rice save us?" by Rey Gamboa, 01/11/2004, the Philippine Star

<sup>28</sup> "Nueva Vizcaya shifts to hybrid rice in a big way" by Gene Basilio, 16/10/2004, The Manila Times

for farmers trying hybrid rice. The reported high net incomes realised by farmers from planting hybrid rice are based on subsidised costs rather than real costs. A survey of farmers growing hybrid rice in 2000 and 2001 found that the majority were not willing to plant hybrid seeds again despite the subsidies (Box 3).<sup>29</sup> For most of them, hybrid rice was more difficult to cultivate and "inferior in terms of grain price, profitability, consumer demand, and head rice recovery." Official statistics from 2003 for one town in Isabela Province, northwest of the country, show that for every hectare of hybrid rice that yielded above the national average for inbred varieties, currently pegged at 4.2 mt/ha, seven hectares of the same variety yielded miserably below it.<sup>30</sup> (See Table 3.) In several fields planted to Monsanto's *Magilas* variety, there was no yield at all!

**Table 3. Farmers' yields from *Magilas 500* in Cauayan, Isabela, Philippines (2003)**

Yields achieved (mt/ha)	Area represented by yield achievement (ha)	As % of total area sown to <i>Magilas 500</i> in Cauayan
<1	2.60	0.85
1-2	33.70	11.02
2-3	75.15	24.56
3-4	84.00	27.46
4-5	70.00	22.88
5-6	29.59	8.69
> 6	13.90	4.54
Total	305.94	

Source: Office of the Provincial Agriculturist (OPA) - Isabela, Philippines

In the Philippines, there are plenty of alternatives to hybrid rice technology and many farmers' organisations condemn the government's tenacity to rely on rice imports. If poverty reduction is the goal, then promoting hybrid rice that only marginalises small, resource poor farmers is certainly not the way to achieve it. If insufficient rice production is the problem, then there are better and more cost-effective options at the farmers' level to address it - which might even hold the key to the country's food security (See Box 4).

<sup>29</sup> 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*, 21 June 2003

<sup>30</sup> Based on data from the Office of the Provincial Agriculturist, Province of Isabela

### **Box 3: Unfilled grains of promise in the Philippines<sup>31</sup>**

For many years, Sulpicio Francisco, 52, has been planting Mulan-ay, a traditional rice variety, in a small portion of his highly diversified farm in Patnongon in the Visayas. He employs sustainable farming practices that he learned from his family. He values crop diversity as it ensures food security in the household. Aside from rice, he grows root crops such as taro, fruit trees like jackfruit and mango, banana, coconut, indigenous trees, and raises fish on a small fishpond in his 7 hectare farm.

One day he was invited by technicians from the Department of Agriculture (DA) to a training seminar sponsored by Monsanto and Syngenta. In it, Monsanto introduced Magilas 500, a hybrid rice variety that can yield 150-180 cavans (7.5 – 9.0 MT) per hectare. The participants were told that the variety cannot be re-used for the next planting as it would not produce a good yield. To ensure that they get the optimum harvest, they would have to buy a new batch of seeds every cropping. They would also need to follow the instructions and apply the recommended amounts of specified fertilisers and pesticides.

Magilas, in Tagalog, means 'extraordinary greatness'. But this was not Francisco's experience with Monsanto's rice. Before the start of dry season in 2003, Francisco set aside his Mulan-ay and bought 5 kilos of Magilas from the local DA office at P50.00 (US\$ 1) per kilo. He planted this on a quarter of a hectare, and, eventually harvested 16 cavans – i.e. 64 cavans per hectare – way below the 150-180 cavans/ha yield promised him by the DA technicians at the Monsanto-sponsored seminar.

Domingo Cristobal of Cauayan in Luzon had a similar experience. He tried the Magilas hybrid rice on his 1.4 hectare farm for the first time because of its name. During the first two months, the rice crop showed good signs of progress. He bought the required inputs and followed the instructions by the letter. But another month passed and he realised something was wrong: the rice grains never did fill up. Cristobal lost about P23,000 (US\$ 400) from this experience and filed a formal complaint against Monsanto at the City Council of Cauayan.

Not far from Cristobal's farm, Monico Malabug replaces his traditional varieties with the Magilas on his 8 ha farm. At the onset of the cropping, he and his wife were so impressed by the stand of the crop – it looked really "magilas". But come harvest time, the grains – and their hope for the promised yield – proved empty. "We took care of the crop very well, we bought the necessary inputs, our farm is a prime agricultural land, and we have good access to irrigation," the wife said, still at a loss as to what happened with their crop. They spent more than P170,000 (US\$3,000) for the seeds, fertilisers and pesticides, and recovered nothing. Representatives from Monsanto reportedly came and offered the family reimbursements for the loss. But Malabug was determined to file charges before the authorities.

The list of nameless, faceless farmers with bad experiences of hybrid rice goes on in all the areas where hybrid rice has been promoted: from Iloilo, Negros Occidental and Antique in the Visayas to Agusan del Sur and Zamboanga del Sur in Mindanao and to Isabela, Bicol, Nueva Ecija and Southern Tagalog in Luzon. But it seems like the government is committed to continue this fiasco. Just recently, the Land Bank of the Philippines (LBP) and the Philippine Confederation of Grains Association entered in a memorandum of agreement for a P350 million (US\$6.2 million) hybrid rice fund meant to achieve 97 percent rice sufficiency and export fancy hybrid rice in 2005.<sup>32</sup>

<sup>31</sup> based on MASIPAG's research and documentation of farmers experiences with hybrid rice in the Philippines (2004)

<sup>32</sup> Melody Aguiba, "LBP, grains sector agree on P350-M hybrid rice fund," *The Manila Bulletin*, 25 October 2004

#### **BOX 4: Farmers' alternatives**

*National Initiatives on Seed and Sustainable Agriculture in the Philippines* - a farmer-led programme implemented by PABINHI Pilipinas that promotes: on-farm conservation and farmer breeding of traditional and improved rice varieties; nature farming that focuses on soil fertility management; and SRI or "system of rice intensification" that explores sustainable methods of growing rice and integration with other crops. The programme covers 20 provinces in the country and so far involves 30 farmers organisations. From its collection and rice breeding efforts, the group now has 631 accessions in its in-situ genebanks that are collected, improved and exchanged among farmers. Average yield from their farmer-bred 'varieties' is 5 mt/ha, without chemical fertilisers nor pesticides, and 6.4 mt/ha using SRI technique.

*MASIPAG* - a national programme implemented by a network of people's organisations, NGOs and scientists working towards the sustainable use and management of biodiversity through farmers control of genetic and biological resources, agricultural production and associated knowledge. The programme has collected and improved cultivars of rice (839 rice selections, of which 98 are locally adapted in Luzon, 141 in Visayas and 127 in Mindanao - given to and exchanged among farmers for free) and corn, indigenous vegetables and poultry and livestock breeds. Aside from this, the group also continuously develops sustainable agro-ecosystems that encourage farmers to shift from monocropping to diversified and integrated farming systems, and cut dependency from external inputs supplied by seed and agrochemical companies. It has about 200 learning farms in 36 provinces managed by farmer groups and individual farmers, which are considered to be 'living seed banks' and venues for experimentation, learning, awareness-raising and experience-sharing.

#### ***Vietnam: Sowing dependence***

Since the government of Vietnam launched its National Hybrid Rice Research Programme in 1992, with financial and technical backing from the ADB and the FAO, the area under hybrid rice has grown from 11,000 hectares in 1992 to 187,000 ha to 480,000 ha in 2003. The programme's main objective has always been to increase rice self-sufficiency in the North, where rice production, dominated by small-scale farms on unfavourable lands, has not kept pace with production increases to the South. While the South has become a major rice exporter, the North has a rice deficit, which is compounded by on-going population pressures and land conversion.<sup>33</sup> The government says that because poor transportation makes it impractical to bring the surplus rice from the South to the North, increasing rice production in the North is the best solution.<sup>34</sup>

Nearly all of the hybrid rice area in Vietnam is planted to Chinese varieties. Of the 17,000 tonnes of hybrid rice seed planted in Vietnam only 2,500-3,000 tonnes are produced domestically, the rest are imported from China and most of the seeds produced locally use Chinese parental lines. Despite state efforts to kick-start a local industry, in 2002, hybrid rice seed imports from China amounted to US\$22 million.<sup>35</sup> Beyond the various public research programmes focusing on hybrid rice, the government operates three subsidy programmes to support local hybrid rice seed companies: a programme supporting the production of hybrid

<sup>33</sup> Bui chi Buu, Cuu, Long Delta Rice Research Institute, "Current Hybrid Rice Breeding In Vietnam" : <http://clri.org/en/new/hybridrice04.htm>

<sup>34</sup> Mahabub Hossain, Tran Thi Ut and Aldas Janaiah, "Vietnam's Experience with Hybrid Rice," *Economic and Political Weekly*, 21 June 2003 , 38(25), 2523-2529.

<sup>35</sup> Asian Development Bank, "Report and Recommendation of the President to the Board of Directors on Proposed Loans to the Socialist Republic of Viet Nam for the Agriculture Sector Development Program," November 2002, p.33.

rice seeds worth US\$1.3 million in 2002; a pilot programme providing free seeds and training to farmers growing seeds under contract to local seed companies for a two to three year period worth US\$500,000 in 2002; and a poverty reduction program administered to provide subsidised hybrid rice seeds to poor and subsistence farmers in 18 mountainous provinces in the North worth US\$2.7 million in 2002.<sup>36</sup>

These subsidies are about to come to an end. Under an agreement signed with ADB, the government will abolish the seed production programmes and phase out the poverty reduction programme. The agreement with the ADB also prevents research centres from directly supplying seed to farmers, limiting them to supplying seed companies with breeders' and foundation seed. The ADB is pushing them to adopt a more commercial approach, seeking financing through partnerships with the private sector and offering "financial incentives" to their researchers.<sup>37</sup>

The end of the subsidies will force major changes within the national hybrid rice programme. After years of research, the national breeding programmes have developed some promising hybrid rice varieties, such as *Viet Lai 20*, which was released in 2004 by the Ha Noi Agricultural University. But these local varieties are more expensive than the Chinese varieties,<sup>38</sup> and as the subsidies disappear, so will the national varieties. This is not to say that the Chinese varieties are without problems. They are plagued by susceptibility to diseases and pests, particularly bacterial leaf blight and brown plant hopper and they continue to suffer from poor eating quality.<sup>39</sup> A recent survey of hybrid rice farmers in northern and central Vietnam found that 42 percent of the farmers growing hybrid rice were feeding it to their pigs.<sup>40</sup>

What will this mean for rice self-sufficiency in Northern Vietnam? Nearly all the hybrid rice seed sown in the North is produced in southern Vietnam or China. Despite the development of certain varieties suited to seed production conditions in the North, there is little reason to suspect that this will change. According to one of the country's leading hybrid rice scientists, the new Vietnamese slogan is "Seed production in South, hybrid rice production in North."<sup>41</sup> This is a big step away from the programme's basic objective of assuring the North's self-sufficiency in rice vis-à-vis the South.

The North's dependence on outside sources for seeds puts its food security at risk. The hybrid rice seeds sold in the country are not of consistent quality and hybrid rice production is highly sensitive to external factors, such as climate, water management and access to fertilisers, which are particularly difficult for farmers to control in the poor, mountainous areas of

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<sup>36</sup> Asian Development Bank, "Report and Recommendation of the President to the Board of Directors on Proposed Loans to the Socialist Republic of Viet Nam for the Agriculture Sector Development Program," November 2002, p.32.

<sup>37</sup> Asian Development Bank, "Report and Recommendation of the President to the Board of Directors on Proposed Loans to the Socialist Republic of Viet Nam for the Agriculture Sector Development Program," November 2002.

<sup>38</sup> Bui chi Buu, Cuu, Long Delta Rice Research Institute, "Current Hybrid Rice Breeding In Vietnam" : <http://clrri.org/en/new/hybridrice04.htm>

<sup>39</sup> Bui chi Buu, Cuu, Long Delta Rice Research Institute, "Current Hybrid Rice Breeding In Vietnam" : <http://clrri.org/en/new/hybridrice04.htm>; Minutes of the meeting of the Asia Pacific Seed Association's Special Interest Group on Hybrid Rice, 19 November 2003, Bangkok.

<sup>40</sup> Mahabub Hossain, Tran Thi Ut and Aldas Janaiah, "Vietnam's Experience with Hybrid Rice," Economic and Political Weekly, June 21, 2003 , 38(25), p. 2527.

<sup>41</sup> Bui chi Buu, Cuu, Long Delta Rice Research Institute, "Current Hybrid Rice Breeding In Vietnam" : <http://clrri.org/en/new/hybridrice04.htm>

Vietnam.<sup>42</sup> Moreover, access to hybrid rice seed will soon be controlled by a private seed sector that is in a period of flux and uncertainty, with state seed companies being privatised and sold off and new multinationals coming in. In such a situation there will be little accountability or stability. Local companies may close down or relocate their operations, leaving farmers without a source of new seeds for the following season's crop. And, with so much GM rice activity in China, how will farmers be able to know if the seeds they are sold are not GM?

The most disturbing element of this new dependence is the dependence farmers will have on outside sources of seeds. Not only will they be forced to purchase new seed every year but they may lose the possibility of returning to their traditional varieties. The subsidy programme for poor farmers is designed to foster dependence. It provides these farmers with a 100% subsidy on the first crop, a 50% subsidy on the second and a 30% subsidy on the third, after which the farmers are no longer eligible for subsidies. Will poor farmers be able to resist such an offer and, more importantly, will they save their traditional seeds to go back to if the hybrids don't work out? If past experience is anything to go by, there will probably be a rapid erosion of traditional varieties, leaving farmers at the mercy of seed dealers.

### ***Bangladesh: Farmers aren't fooled***

Hybrid rice entered Bangladesh in 1999 after major floods wiped out much of the local paddy seed supplies. That year around 600 tons of two varieties, Alok-6201 from India and Sonar Bangla from China, were imported. BRAC, a large NGO that handles much of the micro-credit programmes in the country, carried out most of the distribution of the seeds. There are now several other varieties on the market, including BR-Hybrid-1, a variety developed by the Bangladesh Rice Research Institute (BRRI), and Jaragon-1, a variety developed by BRAC scientists working with parental lines from China.<sup>43</sup>

Unlike in the Philippines and Vietnam, in Bangladesh the government's role in supporting hybrid rice has been limited to assuring a conducive regulatory environment, participating in the occasional promotional programme and carrying out some breeding work. The main protagonists are from outside of government. These include the typical actors, such as the ADB, IRRI, and NGOs like BRAC that collaborate with multinational seed companies. These NGOs have been the main conduit for hybrid rice in Bangladesh. Hybrid rice has yet to make deep inroads in Bangladesh. Despite heavy promotion at the local level—in the form of leaflets, posters, publicity banners, village meetings, broadcasts through megaphones and advertisements on radio and TV—sales of hybrid rice seeds remain low. In 2003, less than 50,000 ha were planted to hybrid rice in the country. As one BRAC official in Chapainabaganj District put it, "We have never received a farmer who came to us through their own interest of receiving hybrid seeds."

The performance of hybrid rice in Bangladesh has been lacklustre at best. A 1999 study of 173 farmers growing both hybrid rice and "high-yielding varieties" on their farms found that, while the hybrids were higher yielding, the costs of inputs were 23 percent higher. The farmers surveyed complained of high seed costs, the need for more crop care and management time, low yield gains, high pest and disease attack, low profits and lack of

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<sup>42</sup> Ministry of Agriculture and Rural Development, Government of Vietnam, "Hybrid Rice in Vietnam: Recent Progress and Issues": <http://www.agroviet.gov.vn/en/stories/TinTiengAnh/HybridRice.asp>

<sup>43</sup> Mahabub Hossain, Aldas Janaiah, and Muazzam Husain, "Hybrid Rice in Bangladesh: Farm-level Performance," *Economic and Political Weekly*, June 21, 2003: p.2518.

suitability for home consumption. Three-quarters of the farmers surveyed who tried eating the hybrid rice said that it was not suitable for their palate.<sup>44</sup> A more recent study, based on interviews with 25 farmers in three districts with experience cultivating hybrid rice paints a similar picture. These farmers complained of pest problems, the "technical" management practices required, high seed costs and poor eating quality. Overall, most of the farmers consulted felt manipulated by the promotional tactics of the seed dealers and few planned to plant hybrid rice seeds again. According to Mohammed Imamuddin, an agricultural extension officer from Noakhali who was interviewed for the study, "Although we talk about higher yields, hybrid rice has many problems. The price of seeds is very high, beyond the purchasing power of small farmers. It cannot be sold in the market and the government does not purchase it either."<sup>45</sup>

## Wrong solutions to the wrong problem

There's no mystery to the seed industry's interest in hybrid rice. Hybrid rice grains can't be replanted, so farmers have to buy seed every year. But this is hardly a justification for the involvement of governments and agencies like IRRI or the FAO that are supposed to be working in the interests of the poor and poor farmers in particular. Instead, they talk about how hybrid rice will increase yields and, therefore, feed more people, as if the complex problem of hunger can be reduced to the genetics of the rice plant. Techno-fixes for hunger like hybrid rice address the wrong problem: production, measured through a narrow prism of rice grain yields per hectare. The real problems are poverty and distribution. In the US, more than a quarter of the 160 billion kilos of edible food produced each year for human consumption is lost to waste by retailers, restaurants and consumers.<sup>46</sup> In India, where some 320 million people suffer from hunger, the country has a food surplus of 65 million tonnes.<sup>47</sup>

Hybrid rice only perpetuates and exacerbates poverty. It shifts control off the farm, to scientists and corporations, as it displaces local varieties and prevents farmer seed practices of saving, exchange and plant breeding that are the foundation of agricultural systems that serve the needs of rural communities. In China, state support for hybrid rice over the past few decades has helped fuel a 46-fold reduction in local rice varieties and undermined the sustainability of farms.<sup>48</sup> "The paddy field seems to have got addicted to heroin," said Li Qibo, a researcher with the Society of Hani Culture in Honghe Hani and Yi Prefecture in Yunnan. "The more rice output you want from it, the more chemicals you have to give it."<sup>49</sup> Similarly, if the Vietnamese government were really interested in supporting agriculture and food security in the North, it has better options rooted in local farming practices and realities. Instead of putting the bulk of its resources into the development of hybrid varieties that farmers cannot save, the government could have looked at supporting farmer seed selection,

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<sup>44</sup> Mahabub Hossain, Aldas Janaiah, and Muazzam Husain, "Hybrid Rice in Bangladesh: Farm-level Performance," *Economic and Political Weekly*, June 21, 2003: p.2518.

<sup>45</sup> UBINIG, "Undesired promotion of hybrid rice in Bangladesh", Dhaka, Bangladesh, forthcoming.

<sup>46</sup> Haider Rizve, "Food waste and hunger exist side by side", IPS, 28 September 2004.

<http://www.ipsnews.net/print.asp?idnews=25343>

<sup>47</sup> Devinder Sharma, "Food for Future: Trade, Biotechnology and Hunger," Talk delivered at an international conference on "Trade and Hunger" jointly organised by the National Farmers Union of Norway and the National Farmers and Smallholders Union, Norway, the Development Fund, and others at Oslo, Norway, 7-8 June 2004

<sup>48</sup> Pei Yanlong, W. Lianzheng, Gao Li Zhi, and Hong De Yuan, Source: Partap, T. and Sthapit, B. (eds), "What is Happening to the Diversity of Rice Genetic Resources in China", *Managing Agrobiodiversity - Farmers' Changing Perspectives and Institutional responses in the Hindu Kush-Himalayan Region*, 1998.

<sup>49</sup> "Challenges planted in the rice industry," China Daily, 29 October 2004:

[http://news.xinhuanet.com/english/2004-10/29/content\\_2152331.htm](http://news.xinhuanet.com/english/2004-10/29/content_2152331.htm)

saving and exchange practices, since these continue to be the main source of seeds for rice farmers in northern Vietnam.<sup>50</sup>

Hybrid rice will only make farmers more vulnerable to outside actors that can manipulate conditions to enhance their own profits. If it ever does increase production, these powerful actors will capture all of the benefits. Not that the consequences for small farmers have ever been at the forefront of research into hybrid rice. For China's "Father of Hybrid Rice", Yuan Longping, "The fewer peasants, the better. With so many peasants, the country won't be well-off . . . If I increase the unit output of rice dramatically, one part of rural labour will be liberated while ensuring the total output of grain. I hope that at least 50% of them can walk away from the field."<sup>51</sup>

The seed industry is not about to abandon its efforts to develop a hybrid rice seed market. APSA's Special Interest Group on Hybrid Rice recently declared India to be a hybrid rice "success story". This takes a bit of imagination! Wherever hybrid rice has been introduced in India, farmers have rejected it. Seed companies are forced to move from area to area looking for new markets where farmers have not had enough experience with hybrid rice to chase them away. But APSA points out that seed production yields in India are high (meaning they can produce seed for cheap) and, in India, they have "the freedom to commercialise the hybrids without any government testing [which] has helped many companies to come up with a large array of hybrids"—i.e. hybrids that otherwise wouldn't be allowed on the market!<sup>52</sup>

The seed industry's success is in developing a base of hybrid varieties that they can use to launch their genetically modified (GM) varieties. Hybrid rice actually serves as a justification for GM. Conventional breeding practices are more difficult with hybrid rice, making it more difficult to breed for qualities like disease or pest resistance. Hybrid rice is thus susceptible to several diseases and efforts are now underway to develop hybrid varieties genetically engineered for resistance to bacterial leaf blight and rice stem borers.<sup>53</sup> Hybrid rice scientists also say that they need GM in order to meet their much-hyped yield targets for "super rice". One techno-fix becomes the justification for another, and each time farmers have to shoulder the costs and consequences.

Hybrid rice is also likely to be a major source of GM contamination. The institutions working on hybrid rice, whether IRRI or Monsanto or the Hunan Hybrid Rice Research Centre, are also experimenting with GM hybrid rice, most likely in the same fields or laboratories where they work with conventional varieties. The risk of contamination is therefore already present and concerns the entire region, because these institutions regularly send hybrid seeds and parental lines across borders.

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<sup>50</sup> Le Thu Anh and Elise Pinners, "Good Seed From The Informal Rice Seed Sector: A study on the local rice seed sector in northern Vietnam," VECO Vietnam, January 2003 : [http://www.mekonginfo.org/mrc\\_en/doclib.nsf/0/099867EE67C8D79B47256CE0002CAB35/\\$FILE/FULLTEXT.html](http://www.mekonginfo.org/mrc_en/doclib.nsf/0/099867EE67C8D79B47256CE0002CAB35/$FILE/FULLTEXT.html)

<sup>51</sup> Huang Yikun Loudan, "Yuan Longping Harvest Again," Economic Observer: <http://www.eobserver.com.cn/english/readnews.asp?ID=55>

<sup>52</sup> Minutes of the meeting of the Asia Pacific Seed Association's Special Interest Group on Hybrid Rice, 19 November 2003, Bangkok.

<sup>53</sup> Swapan Datta, "First IRRI-PhilRice Field Evaluation of Transgenic Rice Held at Muñoz, Philippines", IRRI Bulletin, 12 September 2002; Wenxue Zhai, "National Transgenic Plant Program in China is supporting the development of GM hybrid rice modified with Xa 21 transgenic material": <http://www.genetics.ac.cn/xywz/Faculty/ZhaiWenxue.htm>

## Conclusion

Resistance to hybrid rice is progressively building in Asia. From militant landless peasants to moderate farmers testing and advocating ecological and sustainable agriculture, people are organising to increase public awareness, share information, strategise actions, and continue developing farmers' alternatives. They've seen hybrid rice fail in their fields or those of their neighbours and they don't buy the government propaganda that says hybrid rice will trigger rice self-sufficiency and reduce incidence of hunger and poverty. For them hybrid rice merely displaces productive farmers' varieties and sustainable farm practices that serve as bases of food security and sovereignty.

Yet, despite the failure of hybrid rice to improve conditions for the vast majority of farmers, many of them continue to be lured into producing hybrid rice through government programmes and subsidies or micro-credit schemes. Awareness is therefore critical. There is a need for more national and regional sharing of experiences combined with clear positions on hybrid rice. Hybrid rice is an expensive technology that undermines local efforts at food security and sustainable agriculture. It serves the interests of big business, not small farmers, and will provide transnational seed companies with an entry point for their GM rice. Government support for hybrid rice must therefore be denounced as an effort to facilitate corporate control of the rice seed supply and production systems and an attack on small farmers. Public resources would be much better spent addressing the structural problems affecting agriculture in Asia, looking for political solutions rather than technical ones, and pursuing policy reforms that create space for farmers to strengthen their alternatives, instead of going big and quick along the path of GM rice and corporate control.