



Monthly Bulletin
on Genetic Engineering
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National News

1. 1. Response to the FAO: 'How to Feed the World in 2050'

Aruna Rodrigues

In 1943 Sir Albert Howard, (Formerly Director of the Institute of Plant Industry, Indore, and Agricultural Adviser to States in Central India and Rajputana), considered to be the grandfather of the modern organic farming movement, published 'An Agricultural Testament', which was based on his years of patient observations of traditional farming in India. "Instead of breaking up the subject into fragments, and studying agriculture in piece meal fashion by the analytical method of science, appropriate only to the discovery of new facts, we must adopt a synthetic approach and look at the wheel of life as one great subject and not as if it were a patchwork of unrelated things."

Almost 70 years later, with the advent and adoption of GM crops succeeding the mislabeled 'Green Revolution', these words have returned to haunt us. "Today, as a consequence of technologies introduced by the green revolution, India loses six billion tons of topsoil every year. Ten million hectares of India's irrigated land is now waterlogged and saline. Pesticide poisoning has caused epidemics of cancers. Water tables are falling by twenty feet every year. The soil fertility and water resources that had been carefully managed for generations in the Punjab were wasted in a few short years of industrial abuses. If India's masses have avoided starvation, they have endured chronic and debilitating hunger and poverty". India exports food, but 200 million of mainly rural, women and children go to bed hungry (Global Hunger Index). The ongoing commercialisation of agriculture in India continues, with the US extracting many

pounds of flesh through trade agreements like the Indo-US Knowledge Initiative in Agriculture and US AID and USDA investments in agricultural universities to bring Indian agriculture under the full sway of genetically modified crops controlled by Monsanto, the 90% market leader. Monsanto is also on the Board of this 'Initiative' representing US interests, along with other agri-giants.

Global hunger, already at an unprecedented level, is growing. Those who are the most hungry are the farmers who produce our food. The causes are mainly manmade, attributable squarely to the free trade policies championed by the WTO, and backed by the IMF and the World Bank and maneuvered through the chicanery of these processes to the detriment of the developing nations. The FAO contributes to this through its ambivalent stance, refusing to provide the kind of clarity that would encourage real solutions to the crises. Developing Countries have been forced to open up their markets to western agri-business giants and face a price war on cotton for example in India, because of huge US subsidies provided to American farmers exporting mainly GM cotton to India. We have the astonishing spectacle of poor Indian farmers not being able to compete with US farmers and they are committing suicide. It is called 'competitive advantage', which essentially means the Indian government is not able to protect our markets under the WTO policies, doesn't feel obliged to provide the right level of support prices and/or just can't compete with the magnitude of US government handouts to their farmers. Indian farmers are also GM cotton farmers facing higher input costs and of course, without the competitive advantage of their American counterparts. They also seem to have lost or have been deprived of the "more sophisticated agricultural wisdom that has served Indian farmers for centuries" (Latham), (emphasis mine)

Corporations now own 98 per cent of patents in agriculture, own seed monopolies, and are extending their control of genetic stock (plant and livestock).² Unless this trend is reversed, whole communities and countries will lose control over the production of their food and national food security. Fortunately, strongly echoing Sir Albert Howard, we have a new 'avatar' of him in the collective effort of 400 scientists, to champion our cause of how to produce enough to food to feed the world over the next 50 years.

The IAASTD: The UN International Assessment of Agricultural Science & Technology for Development sees no role for GM crops or Modern Biotechnology, in a road map for agriculture for the next 50 years. Authored by 400 and scientists and signed by 60 countries, including India, it took four years to complete. In its published conclusions in 2008, it states that there is no evidence that GM crops increase yield. Some biotech companies were so disgruntled by the report's lack of support that they pulled out of the entire process. The IAASTD makes it clear that the road map for agriculture for the next 50 years must be through localised solutions, combining scientific research with traditional knowledge in partnership with farmers and consumers. The Report calls for a systematic redirection of investment, funding, research and policy focus toward these alternative technologies and the needs of small-farmers. Therefore, the IAASTD has clearly shown the international response to the WAY FORWARD which is sustainable agriculture that is biodiversity-based.

In his widely referenced report, 'Organic Agriculture is the Future', Doug Gurian-Sherman¹ shows that organic farming systems round the world are often as productive as current industrial agriculture not only in developed countries, but more

so in the developing world; that green and animal manures employed in organic agriculture can produce "enough fixed nitrogen to support high crop yields".

"These highly productive methods are needed to produce enough food without converting uncultivated land—such as forests that are important for biodiversity and slowing climate change—into crop fields. They build deep, rich soils that hold water, sequester carbon, and resist erosion. And they don't poison the air, drinking water, and fisheries with excess fertilizers and toxic pesticides. Some have dismissed the promise of these methods. Among these are State Department Science Advisor Nina Federoff, who in recent interviews characterized organic agriculture as some kind of retreat to a quaint past. She and others characterize organic farming and similar systems as inherently unproductive, sometimes suggesting that such methods are capable of supporting only about half the current world's population.

Federoff's view is at odds with the latest science, and represents a status quo kind of thinking. Today's dominant industrial U.S. agriculture relies on huge monocultures of a few major crops like corn and soybeans, and requires large inputs of fossil-fuel based synthetic chemicals to control pests and fertilize the crops. Such an agriculture churns out a lot of commodity crops (most of which are turned into meat and processed foods) while also contributing greatly to air and water pollution. Industrial agriculture is a major contributor of heat-trapping emissions and a major cause of so-called dead zones such as that in the Gulf of Mexico. And industrial agriculture is ultimately its own worst enemy, as it causes massive degradation of the very soil that is vital to farming itself. This kind of agriculture is unsustainable". (D G-S)

The MYTH of High Yields: GM Crops will neither feed India nor the world. After 20

years of research and 13 years of commercialisation, genetic engineering has not demonstrated sustainable benefits to farmers. 99% of GM crops, which have been commercialised, are either engineered (a) to contain the Bt gene, or (b) are herbicide tolerant (HT) GM crops as in Roundup Ready soybean. Neither of these is engineered for intrinsic yield gain. This is the plain science. The US Department's Agriculture's Review of 10 years of GM crop cultivation in the States, which has the longest history of GM crops, has concluded:

"Currently available GM crops do not increase the yield potential... In fact, yield may even decrease if the varieties used to carry the herbicide tolerant or insect-resistant genes are not the highest yielding cultivars... Perhaps the biggest issue raised by these results is how to explain the rapid adoption of GE crops when farm financial impacts appear to be mixed or even negative." - USDA

'Failure to Yield' released by the Union of Concerned Scientists (UCS)⁴ considers the technology's potential to increase food production over the next few decades.

"The intrinsic yields of corn and soybeans did rise during the twentieth century, but not as a result of GE traits. Rather, they were due to successes in traditional breeding... Cutting through the rhetoric, overall pesticide use (herbicides, insecticides and fungicides) has not been reduced through GE... recent U.S. data suggest that herbicide use in GE crops is now significantly higher than it was prior to their introduction. Weeds that have developed resistance to the herbicide used with GE crops now infest several million acres, forcing greater herbicide use. Insect-resistant GE crops have reduced overall insecticide use somewhat, but on balance GE crops have not reduced our dependence on pesticides... It makes little sense to

support genetic engineering at the expense of technologies that have proven to substantially increase yields, especially in developing countries... these include modern, conventional plant breeding methods, sustainable and organic farming and other sophisticated farming practices that do not require farmers to pay significant upfront costs..." UCS 2009 (emphasis mine)

Agriculture that is Biodiversity-based: The Irrelevance of GE Crops

These reports bring us full circle to the evidence provided by Howard 70 years ago, as well as to the agricultural science and wisdom of Indian farming practices, which find their counterpoint in the wisdom of farmers in all traditional cultures and which scientists like Gurian-Sherman and of the IAASTD describe as "sophisticated".

Our health and nutrition are tied in with seed quality, variety and abundance. In over 10,000 years of agriculture, farmers have selected seed, exchanged seed, preserved biodiversity and delivered safe crops. It is noteworthy and a tribute to their acumen that over the past many centuries, not a single plant has been added to the list of major domesticated crops. On the other hand, with GM crops we cannot make an "outcome prediction of the type that can be made when crossing two strains such as wheat that have been safely eaten for two thousand years" (Schubert/Freese).⁵

In the span of 12 short years of GM crops, we are faced with major problems of safety and testing and billions of dollars are being spent in damage control and clean-up operations. GM is also drawing a disproportionate quantum of investment in research despite its weak performance to date. Instead, these billions of dollars of public money should be invested in now proven, modern alternative agricultural technologies.

The urgent question that must be asked is how much more of our scarce research dollars will be diverted to this controversial and unproven technology?

The health and ecological risks of GM crops are well documented in the scientific literature. Now, the research on their contribution to CC (Climate Change) is gathering momentum. The new report published by GRAIN¹ on the 7th Oct '09, shows that agriculture has a pivotal role in sequestering carbon, and that it is small farmers that hold the key to 'cooling the world'. The evidence highlights the fact that the global industrial food system is the most important "single factor behind global warming, responsible for almost half of the world's greenhouse gas emissions" and that its role in the climate crisis has been seriously underestimated. Soils contain enormous amounts of organic matter and therefore, carbon. Calculations in the report show that the organic matter that has been lost over the past decades can be gradually rebuilt, if policy is oriented to agriculture in the hands of small farmers and their ability through alternative farming practices to restoring soil fertility. "In

50 years the soils could capture about 450 billion tonnes of carbon dioxide, which is more than two thirds of the current excess in the atmosphere", a huge contribution to resolving CC. "The evidence is irrefutable. If we can change the way we farm and the way we produce and distribute food, then we have a powerful solution for combating the climate crisis. There are no technical hurdles to achieving these results; it is only a matter of political will." (Henk Hobbelink)⁶

On the other hand, with GM crops we face a dangerous pincer attack that we must demolish if we are to survive and thrive: (a) on the one hand, the massive disinformation that GM crops will feed the world including India through mythical high yields and without harm, is reminiscent of the 30 years of

disinformation that surrounded Climate Change. The IPCC Report (with Pachauri as Chairman) though almost too late, was nevertheless required to change those perceptions and get consensus across borders on urgent climate mitigation solutions. Fortunately for the world, the International solutions for agriculture proposed by the IAASTD Report and the evidence for the potential contribution of agriculture in the carbon sequestering solutions of organic farming and the role of small farmers, are TIMELY. We must heed these; and (b) on the other hand, a comprehensive deregulation of the kind that led to the melt down of global financial markets. The clear evidence is that the US has similarly

shown the way to a dangerous and unscientific deregulation of GM crops first in the US and that role-model is being pushed in India and other developing countries.

The FAO must take note of the sanity of these road maps for urgent change, and the great irrelevance of GM crops, which are seriously and it must be said, dangerously hindering that vital focus and redirection of resources that are required in agriculture. If the FAO will lead this process for change, then it must encourage and broker that change without ambivalence, and support national and sovereign governments in India and the developing world in these solutions, no matter what pressures a 'misguided' US policy may impose on all parties.

On the 'hope' that the IAASTD generates:

"While here I stand, not only with the sense
Of present pleasure, but with pleasing
thoughts

That in this moment there is life and food
For future years". - William Wordsworth,
Tintern Abbey

Aruna Rodrigues
Director, Sunray Harvesters
India

2. Brinjal Updates

<http://www.financialexpress.com/news/Ramadoss-seeks-10year-green-freeze-on-GM-crops/531058/>
<http://www.expressbuzz.com/edition/story.aspx?Title=Enact+Act+to+ban+Bt+brinjal:+PMK&artid=LNBJILDH4yM=&SectionID=HjHMDUU=&MainSectionID=wtBMLGbuU=&SectionName=rSYj6QYp3kQ=&SEO>

Chennai: Opposing any commercial release of Bt Brinjal, former Union health minister Anbumani Ramadoss in a letter to Prime Minister Manmohan Singh, has asked the government to put a 10-year moratorium on the environmental release of all GM crops until pending issues were resolved and questions answered.

In the letter dated October 19, Ramadoss has highlighted the reasons for opposing commercial release of Bt brinjal, which he says was created with “the toxic Bt gene”.

He has pointed out that there are more than 2,500 varieties of brinjal in this country, which could be jeopardized irreversibly with the entry of bt brinjal.

The approval would violate consumers’ freedom of choices forever. Stating that agriculture and health were state subjects, the former health minister said, government should not be taking any step that violates the Constitutional authority vested with state governments.

Instead of waiting for directions from the Union Minister for Environment and Forest Jairam Ramesh in this regard, the State should take proactive steps immediately, he added. Asserting that cultivation of Bt brinjal would be beneficial only for Monsanto, a US based agriculture firm that developed it, the PMK leader said the American company would demand royalty for using the Bt seeds. “Moreover, there is no mechanism in India for labelling Bt products, so the consumers won’t know what is Bt and what is not,” he pointed out. Dr S Ramadoss on

Monday urged Chief Minister M Karunanidhi to enact legislation during the forthcoming Assembly session banning Bt brinjal in the State.

Andhra Pradesh: The AP government has formed a committee consisting of the vice-chancellors of the Agricultural University and the Horticultural University to examine the eligibility of bt brinjal. The committee will report to the Agriculture Production Commissioner, Mr. Pankaj Divedi. Mr Divedi was the APC Chattisgarh when GM rice trials were held and he ordered for the burning of the trial.

Meanwhile, a DDS team attended the CPI Farmers’ Mahasabha (conducted every three years) on 26, 27 and 29 October 2009.

<http://www.eenadu.net/archives/archive-28-10-2009/district/districtshow1.asp?dis=vijayawada>

At the mahasabha, the team made a presentation on the repercussions of pitching bio-tech products. The presentation delineated in vivid detail the woes and afflictions brought on by the introduction of bt cotton, and warned of a worse fate if bt brinjal were to be forced down the consumers’ throat. A resolution was passed urging the country to be wary of supporting such misadventures, while warning of the dangers the situation posed to the farmers at large.

Karnataka: DAVANAGERE: The Karnataka Rajya Raitha Sangha (KRRS) has urged the Union government to withdraw the permission granted to grow genetically modified brinjal in the country and state as it would lead to increased cancer and Parkinson’s disease, said KRRS state president Kodihalli Chandrashekar. He told the media here on Thursday that the European countries and USA had totally banned all types of BT genetically modified crops and vegetables as they were confirmed to be reasons for cancer and other deadly

diseases, even affecting cattle which graze on these lands.. In India, Kerala has been declared a genetically modified free state and Uttaranchal has followed this idea, he said, urging Chief Minister BS Yeddyurappa to declare Karnataka too GM free.

Kerala:

<http://news.outlookindia.com/item.aspx?667915>
<http://www.deccanchronicle.com/chennai/panel-nod-bt-brinjal-evokes-mixed-reaction-956>

Kerala Bio-diversity Board (KBB) today strongly came out against the Centre's move to allow genetically modified bt-brinjal in the country holding that GM seeds would not only pose health hazard to humans but also destroy the eco-system and bio-diversity. Prof V S Vijayan, Chairman of the State Biodiversity Board, called it a black day for the nation's sovereignty over food. He told reporters that the GM seeds also would not result in high yield, an argument put forward by the advocates of GM-seeds.

As part of a nation-wide protest, greens organisation Thanal has called a fast in the State on Friday. "It is a do or die situation. The objections to GM crops are not merely emotional, but technical. In ten years, no local crop variety will remain," R Sridhar of Thanal said.

Mr. S. Kanniyam, spokesperson, SICCFM.(The South Indian Co-ordination Committee of Farmers Movement) observed, "Farmers will throw the seeds away if the company tries to lure them to use it. The decision of the GEAC is completely against the interest of the farmers in the country, who will be forced to depend on Multi National Companies for the supply of seeds, and which will put agriculture in a crisis"

Madhya Pradesh:

<http://www.hindu.com/2009/10/28/stories/2009102851760500.htm>

Bhopal: Madhya Pradesh has joined Kerala, Orissa and Chhattisgarh in saying "no" to Bt Brinjal. Agriculture Minister Ramakrishna Kusmariya has assured civil society organisations that Bt Brinjal will not be allowed in the State as it is "the latest version of East India Company-type colonisation of the country" that will destroy Indian farming.

The State Govt's stand has been welcomed by GM-free Madhya Pradesh, a consortium of civil society organisations opposing the Centre's move to introduce Bt Brinjal and other genetically mod foods into India.

"This stand honours the commitment made by the State Govt," said Nilesh Desai of Beej Swaraj Abhiyan

Orissa:

<http://www.expressbuzz.com/edition/story.aspx?Title=Decision+on+Bt+brinjal+after+consultations&artid=HMrNn0kFbdI=&SectionID=mvKkT3vj5ZA=&MainSectionID=mvKkT3vj5ZA=&SEO=cuttack,+rice,+research,+genetically,+modified,+cr&SectionName=nUFeEOBkuKw=IANS>

BHUBANESWAR: Orissa Thursday said it won't allow genetically modified crop, including Bt Brinjal, in the state.

"The Orissa government does not favour genetically modified crop in the state. As a matter of policy, we have not accepted the proposal," said Damodar Rout, agriculture minister.

"The interest of our farmers is more important than the interest of capitalists," he added.

Rajasthan:

<http://www.hindu.com/2009/10/20/stories/2009102054160500.htm>

JAIPUR: Civil society groups in Rajasthan have strongly protested against the Genetic Engineering Approval Committee (GEAC)

recommending commercial cultivation of genetically modified Bt Brinjal, saying its large-scale production would lead to gene pollution by contamination of other varieties. They have also questioned the haste in the whole process of approval.

The Food, Trade and Nutrition Coalition (FTN-Asia), Kisan Seva Samiti Mahasangh and Pairvi said in a joint statement here that there are several “unresolved issues” surrounding the environmental release of the transgenic vegetable as well as valid concerns over its safety for human consumption. They called for an immediate high-level review of the matter.

Demanding that a legal regime be put in place for regulating the genetic modification experiments, the civil society groups feared that the farmers would be driven into heavy debts with the use of GM seeds and their failure. For the consumers, too, it was a serious question whether they needed a vegetable with pesticide properties, they said. The statement was signed by FTN-Asia patron Sharad Joshi, Pairvi director Ajay Jha, Kisan Seva Samiti Mahasangh secretary Bhagwan Sahai and Jaipur-based Institute of Development Studies director Surjit Singh.

Tamil Nadu:

<http://www.thehindu.com/2009/10/16/stories/2009101654080500.htm>

Erode: The Genetic Engineering Approval Committee’s (GEAC) decision on commercial cultivation of Bt brinjal has upset farmers and environmentalists, who say if the government approves commercial cultivation it will be hazardous for consumers, farmers, environment and the country as a whole.

Organic farming scientist and a pioneer of safe food campaign G. Nammalvar says the decision has to be opposed for many reasons.

Farmers up in arms against GEAC’s decision on Bt brinjal
Staff Reporter

‘There is no proof to say that the crop is safe for humans’

3. Labeling Concerns!

<http://www.thehindubusinessline.com/2009/10/16/stories/2009101651181600.htm>

Mumbai: Though the Government is yet to give its final clearance on the commercial release of Bt brinjal in India, concerns are being raised on who will regulate genetically modified (GM) food and how it will be labeled for consumers.

There has to be a robust labelling system, so that consumers have a choice between regular and GM food, said Ms Sunita Narain, Director, Centre for Science and Environment (CSE).

The labs in the country are not at present capable of identifying GM products, and there is also a question of who will regulate these products, she added.

Food industry representatives also agree that it is unclear whether GM products will be regulated by the Ministry of Food, or will it be Health; Environment or Science and Technology.

4. Transgenic brinjals put on ice

<http://www.nature.com/news/2009/091019/full/4611041a.html>

Stiff opposition from activists has persuaded the Indian government to put off commercial release of the country’s first genetically modified (GM) food crop, despite clearance from the nation’s top biotechnology regulator. Jairam Ramesh, India’s minister of environment and forests, said that permission for its cultivation will be given only after consulting “all stakeholders”.

Ramesh says that the ministry will seek public comments until the end of the year and that he “will have a series of consultations with scientists, agriculture experts, farmers’ organizations, consumer groups and NGOs” in January and February 2010 before deciding whether to go forward.

The decision to seek further input has angered some crop scientists. “The minister has set a bad precedent by ignoring the recommendation of the GEAC — a statutory body consisting of scientists,” says Chavali Kameswara Rao, secretary of the Foundation for Biotechnology Awareness and Education in Bangalore. “The biosafety issue of Bt brinjal has been studied by more than 150 scientists, and nothing new will come from fresh consultations.”

But GEAC member Pushpa Bhargava, who was founding director of the Centre for Cellular and Molecular Biology in Hyderabad, says Ramesh has made the right choice. “The government need not accept every recommendation made by the GEAC,” he says. Bhargava was one of the three members of the GEAC, out of a total of 20-odd members, who opposed the introduction of Bt brinjal — citing what they

called inadequate safety data provided by Mahyco.

The only other study, by French scientist Gilles-Eric Seralini of the Committee for Independent Research and Information on Genetic Engineering, branded Bt brinjal “potentially unsafe for human consumption & **eating Bt brinjal reduced appetite in goats, increased prothrombin time (the time it takes blood to clot) in goats and rabbits, and caused the plants to produce a protein inducing resistance to the antibiotic kanamycin.**”

5. Nestle Makes Amends!

Nestle bows to public pressure and makes a pledge that it will not sell any genetically-contaminated food in India... for now.

Three Indian companies (Britannia, MTR and Ruchi Soya) commit to selling genetically-unadulterated food now and in the future.

Environment Minister Jairam Ramesh responds to the civil society’s campaign by deferring approval of genetically-contaminated food crops!

GE World

6. Hunger Stalks the Earth!

For the first time in history, more than one billion people live in hunger. Each day 25,000 people starve to death or die from an illness caused by hunger. Shockingly, many of those who actually produce the food have been hit the hardest. Three-quarters of the world’s hungry live in rural areas, of whom the overwhelming majority are farmers in poor countries.

While environmental catastrophes such as drought exacerbate the plight of the rural

poor, the main causes of poverty and hunger in the developing world are man-made.

The economic hardship facing many farmers can be attributed to the free trade policy prescriptions championed by the World Trade Organisation (WTO), International Monetary Fund (IMF) and World Bank. Even though they are unaccountable to the broader international community, these institutions wield enormous influence over the agricultural policies of developing nations

The most harmful range of farming products currently on the market are genetically

modified (GM) crops. Promoted by agribusiness as a silver bullet in the fight against global hunger, GM crops are in fact more expensive to grow and produce poorer yields. Despite the harm these crops can cause, the GM revolution has gained momentum in recent years, leading to a massive boom for firms like Monsanto and Syngenta.

Yet an alternative to the current approach is taking root. Across the developing world, grass-roots organisations are challenging corporate farming practices and the model of production for export.

Based on the principle of local control over resources, the food sovereignty movement prioritises the needs of small-scale farmers over the profits of big business. This new concept recognises that the key to fighting global poverty lies in community ownership, sustainable agricultural policies and workers' rights.

Meanwhile, world leaders are preparing to meet at the FAO World Food Summit in Rome in November, where the powers of global governance and agribusiness will utilize the desperation of starving nations to accelerate the expansion of GMO-based agriculture throughout the world. The Obama administration's proposal to dedicate over a billion dollars of emergency

funding to developing countries for agriculture, and the U.S. government's Global Food Security Initiative are thinly veiled efforts to this end.

"It's time for all civil society to recognize the gravity of this situation, global capital should not control our food, nor make decisions behind closed doors. The future of our food, the protection of our resources and especially our seeds, are the right of the people,"

7. Monsanto guilty in 'false ad' row

<http://news.bbc.co.uk/1/hi/world/europe/8308903.stm>

France's highest court has ruled that US agrochemical giant Monsanto had not told the truth about the safety of its best-selling weed-killer, Roundup.

The court confirmed an earlier judgment that Monsanto had falsely advertised its herbicide as "biodegradable" and claimed it "left the soil clean".

The company was fined 15,000 euros (£13,800; \$22,400). It has yet to comment on the judgment.

Roundup is the world's best-selling herbicide.

GE - steps ahead in Research

8. GM Crops Keel Over!

<http://trak.in/news/genetically-modified-crops-succumb-to-bug-infection/17445/>

New York: As the debate over the safety of genetically modified food continues to rage, biologists have found that GM squash plants – resistant to three major viral diseases – became more vulnerable to a fatal bacterial infection.

9. Pests outsmart GM ploys!

Published online 6 July 2009 | Nature | doi:10.1038/news.2009.62

Tabashnik, B. E. et al. Proc. Natl Acad. Sci. USA advance online publication doi:10.1073/pnas.0901351106 (2009).

A subtle game of hide and seek is being played out between scientists and insects. No sooner the scientists come up with their arsenal against them, than the insects begin to mutate and escape the threat. Insects can become resistant to individual insecticides in much the same way as bacteria develop resistance to antibiotics. One way to reduce this threat is to adopt a 'pyramid' approach and create crops that produce multiple toxins that target the same pest. While the scientists are busy aiming to unnerve the insects by juggling with the binding sites of the toxins, there comes now the knowledge that toxins are activated via the same pathway in the insect. So, read what follows

to know that the threat of resistance continues:

- Caterpillars reveal a chink in the armour of transgenic crops.
- Pink bollworms developed resistance to two Bt cotton toxins. USDA
- The results strike a cautionary note at a time when developers are racing to create crops that produce many different pesticides.
- "Evolution by insects is not something that scientists are going to stop."

This monthly bulletin is brought out by South Against Genetic Engineering (SAGE), a coalition of civil society activists, farmers, scientists, academicians, and consumer groups of four Southern States of India, viz., Andhra Pradesh, Karnataka, Tamil Nadu and Maharashtra. SAGE has been waging a concerted battle against genetic engineering through a series of activities that involve public protests, media actions, seminars, consultations and publication of a series of educational materials.