



June 2008 Vol. 9 No. 1

AGROLINKS



THE RACE TO GROW MORE FOOD

USING AGRICULTURE TECHNOLOGY
TO MAKE A DIFFERENCE

FIXING ASIA'S RICE BOWL
THE NEED FOR LONG-TERM
SOLUTIONS

JATROPHA: A WONDROUS WEED
TRANSFORMING INDIA'S WASTELANDS
INTO BIOFUEL RESERVES



AGROLINKS

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AN AGRICULTURE REVIVAL

When I visited the Philippines recently, I met with a corn farmer who was keen to grow more corn to take advantage of rising global prices. Instead of sticking to status quo and relying on traditional farming methods, he spent time gathering information on how he could work better. Eventually, he switched to insecticide-treated seeds, which protected his crops in the early weeks of growth. The result: higher crop yields and a better income.

The agriculture landscape is evolving rapidly amid a global food shortage sparked by a confluence of factors: surging demand from developing nations, poor weather, loss of arable land to urbanization, growing demand for feedstock, crop losses from pest attacks and speculation in the commodities markets.

The industry has also become more complex, being intertwined with energy needs as farmers increasingly switch to growing crops for biofuels. To be sure, global agricultural production must increase significantly in order to meet soaring demand.

Solving the food crisis requires investment in agricultural research and the use of agricultural solutions such as better seeds, pest control and other biotechnological innovations to increase yields.

This edition of Agrolinks will delve into these issues, plus a look at the latest news on biofuels in India, the global rice shortage, no-till technology and developments in biotechnology.

Enjoy!

Caren Wiegemann
Chair, Communications Project Team
CropLife Asia






FEEDING THE WORLD

The global food shortage has turned the spotlight on agriculture technology, seen by experts as key to solving the crisis.

By Jeremy Slater





For three generations, Zeng Zhihui's family has planted vegetables and grain for a livelihood in China's Guangdong province. Yet, like many in China, he worries if China will have enough food to feed itself in the years to come. Never mind that the government assured citizens in May that the world's fastest growing economy has ample grain reserves – 250 million tons, or half of annual consumption – more than what the Food and Agriculture Organization of the United Nations regards as a safe minimum for global stocks.

The loss of arable land in China to urbanization, a fast expanding population and rising affluence have made the issue of self-sufficiency a pressing one. To add to the problem, farmers are increasingly abandoning the trade for more lucrative city jobs.

Even Zeng, who is married with two children, says he has no wish to see them become farmers. "I don't want them to follow in my footsteps – farmers have low social status. Now, I'm just about making ends meet."

While Zeng says he will continue farming due to a lack of opportunities, scores of farmers elsewhere in China are making alternative plans. The federal government has been struggling since March to sweeten the deal for farmers with tax exemptions and subsidies. Still, this is not enough to compensate farmers for high fertilizer and other input costs. According to local news reports, Chongqing's municipal government earlier this year unveiled plans to prevent farmers, who were fed up from making losses, from abandoning their land. Yet many farmers say they plan to throw in the towel after the harvest later this year.

China is not alone in its fight to feed its population. The world is grappling with a food shortage at a time when demand from developing economic giants such as India and China is rising. Bad weather, urbanization, biofuel crops, rising demand for feedstock, crop losses from pest attacks and speculation in the commodities markets have contributed to the food crisis.

Experts say that agriculture technology is crucial in providing long-term solutions to the food crisis. New farming techniques and crop varieties will encourage bigger and better harvests. They will go a long way to solving the problem of a growing population, rising demand and the increasing need for fuel and fiber. However, turning new technology into options that small-holder farmers can use still needs the political will of governments globally.

FEEDING MORE PEOPLE FROM THE SAME LAND

Thanks to modern intensive agriculture using plant science:

- Production of world food calories has doubled since 1960;



- Output of resource-intensive foods such as cooking oils and meats has tripled; and



- Food supplies in the developing world have increased by 25 percent.



And all this was achieved by maintaining a stable area of agricultural land since 1950, despite a population growth from 2.5 to 5.5 billion.



The Price of Complacency

Over the past 20 years, under-investment in agricultural research, infrastructure and irrigation by governments when food was plentiful has contributed to the current food crisis. As has a failure to do more to facilitate market access for farmers.

The trouble is, it would take some time to reverse the situation created by years of neglect. However, the time to bring about the change is now, experts say.



“The issue of feeding the world has been a slumbering giant for almost a generation,” says Keith Jones, head of stewardship and sustainable agriculture at CropLife International. “But food security and the essential role agriculture plays in supporting rural livelihoods are now being taken very seriously. Frankly it is about time.”

United Nation (UN) Secretary-General Ban Ki-Moon said in a recent interview with the British Broadcasting Corporation that the UN World Food Programme and other programs may be forced to ration food aid because of the rising global demand for food.

He added that these threatened shortages could be eased by a “green revolution” in farming technologies that could help transform farming methods in Africa and other developing parts of the world. “There was a broad consensus that more resources should be provided to help an African green revolution,” Ban said. The President of the World Bank, Robert Zoellick, who said the Bank must help and “offer access to technology and science to boost yields”, also highlighted the need for a green revolution in a recent speech.

“We have to ensure that small-holder farmers have proper access to land and water resources and essential inputs such as seeds and fertilizers,” said Jacques Diouf, Director-General of the Food and Agriculture Organization. “This will enable them to increase their supply response to higher prices, boosting their incomes, improving their livelihoods, and ultimately benefiting consumers as well.”

The Biotechnology Option

To be sure, biotechnology provides the key to crops that are pest-resistant, drought-resistant and that generally grow better under adverse conditions. Commonly known as genetically modified (GM) crops, they are mired in controversy. While scientists say GM crops are an important component

to solving the food crisis, environmentalists argue that they could harm human health and cross-contaminate other plant species.

Still, consider Bt corn, which has made a positive difference on many small farms in Asia. Bt corn is planted on about 49,000 acres of land in the Philippines. The government approved the commercial planting of the crop as a way "to help the poor of our country", according to the Philippines Secretary of Agriculture. The crop provides 41 percent to 60 percent higher yields, increases net income by about 34 percent and makes both food and feed safer by minimizing insect damage.

"The plant science industry is also developing new types of crops that are drought and salt tolerant," says CropLife International's Jones. "The clever management of these technologies can allow us to grow on different terrains, allowing more traditional crops to be grown in more traditional areas of agricultural production.

"This would enable us to grow the type of crops mentioned above on degraded land where very little is grown or if it is the yields are very poor at the moment," he adds. "Future possibilities also include varieties that utilize nutrients more efficiently, thereby easing fertilizer demand."

Improving Yields

Says Jones, "The use of modern crop protection techniques is essential to reduce the damage caused to crops and therefore give us more food to satisfy increasing demand."

Case in point: In Egypt, rice yields are 10 tons per hectare while yields in Bangladesh, where modern technology is lacking, yields are three to four tons per hectare. Jones notes that by improving agriculture production in poor countries such as Bangladesh, problems of social unrest could be eliminated as rural incomes and livelihoods improve.

The Asian Development Bank (ADB) said in a recent report that Asia must harness technology and build infrastructure for the

efficient use of water, power and other key inputs to raise crop yields. ADB noted that poor yields are the result of many factors including poor crop management skills, the use of cheap seeds, poor post-harvest technology, poor infrastructure and inadequate funding for research and development.

Indeed, if yields in major Asian producing countries could be raised to the world average, global output of wheat could jump by 17 percent and rice by 23 percent, the report said.

Overcoming Political Inertia

"Governments have a role to play not only in improving transport links, but in creating the right policy climate to allow farmers access to inputs and more markets, and encouraging the use of credit facilities to allow farmers to find the investment they need," Jones says.

Indeed, market access, investment in agriculture technology and no farm subsidies are effective means in promoting sustainability and increasing production in the long run, says agricultural economist Professor Mad Nasir Shamsudin at Universiti Putra Malaysia.

These subsidies, widely used by governments in developing countries and the developed world, distort prices. In addition, they are often ineffective in raising farmers' productivity, he says.



"I would rather governments channel funds into investments in agriculture technology as that would yield long-term benefits to farmers in terms of productivity and income," Shamsudin notes.

Jeremy Slater is a staff writer at CropLife International



T IN ASIA'S

It's time to

From public anger over rice shortages in the Philippines to panic buying in developed countries such as Singapore and the USA, there are grim warnings that unless governments act to revitalize the agricultural industry, social unrest could become a serious problem.

Economists and researchers see the current food shortages as a wake-up call for governments to do more to fine-tune agriculture policies on rice, a staple in Asia. They include increasing investment in infrastructure, improving irrigation systems, getting farmers to plant higher-yield seeds and growing genetically modified crops. Efforts should also include educating farmers on pest management, reducing post-harvest losses and improving food safety.

While global rice prices rose throughout 2007, it was in the first quarter of 2008 that prices tripled to above US\$1,000 per ton as a confluence of factors – strong demand, speculative trading, bad weather and years of falling yields – took its toll. Earlier this year, major exporting countries such as Vietnam and India unveiled export restrictions to protect domestic consumers, causing prices to spiral further.

Global production of milled rice in the fiscal year ending 2009 is forecast at a record 432 million tons, some 1 percent up from fiscal 2008. However, average yields are expected to be stagnant. This is not good news. According to the International Rice Research Institute (IRRI), global average rice yields must rise by at least 0.5 tons per hectare over the next 10 years, about 12 percent above current levels, to meet increased demand.

Home to the world's top three exporters: Thailand, Vietnam and India, Asia's rice industry suffers from inefficiencies, the loss of arable land to urbanization, a lack of investment in agriculture technology and political inertia. While these factors were overlooked when rice was plentiful, governments, consumers and farmers are now feeling the pain.

In India, experts say there is no shortage despite the government's ban on non-basmati rice exports earlier this year to quell inflation. India's harvest in 2009 is forecast to increase marginally to 96 million tons. In Vietnam, pest

THE CRACKS RICE BOWL

DEALING WITH RICE BUGS

Paul Teng, agricultural scientist and author of *BioScience Entrepreneurship in Asia*, speaks with Agrolinks about



the importance of integrated pest management in helping rice farmers raise yields. Teng is also the Dean of Graduate Programmes and Research at Singapore's National Institute of Education and a partner in Asia BioBusiness. In February, he visited rice plantations in South Vietnam's Can Tho province in the Mekong Delta with Pham Van Du, Deputy Director-General of Crops at Vietnam's Ministry of Agriculture and Rural Development.

"At Can Tho province, we visited a rice farmer whose entire crop had recently been destroyed by plant hoppers. Despite soaring global prices, the farmer was convinced he could no longer make a decent living from planting rice. Instead, he plans to support his wife and three children by starting a fishery. This he would do from a bank loan. He says he expects profits from breeding Tilapia or catfish to be tenfold more than growing rice."

What this shows is the importance of pest control. Many rice farmers in Asia don't know how to use pesticides the right way. Generating awareness among farmers is crucial. When used safely, pesticides go a long way in protecting crops and helping farmers be more productive."

rethink ways to raise crop yields – fast.

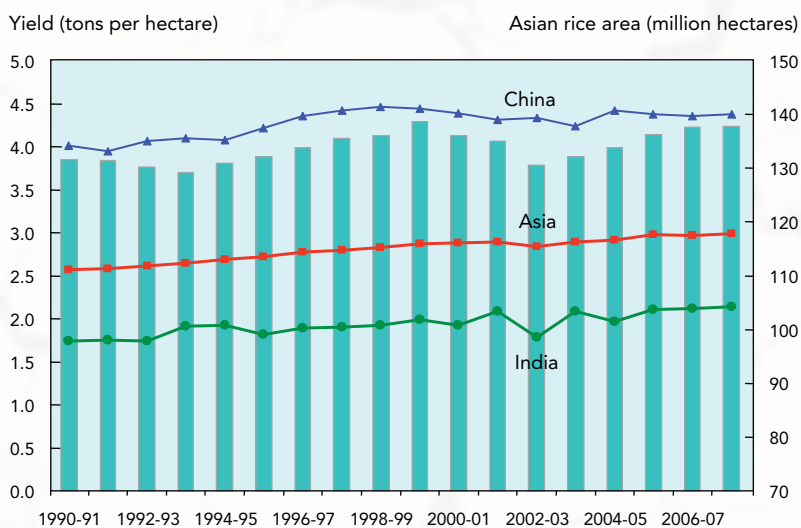
By George Fuller

infestation destroyed significant amounts of this year's rice crop (see box story). Coupled with inflation at more than 20 percent, the government crimped rice exports earlier this year to protect domestic consumers.

In Asia, average yield growth of rice fell from 2.1 percent annually between 1970 and 1990, to 1.4 percent in 1990 to 2005. Globally, yields have risen by less than 1 percent annually in recent years, says IRRI. The world's top three exporters, together with the USA, Pakistan and China, account for more than 85 percent of global rice exports.

Experts say the key cause for the drop in rice yields is complacency. The Green Revolution in the 1960s saw crop yields multiplying, ensuring adequate supplies over the next 40 years to meet an expanding global population. The initiative was so successful that a steady decline in rice prices in the 1990s led many governments to believe that food supplies would stay ample. IRRI studies showed that public spending on agricultural research in Asia rose an average of 3.9 percent per year during the 1990s, compared with 4.3 percent annually in the 1980s.

Trends in rice area (columns) and yield (lines) in Asia, 1990-2007



Source of basic data: USDA, 1990-2007

But with corruption rife in many Asian countries, the rice industry has taken a beating. Case in point is the Philippines, the world's number one rice importer. As rice prices soared, the country has been plagued by violence as consumers took to the streets to protest against rocketing prices.

In May, Rolando Dy, economist and executive director of the food division at Manila's University of Asia and the Pacific said the rice crisis in the country was the result of bad government policies and not a commodity shortage. He blamed graft and corruption as well as under-investment in agricultural research and infrastructure for the country's social unrest, sparked by high rice prices.

All this happened despite President Gloria Arroyo's move in April declaring a 43.7 billion peso (\$1 billion) initiative to steer the country towards self-sufficiency in food. The measures included funding for farmers to buy higher-yield hybrid seeds, subsidies on fertilizers, bank loans as well as improving infrastructure and irrigation.

Indeed, hybrid seeds have been touted as an effective way to increase rice yields, as has been the case in China. Hybrid rice strains yield 15 to 20 percent more than conventional seeds and cost anywhere from double to fivefold more per kilo, depending on the size of government subsidies, experts say.

Since the 1970s, China, the world's fastest growing economy, has enjoyed success in its foray into hybrid rice, a move by the government to ensure food security. Hybrid rice makes up an estimated 65 percent of the country's total rice production. Countries such as Malaysia have said they are keen to start planting hybrid rice in a move to be self-sufficient.

With demand for rice in China rising amid a diminishing supply of arable land, private Chinese companies recently unveiled plans to invest in farm projects in Africa. The government has said it is not a public initiative, reiterating that the problem of food security should be solved at home. The problem is, despite incentives and government subsidies, rice farmers in China are disenchanted. A recent media report found that rice farmers are making losses despite soaring global prices, mostly due to high fertilizer costs. In addition, bureaucratic bottlenecks in some provinces mean that government incentives and subsidies may not always reach the farmers.

In Thailand, the government has in place an intervention policy of buying rice from farmers after the main harvest. However, most farmers these days prefer to sell their paddy directly to traders and millers to get higher prices, according to a report by the US Office of Agricultural Affairs in Bangkok. Amid soaring rice prices, opportunities for farmers in the world's largest rice exporting country are bright. Bangkok-based US Department of Agriculture counsellor Gary Meyer says farmer incomes have grown, allowing them

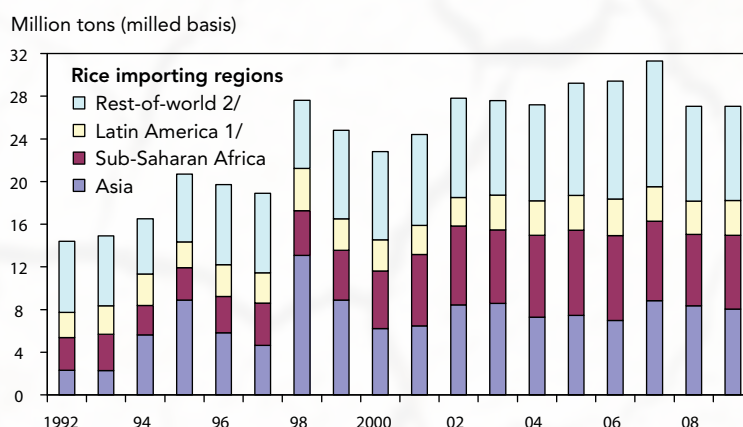
to apply better technology, buy fertilizers and seeds as well as increasing their credit worthiness.

While scale economies in Asia's rice farming have improved significantly over the last 10 years, they are nowhere near that of developed economies such as in the USA and Australia, notes Paul Teng, who spent 12 years at the IRRI as a program leader for cross ecological systems research. In Vietnam, the grouping of thousands of families to farm in estates has eliminated many of the inefficiencies of small-holder farming in the last decade.

To be sure, the world will grapple with high rice prices for at least the next two years, as demand is expected to be firm while global stocks run low and export restrictions prevail, experts say. Raising production to meet increasing demand requires governments to act decisively now. Fancier seeds are only part of the strategy to ensure adequate supplies going forward. Proper crop management practices, including pest control, irrigation and fertilizers, are essential to raising yields.

George Fuller is the Executive Director of CropLife Asia.

Global rice trade in 2008 is projected to decline 14 percent; unchanged in 2009



2008 and 2009 are forecasts. 1/ Mexico, Central America, the Caribbean, and South America. 2/ includes imports not assigned a specific country.
Source: Production, Supply, and Distribution data base, Foreign Agricultural Service, USDA, <http://www.fas.usda.gov/psd>.



India bets on **JATROPHA**

The global race to grow crops for biofuels has sparked controversy amid food shortages. In India, the focus is on growing jatropha, a hardy plant that thrives on poor soil. The aim: achieving energy security while ensuring that jatropha plantings don't compete with food crops. But are Indian farmers joining the fray?

By Cheek Soh Hui

On the great swathes of infertile land that pervade much of India, farming entrepreneur Murali Krishna Karanam is working hard at studying what makes jatropha tick. The plant is known to survive in poor soil, requires little water and grows just about anywhere from deserts to rock piles. But Karanam, director of Karanam Green Fuel, believes there is so much potential in jatropha as a biofuel crop that he's devoting much of this time to researching the feeding and irrigation needs of the plant. His aim is to globalize India's jatropha industry: the problem is, not enough farmers know much about the crop, he says.

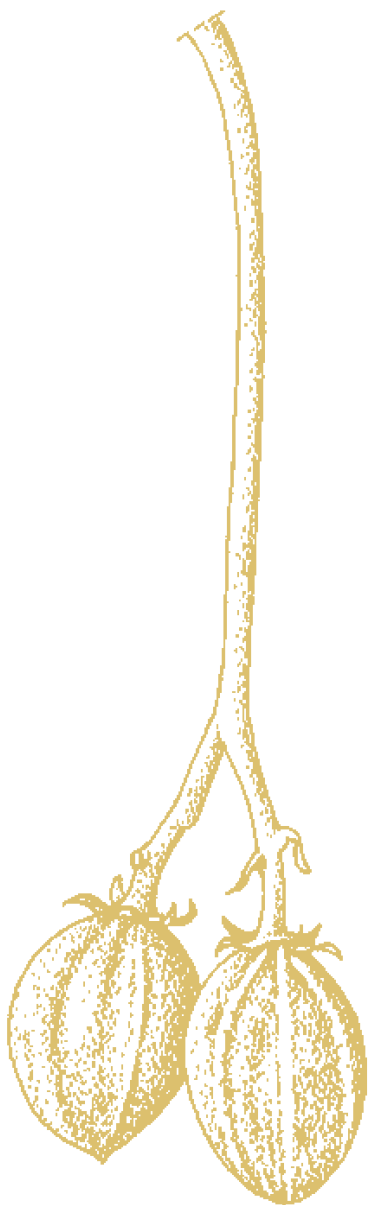
The Indian government unveiled plans in 2003 to promote jatropha in a big way to cut the country's dependence on imported oil. However, things are not rosy amid global food shortages, says Karanam, who is also an associate at The Energy and Resources Institute (TERI), a non-profit research group. He says more must be done to raise awareness of the potential of jatropha among rural farmers.

"In India, jatropha does not have a history as a commercial crop," he says. "While people in the towns know quite a bit about the potential of jatropha for the production of biodiesel, not the same can be said for farmers in the rural areas."

And now that the world is gripped by food shortages, Karanam says he believes the government will be increasingly hesitant about promoting jatropha as a biofuel crop. While the plant thrives in arid conditions and poor soil, there is concern that soaring oil prices could drive farmers to eventually substitute food crops grown on arable land for jatropha. This could spark unrest and other social problems if India were indeed struck by an acute commodity shortage or escalating food prices.

In 2003, the Indian government announced plans to blend diesel with a planned 13 million tons of biodiesel, produced largely by jatropha, by 2013.

One way to circumvent these government concerns would be to encourage farmers with at least 2.5 hectares of land to concurrently grow jatropha and sweet sorghum, which provides biofuel, food and livestock feed. Like jatropha, the sweet sorghum plant thrives in arid conditions and requires little irrigation, Karanam says.



"That way, you address both the food and biofuel issues," he says. "I see that as boosting jatropha over the long term. In India, companies and scientists are working together to conduct trials on the viability of pairing these crops on about 100 hectares of land in India."

Studies have shown that sweet sorghum in India costs \$1.74 to produce a gallon of ethanol, compared with \$2.19 for sugarcane and \$2.12 for corn.

With an estimated 17 million hectares of wasteland in the country, jatropha holds great promise. Companies such as BP, D1 Oils of the United Kingdom, Reliance and Daimler Chrysler have joined the fray. BP, which has an equal joint venture with D1 Oils, said in 2007 that the group would invest \$160 million over the next five years, with the latter contributing jatropha seedlings and 172,000 hectares of existing plantations in India, Southern Africa and Southeast Asia. Investments will be made through directly managed plantations on owned or leased land, which will also provide employment for local communities, and through contract farming and seed purchase agreements.

And Reliance has not only unveiled a tie-up with a bank to provide financing for farmers. Its life sciences unit is also developing higher-yield transgenic varieties through investment in research and development (R&D).

"Currently, not many farmers are aware of how they can benefit from planting jatropha but I see that changing in the near future as companies work at attracting farmers to plant the crop. What would work for farmers are access to technology, finance and seed buyback arrangements," says Karanam, who owns 50 hectares of jatropha plantation in Andhra Pradesh's Turlapadu village.

While the private sector is stepping up R&D efforts, government

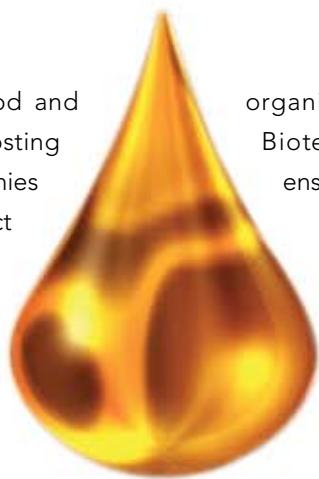
organizations such as India's Department of Biotechnology (DBT) are doing likewise in a bid to ensure sustainability for the jatropha initiative.

"Continuous R&D is very important for any policy program for biofuels," says Renu Swarup, DBT's Adviser. "Jatropha is a weed and not much systematic scientific research has been done on the crop. What we are doing is looking at the selection and characterization of superior quality from across the country as well as developing hybrids," she says.

For smallholders in India, the cost of production and maintenance of jatropha is insignificant given the low cost of labor. A ton of jatropha seeds cost 6,000 to 7,000 rupees. After the third year of plantation, a farmer owning an acre of jatropha plantation, or 1,000 plants, is expected to produce 450 kiloliters of oil, earning between 7,000 and 10,000 rupees a year, says Karanam. This is more than the average earnings of 5,000 rupees of farmers growing other crops, he adds. "What we want to do is to generate awareness of the potential of jatropha among smallholders who have at least 10 acres, not those with just one to two acres," he explains. "Only farmers with sufficient land can afford to wait out the first two years before enjoying earnings from jatropha."

Jatropha currently covers an estimated 2 million hectares of wasteland in India, with states such as Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Orissa and Chatisgad being prime growing areas because of arid weather and ample supplies of sandy soil. Plantings grew an estimated 50 percent year-on-year in 2007 and are expected to double in the next five years, experts say.

Cheok Soh Hui is the Communications Manager at CropLife Asia



MORE THAN A WEED



Renu Swarup, Adviser at India's Department of Biotechnology (DBT), speaks with Sajiv Anand, Director of the All India Biotechnology Association, on the latest research and development efforts on jatropha.

Q. What is the status of R&D undertaken by the Department of Agriculture with regard to biofuel crops such as jatropha?

We are looking at the selection and characterization of the superior quality material from across the country. We have not only looked at this material from the viewpoint of high oil content and yield, but also at characterization. We are now doing chemical characterization for oil content and quality plus molecular characterization that will enable us to "fingerprint" plants that are found to be desirable based on the criteria that we have identified.

Q. What are the challenges in utilizing jatropha for biofuel production in a developing country like India? What steps have DBT taken to overcome these challenges?

There has been no scientific study done on jatropha. As it has traditionally been seen as a weed, there was no systematic breeding program. We have now started a program on the breeding of jatropha where we are looking at bringing out varieties under the Indian Council for Agricultural Research (ICAR) system. They have now brought out one variety of jatropha.

Q. What is DBT's strategy on biofuels and how do you view the draft national biofuel policy from DBT's perspective? What should be the salient features of such a policy?

DBT's strategy, in the first place, is that we are not looking at any food crops. However, that's not only a DBT strategy but also a Government of India policy. The other strategy is that DBT is looking at all bioenergy aspects for renewable energy from biomass and one aspect of this is biofuel.

The draft national biofuel policy is being prepared by the government and DBT has been a party to it. We have been sending our comments and the policy is, in fact, very good. There is emphasis on R&D and this is what DBT has been emphasizing: that we cannot take up a large-scale biofuel program until and unless we have a very strong research component along with it. For jatropha, we have not stopped at accession. We have gone into the genetic modification of jatropha to try and see if we can actually have an improved oil content within the plant variety. This means looking at the metabolic pathway synthesis to actually improve the quality.

Q. What are the other non-crop projects and technologies supported by DBT to address biofuel development in India? Can renewable fuels meet energy demands in an energy-starved developing country like India?

For non-crop technologies, we are basically looking at the development of ethanol through lignocellulosic waste materials. We are also looking at various wastes and we are still working out the technologies that are at the pilot stage. So, we do not have any one waste that we are targeting. In fact, we are launching a major program to screen some of the grass in our country. We have a huge diversity of grasses and some of the grasses have potential as raw material for ethanol development. We can also have biodiesel and other biofuel production from algae.

On renewable energies, yes, definitely we have a lot of potential because there is so much biomass in our country. But, we have not been able to actually tap biomass energy at all. If the whole issue is studied in a holistic manner, there is a lot of potential with all these technologies that we are talking about.



SEEDS OF HOPE

Innovations in biotechnology bring a host of benefits to farmers and consumers, from raising yields to consumer-centric perks like zero trans fat.

By George Fuller

At Rosalie Ellasus' 10-hectare farm in the Philippines' San Jacinto town in Pangasinan province, northern Luzon, scores of workers used to toil for days just to pluck weeds from the cornfields. The 48-year-old farmer also grappled with pests that ravaged her harvests. After switching to genetically modified (GM) corn seeds in 2002, yields more than doubled. With conventional seeds, yields were an average of 4 tons per hectare, Ellasus says. With Bt corn, it was about 7.6 tons, and with stacked trait seeds that made the corn both insect and weed resistant, yields climbed to 9.2 tons. Using GM seeds has also meant that her fields didn't need as much plowing as before, a move that has helped to cut costs and preserve soil nutrients.

"It's logical for farmers to want to grow better crops, cut costs and be freed up for other tasks," she says. "I learned the modern way of farming and there's no turning back for me."

Technology will "bring about an important improvement in agricultural productivity and competitiveness," noted Adolfo Brizzi, World Bank Sector Manager for Agriculture and Rural Development for South Asia, in an April policy report.

Part of that technology is GM crops, which many scientists argue is an option for farmers who need healthier crops. Although it has been more than 50 years since scientists first broke the DNA puzzle, opponents warn

that not enough is known about gene functions. They say the long-term impact of GM crops on the environment and human health cannot be reliably predicted. Other scientists point out that GM crops are safe, having been planted globally in the past 12 years.

Nobel Peace Prize winner and agricultural scientist Norman Borlaug recently said current GM crop varieties help to control insects and weeds and are lowering production costs and increasing harvests. Future GM products are likely to carry traits that will improve nutrition and health, help guard against drought, heat and cold. They also allow plants to utilize plant nutrients more efficiently. Indeed, these agricultural innovations "have more benefits to offer society, and especially poor farmers and consumers".

These improved crops will help farmers maintain high productivity with less inputs of land, water, fuel and nitrogen fertilizer, says Harvey Glick, Senior Director of Scientific Affairs at Monsanto, Singapore. He adds that while it is difficult to predict launch plans given the uncertainties of the regulatory approval process in each country, the first of these products will likely be available to farmers within the next five years. "They will start in countries that have an efficient, science-based regulatory approval process and an innovative agricultural sector," he says.

George Fuller is the Executive Director of CropLife Asia

ENHANCING FOOD SECURITY IN DEVELOPING COUNTRIES

"People in developing countries spend a larger proportion of their income on food than those in the developed world. Hence, food security is a major issue in the Philippines. We're focusing on growing food that delivers benefits to farmers and consumers. Plants that are resistant to drought and pests are important to farmers because they help increase yields. Consumers could also benefit from plants that have no trans fat, for instance. One important project we're working on is the genetically modified papaya project, which started in 1997. We're targeting fruit that is resistant to the papaya ringspot virus, plus being capable of delayed ripening. We should be testing it in many locations within the Philippines by 2010 and hopefully, the fruit should be available commercially by 2014. Going forward, what I'd like to see is for biotechnology to be better understood and accepted by the general public. Concerns should be addressed through continuous education so that there is greater awareness of the science behind GM crops and the health benefits they bring."

Antonio Laurena, Research Professor at the Institute of Plant Breeding, University of the Philippines, Los Baños





REAPING THE BENEFITS OF NO-TILL FARMING

Increasing crop yields is a priority amid global food shortages. While several factors impact yields, soil conservation through no-till techniques has been found to have a positive impact.

*Bangkok-based **Samran Sombatpanit**, former president of the World Association of Soil and Water Conservation, speaks with Agrolinks on the latest developments in no-till technology and its role in modern agriculture.*

By Cheek Soh Hui



“ Recent studies focusing on South America show that crop yields from no-till plots are almost as high or about the same as conventional farming with tillage. With greater use of precision agriculture, like in Japan and Taiwan, it is possible to increase yields from no-till plots. This is taking into consideration the many advantages of the technology, especially in reducing consumption of fossil fuel and decreased soil erosion.

Currently, countries such as India and Laos are the leaders in no-till technology. There are companies in India that produce equipment such as no-till seeders. They have been available commercially for some time. In addition to these countries, others like China and Kazakhstan are increasingly turning to no-till farming. As oil reserves run low going forward, I expect to see more and more farmers taking to no-till technology.

There are many advantages to no-till farming. It is economical: because farmers use their machinery less, consumption of fuel is reduced. There is less soil erosion and better soil biodiversity. Vital soil components

such as earthworms and microbes remain undisturbed. There is also less need to open up more land to grow crops because no-till cropping will improve the fertility of the soil, increasing yields over time.

On the other hand, no-till cropping may mean farmers have to use more herbicides. This may cause pollution in streams. Thus, research in the field of herbicide application in no-till farming is imperative. People who oppose no-till farming are usually concerned with the amount of herbicide used and lower yields from inexperienced farmers. This can be problematic and should be solved soon if we want to encourage the successful extension of no-till farming.

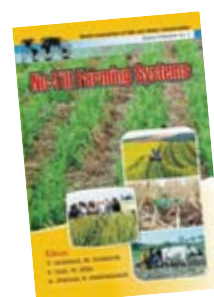
While some people may find the need to use herbicides in no-till farming objectionable, my view is that farmers can be trained to use herbicides safely and in an environmentally friendly way.

Turning to Thailand. We are the world's largest rice exporter, but is no-till farming possible in lowland paddy fields? Yes, it is, but the process might be somewhat more complicated than for upland crops due to different water

regimes. Therefore more research is needed. However, in Thailand, the government initiative to generate awareness among farmers in this particular technique is not yet forthcoming. I have started talking to government officials on this issue and my hope is for farmers to have more hands-on opportunities on no-till techniques soon.

Going forward, soaring oil prices will likely compel farmers to turn to methods such as no-till to cut costs and conserve energy. It is important for governments to support research and extension services to acquire many benefits from this technology. Commitment from both the farmers and government must be strong for no-till farming to take off. ”

Cheek Soh Hui is the Communications Manager at CropLife Asia



No-Till Farming Systems features case studies from 20 countries all over the world. Email: sombatpanit@yahoo.com for more information.

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