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# GM CROPS:

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## NO PANACEA TO FOOD SECURITY

A briefing paper on the MYTH that GM crops are necessary to feed India's growing population



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## 1. The GM Crop Debate

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### *Genetic Modification*

*An alteration of genetic material of an organism by modern biotechnological techniques, whereby new DNA is inserted into the host genome by first isolating and copying the genetic material of interest and then inserting this construct into the host organism. The technology of Genetic Modification is often applied to create organisms that do not normally exist in nature and crossing natural reproductive barriers, cutting across even animal kingdoms.*

Source: Scientist letter to Jayanthi Natrajan, <http://indiagminfo.org/?p=540#more-540>

The introduction of Genetically Modified (GM) crops have kick started a huge controversy across the world which has never been seen before with any other technologies in agriculture.

Genetic Engineering as a technology and its products, Genetically Engineered/modified organisms, are yet to answer many a questions on their impacts to environment and human health. The unpredictability and irreversibility of Genetic Engineering and the uncontrollability of GE crops in the environment coupled with studies pointing at the potential risk to human health and environment has resulted in a controversy across the world around the need for introducing such potentially risky organisms. Added to this is also the corporate control of the seeds, the most important input in agriculture, through this technology.

Due to this growing scientific evidence on the lack of safety of GM crops and reality of corporate monopoly in seeds, majority of countries have shunned this so-called gene revolution path for agricultural development. It has been 19 years since the first GM crop was introduced for commercial cultivation and today 75% of GM crop cultivation happens in just 3 countries; USA, Brasil and Argentina. Even today only less than 4% of the global agriculture land is under GM crops.

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## 2. GM Debate in India

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There is an unprecedented debate around GM crops in India at this point. This started even before the commercialisation approval of Bt Cotton, the only GM crop which is commercially cultivated in the country, but has reached its heights when the existing regulatory system was on the verge of approving Bt Brinjal, the first GM food crop. This debate, as in other parts of the world, is grounded on the various scientific studies which points at the potential harm to health and environment from environmental release of GM crops<sup>1</sup>.

The public consultations on Bt Brinjal that the then Minister for Environment and Forests organised in 7 cities across the country in 2010 saw a wide cross section of the Indian society, Scientists, farmer unions, environmental groups, consumer groups, political parties and lawyers opposing its introduction due to the potential to harm health of human beings, impact biodiversity and the reality of corporate control of our seed and agriculture. The Central Government also received formal letters of opposition from several state governments. Taking into account these varied concerns, on the 9 February 2010, introduction of Bt Brinjal was put under an indefinite moratorium by the Ministry of Environment and Forests<sup>2</sup>. The consultations brought to light the

inadequacies in the existing assessments for GM crops and also raised fundamental questions on the need for such risky technologies.

The three years after the moratorium decision has seen growing scientific evidence and public outcry against GM crops, the latest being an independent review released by Greenpeace of the safety assessment of Monsanto's GM corn that leads the regulatory pipeline for commercial approvals<sup>3</sup>. At the same time, the Central Government seems to be pushing forward with GM crops. There were efforts from the government to bring in a weaker regulatory law, the Biotechnology Regulatory Authority of India bill, to circumvent all opposition and act as a single-window clearance for genetically modified organisms across the board. But this has been stalled due to opposition both inside and outside the Parliament.

Last year saw the Parliamentary Standing Committee on Agriculture in a report, unanimously agreed to by all its members cutting across party lines, asking the government to avoid any haste in embracing GM technology in agriculture<sup>4</sup>. Besides pointing at the various risks that GM

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<sup>1</sup>Greenpeace, Environmental and Health Impacts of GM crops - the Science, 2011, available at <http://www.greenpeace.org/eu-unit/en/Publications/2011/impacts-the-science/>

<sup>2</sup>Ministry of Environment and Forests, Decision on Commercialisation of Bt-Brinjal, 9 February 2010, available at [moef.nic.in/downloads/public-information/minister\\_REPORT.pdf](http://moef.nic.in/downloads/public-information/minister_REPORT.pdf)

<sup>3</sup><http://www.greenpeace.org/india/en/publications/Analysis-of-the-data-submitted-by-Monsanto-to-the-Indian-authorities-on-genetically-engineered-maize-MON89034-x-NK603/>

<sup>4</sup>[http://164.100.47.134/lssccommittee/Agriculture/GM\\_final.pdf](http://164.100.47.134/lssccommittee/Agriculture/GM_final.pdf)

A giant banner reading 'Save our Rice' is displayed in a rice field. The banner is a protest against genetically engineered rice field trials in the region.  
© Greenpeace



crops could pose to the health of our citizens, biodiversity and farm livelihoods, it also asserted the need for an all-encompassing Bio-safety Authority through an Act of the Parliament, which is extensively discussed and debated amongst all stakeholders before acquiring shape of the law. The Committee also recommended an immediate stopping of all open releases of GM food crops including those in the name of field trials.

More recently, the Supreme Court's appointed Technical Expert Committee comprising of eminent scientists in the fields of toxicology, molecular biology, nutrition science and biodiversity in its interim report highlighted the potential impact of GM crops on human health, biodiversity and our socio-economic conditions and recommended a precautionary approach towards the adoption of GM crops, including those being released for open field trials.

### 3. GM CROPS: MOST EXPENSIVE DISTRACTION TO ACHIEVE FOOD SECURITY IN THE 21ST CENTURY

Having failed to pass the test on safety and on farm performance there is a strong propoganda from the GM crop developers and their promoters to project this risky technology as a necessity if we want to achieve food security. Unfortunately this argument has been taken up by responsible agencies like the Union Ministry of Agriculture as reflected in their affidavit filed in the Supreme Court of

India on a PIL filed on the matter of open releases of GM crops. This briefing tries to look at this argument in a logical manner, looking both at what constitutes food security and what is the current situation in our country interms of food production and distribution systems along with other factors that are the essential components of Food security in our context.

According to the Food & Agriculture Organisation (FAO), "Food Security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life."

According to WHO, food security is built on three pillars<sup>5</sup>

- Food availability: sufficient quantities of food available on a consistent basis.
- Food access: having sufficient resources to obtain appropriate foods for a nutritious diet.
- Food use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation.

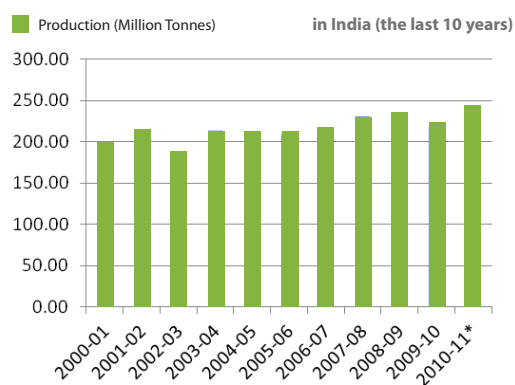
### 3a. The Indian Paradox of excess production and increasing starvation

Considering the food grain production in India for the last ten years, it is clear from government data that there has been an increase in production from 197 million tonnes in 2000-01 to 241 million tonnes in 2010-11. The Parliamentary Standing Committee on Agriculture in their report tabled in August 2012 has clearly stated that this increase in production of food grains in the last decade has kept in pace with the population growth trend<sup>6</sup>.

As per FAO statistics for the year 2011 India is also ranked 1st in the world in fresh fruit production, milk production and production of pulses and 2nd in the world in the production of fresh vegetables<sup>7</sup>.

The Indian Council for Medical Research (ICMR) calculates food consumption based on the Recommended Dietary Allowance (RDA) which is nutrient centric and technical in nature. Given below are calculations on the availability of food grains, pulses and edible oil in our country as per ICMR requirements of 2700 calories for a moderately active male if the country opts for a universal PDS<sup>8</sup>.

#### FOOD PRODUCTION



Source: Scientist letter to Jayanthi Natrajan, <http://indiagminfo.org/?p=540#more-540>

<sup>5</sup><http://www.who.int/trade/glossary/story028/en/>

<sup>6</sup>[http://164.100.47.134/lssccommittee/Agriculture/GM\\_final.pdf](http://164.100.47.134/lssccommittee/Agriculture/GM_final.pdf) (Page 276-277)

<sup>7</sup>FAO statistics 2012, <http://faostat.fao.org/site/339/default.aspx>

<sup>8</sup>Dietary Guidelines for Indians-A Manual, ICMR,2011

	ICMR Norm per family per month	% of production (2008-09) required under Universal PDS
Foodgrains	50kgs	Half of the total food grain production in the country
Edible Oils	2.8kgs	65% of the total edible oil production.
Pulses	5.25 kgs	68%-72% of the total pulses production

Source: Right To Food Campaign: Food Security, What the Government Says and What we want, 2011, [www.righttofoodindia.org/data/food\\_security\\_what\\_the\\_government\\_says\\_and\\_what\\_we\\_want.pdf](http://www.righttofoodindia.org/data/food_security_what_the_government_says_and_what_we_want.pdf)

The Right To Food Campaign data indicates that the problem of food security is broader than production alone and that the core of the problem is the lack of political will for a Universal Public Distribution System. It was also reported that the Indian Government is sitting on one of world's biggest hoards of food grains, about 667 lakh tons as of January 1, 2013, making the current stock 2.5 times more than the Government's benchmark for buffer stocks (TOI, Jan 18th, 2013). In fact reports of rotting food grains in our Food Corporation of India (FCI) godowns have become a regular feature now. How is it that the Government insists on technologies like GM to increase production, when it is sitting on a mountain of foodgrain?

The question to ask is why are these mountains of food grain not being distributed to the people when a third of the children are born malnourished, half of children are underweight and a third of the adult population has a Body Mass Index (BMI) of below 18.5, one of the worst in the world. The Planning Commission's estimate of the required subsistence calorie intake for defining the poverty line is set at 2400 calories per person per day in rural areas and 2100 calories per person per day in urban areas. Going by that figure it shows that at least 80 per cent of the population in rural areas and 50 per cent in urban areas fall below the required subsistence intake. We stand way down the Global hunger Index at 65th out of 88 nations, worse than many Sub Saharan African countries. Despite repeated Supreme Court orders regarding distribution of food grains to the poor at Antyodya prices, the Government of India refuses to comply and refuses to allow the food to be distributed through the Public Distribution System (PDS), although clandestine ways are resorted to export the grain abroad.

Thus it becomes clear that the issue of food insecurity and malnutrition in India at present centres around access to the available food and not lack of production. This is well captured in the parliamentary standing committee on Agriculture's report on GM food crops which says *"The*

*present worrisome situation" as regards food security is primarily because of "faulty procurement policy, mismanagement of stocks, lack of adequate and proper storage, hoarding and lopsided distribution, massive leakages in the public distribution delivery system, etc."*<sup>9</sup> This is a trend seen globally as well.

Also not to be forgotten is the importance of purchasing capacity in ensuring food security as many eminent socioeconomists including Nobel lauret Prof Amartya Sen has stated again and again<sup>10</sup>. Thus no amount of increase in production with out ensuring livelihood security to small, marginal and landless farmers and farm labourers would ensure food security.

**GM crops have also been found to be a threat to this livelihood security** of those involved in farming. The Bt cotton experience is a case in point where increased input costs starting with seed costs, due to royalty fees for Monsanto, along with increased use of agrochemicals besides no increase in yields and compounded by failing markets have put the small and marginal cotton farmer, especially in the rain fed regions in tremendous distress<sup>11</sup>. The threat to rural livelihoods from GM crops would become bigger if the government goes ahead with Herbicide tolerant GM crops that are in the regulatory pipeline. The HT crops would initially eliminate manual weeding which forms one of the main sources of income for the rural women agricultural labour at present. While experiences from other countries have also shown that in due course of time the farmers are also impacted as weeds grow tolerant to herbicides leading to the spiral of increased usage of herbicides<sup>12</sup>.

Dr Charles Benbrook renowned agricultural economist stated in his studies that "Resistant weeds have become a major problem for many farmers reliant on GE crops, and are now driving up the volume of herbicide needed each year by about 25 percent."

### 3b. Would GM crops increase food production?

Now if one is to take the argument of the need for increased production through increased yield, here again GM crops have failed to show any such increase in yield in the nearly 2 decades of their existence in the world. Yield, as

acknowledged by all, is a multigenic factor and is dependent on various environmental factors as well. It is also important to know that so far there has been no single GM crop that has been developed for increasing yield. There are only two

<sup>9</sup>[http://164.100.47.134/lssccommittee/Agriculture/GM\\_final.pdf](http://164.100.47.134/lssccommittee/Agriculture/GM_final.pdf)

<sup>10</sup>[http://www.fao.org/docrep/X0172E/x0172e05.htm#P1192\\_101453](http://www.fao.org/docrep/X0172E/x0172e05.htm#P1192_101453)

<sup>11</sup>10 Years of Bt cotton- False Hype and Failed Promises- Coalition for a GM Free India, [http://eands.dacnet.nic.in/latest\\_2006.htm](http://eands.dacnet.nic.in/latest_2006.htm)

<sup>12</sup><http://www.testbiotech.org/en/node/765>

traits that comprise majority of the GM crops being cultivated- herbicide tolerance (HT) and insect resistance (Bt)<sup>13</sup>.

A look at the Bt cotton situation in India would explain the yield-production myth of GM crops very well. Ten years of official cultivation of Bt cotton raises many a question about its sustainability for Indian farming. One of the biggest myths promoted by the proponents of this technology is that Bt cotton has been responsible for phenomenal cotton production in India. A look at the govt statistics tells a different story. In 2004-05, when Bt cotton was a mere 6% of the total acreage, the yield was 470 kg/hectare. In 2011-12 when the

Bt cotton acreage reached 96%, it was 481 kg/hectare.<sup>14</sup>

In fact, a 10 year review for the same period done by Central Institute of Cotton Research notes that, "Cotton Advisory Board data show cotton yield increased by about 60% in three years between 2002 to 2004 when the area under Bt cotton was a meager 5.6 % and non Bt area was 94.4 %. The yields did not increase significantly more than the pre Bt era even until 2011 when the Bt cotton area touched 96%".<sup>15</sup> This has also been accepted by the Planning commission of India in its draft of the 12th five year plan.<sup>16</sup> So where is the big yield that spokespersons of GM seeds talk about?

### 3c. GM Crops And Food Security – The Global Experience

Genetically Modified crops have been commercialised for nearly 20 years and an analysis of the industry data indicates a rejection by majority of the countries to adopt this controversial technology. The five countries that account for 91% of the global GM production are USA, Brasil, Argentina, India and Canada. Despite the hype by GM proponents that GM is the fastest adopted technology, the table below indicates that this is untrue even for the countries that are supposed to be the main producers of GM crops, with the majority of agricultural land still being under conventional farming. The total land under GM crops cultivation in 2011 was 159 million hectares which is only 3% of the world's agricultural land<sup>17</sup>.

the GM crops being cultivated- herbicide tolerance (HT) and insect resistance (Bt)<sup>18</sup>. These are not traits that are developed to sustain food productivity in an unpredictable climatic environment. Added to this, genetically modified crops are predominantly cotton, maize, canola and soybeans which are either commercial crops or used as animal feed.

There is no evidence till date that the GM technology will improve food security and an examination of the situation of the largest producers of GM crops further emphasises that this is a false claim made by the Biotech companies to promote their technology. The table below indicates no direct correlation between GM crops adoption and cultivation to food security in those countries.

So far, there are only two traits that comprise majority of

Country	% of land under GM cultivation
USA	17%
Brasil	12%
Argentina	17%
Canada	14%
India	6%

Source: Late Lessons from early warnings: Report II, EEA, Jan 23 2013. Chapter 19, <http://www.eea.europa.eu/publications/late-lessons-2>

<b>USA</b>	According the US Economic Research Service in 2011, 14.9% of American households were food insecure at some point in the year, that is around 17.9 million households in the country that is the largest producer of GM crops. This is an increase of 15% of the population in 2011 that is food insecure from where it was at 12% in 1995, before GM crops were commercialised in 1996.
<b>BRASIL</b>	It is the second largest producer of GM crops in the world. The % of malnourishment has increased from 12.6% in 2004-06 to 25.5% in 2010-12. The increase in malnourishment is almost double for the period of transgenic crop expansion.
<b>ARGENTINA</b>	In Argentina the third largest producer of GM crops there has been no significant change in the hunger situation. The malnourishment has been less than 5% of the population in 1999-01 and 2010-12. There has been no change in years of expansion of transgenic crops.

Source: ScientistlettertoJayanthiNatrajan submitted on the 9th Feb 2013- Coalition for a GM FREE India, <http://indiagminfo.org/?p=540#more-540>

<sup>13</sup>ISAAA Brief 43-2011. Executive Summary as accessed

<sup>14</sup>10 Years of Bt Cotton-False Hype and Failed Promises- Coalition for a GM Free India, <http://indiagminfo.org/wp-content/uploads/2012/03/Bt-Cotton-False-Hype-and-Failed-Promises-Final.pdf>

<sup>15</sup>KR Kranthi, Bt Cotton: Questions and Answers, 2012, Indian Society for Cotton Improvement, Mumbai.Pg 32

<sup>16</sup><http://planningcommission.nic.in/plans/planrel/12thplan/welcome.html>

<sup>17</sup>Late Lessons from early warnings: Report II, EEA, Jan 23 2013. Chapter 19, <http://www.eea.europa.eu/publications/late-lessons-2>

<sup>18</sup>Late Lessons from Early Warnings: Report II, EEA, Jan 23 2013. Chapter 19

It only seems absurd that the proponents would promote this technology to achieve food security given the status of GM crop cultivation and the hesitance to accept GM crops

in the world, thus questioning the ability of GM crops to deliver on an important aspect of food security i.e. availability of quantities and diversity of food.

### 3d. FOOD SECURITY IS ALSO ABOUT FOOD SAFETY

Any definition of Food Security by credible agencies emphasises the need for 'safe and nutritious food'. Genetically Modified (GM) crops are controversial worldwide for a variety of reasons like the monopolistic control of seeds, control of our food systems by seed companies and cost of high cultivation for farmers. But apart from this there is growing scientific evidence on the environmental and health risks of GM crops<sup>19</sup>. The potential risk to human health from GM crops has been highlighted both by the Technical Expert Committee (TEC) set up by the Supreme Court and the Parliamentary Standing Committee on Agriculture in their respective reports.

There is also an on-going scientific controversy around the safety assessments of GM crops. Independent scientific studies on the safety of GM crops for animals or humans are severely lacking and there is a tendency for studies conducted by researchers with affiliations to the GM industry

to give favourable results to GM crops. This has been highlighted in the past by many reputed experts during the Bt Brinjal approval debate. This was again brought to light in a recent independent study by Testbiotech, commissioned by Greenpeace India on Monsanto's Herbicide Tolerant and pest resistant GM corn which leads the GM regulatory pipeline in India for commercial approval. The review report by Testbiotech concluded that based on the data presented by Monsanto, no decisions can be taken on the safety of the plants. Apart from the missing data and inadequate investigations, there are, in fact, substantial indications for health and environmental risks<sup>20</sup>.

This not only emphasises the repeated failure of the Indian Regulatory system in assessing the safety of Genetically Modified Organisms (GMOs) but also highlights the potential health and environmental impacts of GM crops.

### 3e. GM CROPS-EXTENSION OF THE RESOURCE EXPLOITATIVE TECHNOLOGIES

The sustainability of farming is critical to the food security in India. There is a growing acknowledgement in the policy and scientific circles that input intensive agricultural practices with mindless usage of agrochemicals have led to destruction of natural resources like water, soil and biodiversity, which form the natural capital for sustaining our farming. GM crops are an extension of this chemical treadmill as best seen in the case of Bt cotton<sup>21</sup> in India and other GM crops elsewhere.

The most recent assessment of 20 years of GM crop cultivation in USA gives a dismal picture of the consequences to farmers with the increased cost of cultivation due to increased use of herbicide as well as the cultivation of herbicide resistant crops has led to a reduction in the biodiversity<sup>22</sup>. This should be an eye-opener for policy makers that GM crops are not a sustainable option for farming or the biodiversity and thus have no role to play in food security.

## 4. Road map to food security in india

### The Parliamentary standing committee on the question of GM crops and Food security

*"The present worrisome situation" as regards food security is primarily because of "faulty procurement policy, mismanagement of stocks, lack of adequate and proper storage, hoarding and lopsided distribution, massive leakages in the public distribution delivery system, etc."*

*"If these shortcomings and problems are attended to along with liberal financial assistance to agriculture and allied sectors, proactive measures are initiated to arrest the decreasing trend in cultivable area and farmer friendly and sustainable agricultural practices are put in use, there would not be any compelling need for adopting technologies which are yet to be proven totally safe for biodiversity, environment, human and livestock health and which will encourage monoculture, an option best avoided."*

*The committee finally recommends that "the Government come up with a fresh road map for ensuring food security in coming years without jeopardizing the vast bio-diversity of the country and compromising with the safety of human*

<sup>19</sup>Greenpeace Briefing on Health and Environmental Impacts of GM crops, 2011, <http://www.greenpeace.org/eu-unit/en/Publications/2011/impacts-the-science/>

<sup>20</sup><http://www.greenpeace.org/india/en/publications/Analysis-of-the-data-submitted-by-Monsanto-to-the-Indian-authorities-on-genetically-engineered-maize-MON89034-x-NK603/>

<sup>21</sup>10 Years of Bt Cotton-False Hype and Failed Promises- Coalition for a GM Free India, <http://indiagminfo.org/wp-content/uploads/2012/03/Bt-Cotton-False-Hype-and-Failed-Promises-Final.pdf>

<sup>22</sup><http://www.testbiotech.org/en/node/765>



health and livestock health." [Para – 7.71]. Report of the Parliamentary Standing Committee on Agriculture, which was tabled on the 9th of August 2012, on GM crops and food security in India.

Source: [http://164.100.47.134/lssccommittee/Agriculture/GM\\_final.pdf](http://164.100.47.134/lssccommittee/Agriculture/GM_final.pdf)

*"To feed 9 billion people in 2050, we urgently need to adopt the most efficient farming techniques available. Today's scientific evidence demonstrates that agroecological methods outperform the use of chemical fertilizers in boosting food production where the hungry live- especially in unfavourable climates."*

*"To date agroecological projects have shown an average crop yield increase of 80% in 57 developing countries with an average increase of 116% for all African projects. Recent projects conducted in 20 African countries demonstrated a doubling of crop yields over a period of 3-10 years."*

*-Olivier De Schutter, UN special rapporteur on the right to food and author of the report, "Agroecology and the right to food" Source: [http://earthopensource.org/files/pdfs/GMO\\_Myths\\_and\\_Truths/GMO\\_Myths\\_and\\_Truths\\_1.1.pdf](http://earthopensource.org/files/pdfs/GMO_Myths_and_Truths/GMO_Myths_and_Truths_1.1.pdf)*

At this juncture it will be useful for us to heed to the International Assessment of Agricultural Science and Technology for Development (IAASTD), one of most detailed assessments of the agriculture science and technology ever done in the world. The initiative sponsored by UN and the world bank had 450 scientists along with another 900 experts across the world analysing the developments in agricultural science and technology and their impacts in the last 50 years. The IAASTD report to which India is also a signatory calls for a fundamental change in farming practices in order to address soaring food prices, hunger, social inequities and environmental disasters. It acknowledges that

genetically engineered crops are highly controversial and will not play a substantial role in addressing the key problems of climate change, biodiversity loss, hunger and poverty.

It recommends small-scale farmers and agro-ecological methods is the way forward if the current food crisis is to be solved and to meet the needs of local communities, declaring indigenous and local knowledge play as important a role as formal science - a significant departure from the destructive chemical-dependent, one-size-fits-all model of industrial agriculture<sup>23</sup>.

**Agro-ecology** is a scientific practice and a bottom up approach to sustainable farming has been endorsed by many international reputed bodies as a way forward for food security. Agroecology minimises the use of agro-chemical inputs and leverages on interactions between the biological components of the agro-ecosystem. This in-turn produces productivity, crop protection and soil fertility. Most importantly this contributes by creating resilience to unpredictable changes at local levels<sup>24</sup>. Agroecology will help create sustainable farming systems that will have potential to ensure food, nutrition and wealth to the poorest and low-yield farming communities that are needed according to the UN-FAO to feed the world.

Source: Late Lessons from early warnings: Report II, EEA, Jan 23 2013. Chapter 19, <http://www.eea.europa.eu/publications/late-lessons-2>

India as a nation is struggling with the big question to achieve food security with a growing population and the already starving millions. It is important that our decision makers do not get distracted by techno-fixes like GM crops which are promoted by global biotech seed companies as a silver bullet. It is established that a multipronged approach which includes (a) the promotion of sustainable food production systems, (b) efficient food distribution and (c) ensuring livelihood security of citizens is the way forward for our country to be food secure, now and in future.

# GM CROPS 2013

## NO PANACEA TO FOOD SECURITY

Earth is only one.  
Take it in your hands.  
Live sustainable.

### GM CROPS

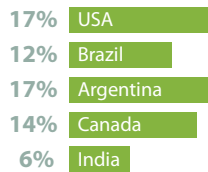
20 Yrs.

Genetically Modified (GM) crops commercialised for nearly 20 years. Industry data indicates a rejection by majority of the countries to adopt this controversial technology.

91 %

91% of global GM production is in **USA, Brazil, Argentina, India & Canada**. Despite the hype that GM is the fastest adopted technology, even these 5 countries use conventional farming in majority of agricultural land.

Total land under GM crops cultivation in 2011 was **159 million hectares** which is only **3%** of the world's agricultural land.



### PARLIAMENTARY BODY AND SUPREME COURT EXPERTS COMMITTEE ADVISES CAUTION AGAINST GM CROPS

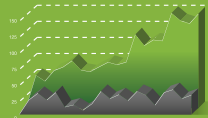
Parliamentary standing committee on Agriculture submits its report on GM food crops and categorically denies any role for GM crops in providing food security to our country. The report also points to the threats from GM crops to farming and farm livelihoods.

Technical Expert committee constituted by the Supreme Court of India highlights the potential impacts of GM crops to human health, biodiversity, socioeconomic situation of our country and advises a precautionary approach towards them.



### BT COTTON

Bt cotton adds to the increased burden of small and marginal farmers in India especially in the rainfed region which forms majority of cotton area.



Data from cotton advisory board shows that cotton yield increased by 60% in 3 years between 2002-2004

60%

When the area under bt cotton was as little as 5.6%.

5.6



But there was no significant increase in yield until 2011 when the area under BT Cotton touched 96%.

96%

2002

2004

2011



2006 - 07



2012 - 13

## A DISMAL PICTURE FOR FARMERS

20 years of GM crop cultivation in USA lead to increased cost of cultivation due to increased use of herbicide. Cultivation of herbicide resistant crops has also led to a reduction in the biodiversity



Dr Charles Benbrook, renowned agricultural economist stated in his studies that "Resistant weeds have become a major problem for many farmers reliant on GE crops, and are now driving up the volume of herbicide needed each year by about 25%"

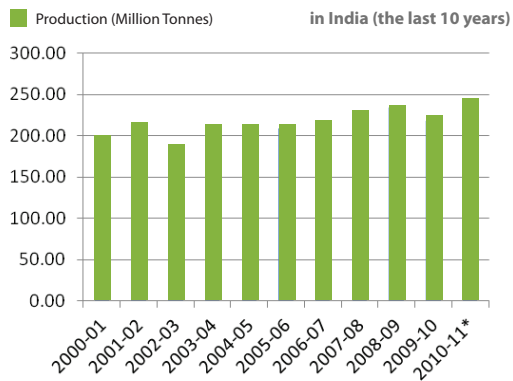


Recorded evidence of adverse impacts of Monsanto's glyphosate-based herbicide used along with GM herbicide tolerant crops on water, biodiversity and soil-plant system.

This should be an eye-opener for policy makers that GM crops are not sustainable for farming or biodiversity and thus have no role to play in food security.



## FOOD PRODUCTION



India stands way down the Global Hunger Index at 65th out of 88 nations, worse than many Sub Saharan African countries.

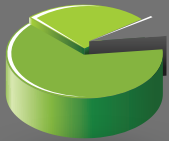
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Pulses	5.25kgs	68%-72% of the total pulses production

Source: Right To Food Campaign: Food Security, What the Government Says and What we want, 2011, [www.righttofoodindia.org/data/food\\_security\\_what\\_the\\_government\\_says\\_and\\_what\\_we\\_want.pdf](http://www.righttofoodindia.org/data/food_security_what_the_government_says_and_what_we_want.pdf)

Indian Government is sitting on one of **world's biggest** hoards of food grains, about **667 lakh tons** as of January 1, 2013, making the current stock **2.5 times more than** the Government's benchmark for buffer stocks (TOI, Jan 18th, 2013). In fact, reports of rotting food grains in our Food Corporation of India (FCI) godowns have become a regular feature now.

### BIG QUESTION:

Why are these mountains of food grain not being distributed to the people? Third of the children are born malnourished, half of children are underweight and a third of the adult population has a Body Mass Index (BMI) of below 18.5, one of the worst in the world.



The Planning Commission's estimate of the required subsistence calorie intake for defining the poverty line is set at 2400 calories per person per day in rural areas and 2100 calories per person per day in urban areas. At least 80% of the population in rural areas and 50% in urban areas fall below the required subsistence intake.

## SOLUTION

A multipronged approach which includes (a) the promotion of sustainable food production systems, (b) efficient food distribution and (c) ensuring livelihood security of citizens is the way forward for our country to be food secure, now and in future.



*"To feed 9 billion people in 2050, we urgently need to adopt the most efficient farming techniques available. Agroecological methods outperform the use of chemical fertilisers in boosting food production where the hungry live- especially in unfavourable climates. To date, agroecological projects have shown an average crop yield increase of 80% in 57 developing countries with an average increase of 116% for all African projects. Recent projects conducted in 20 African countries demonstrated a doubling of crop yields over a period of 3-10 years."*

- Olivier De Schutter, UN special rapporteur on the right to food and author of the report, "Agroecology and the right to food"  
Source: [http://earthopensource.org/files/pdfs/GMO\\_Myths\\_and\\_Truths/GMO\\_Myths\\_and\\_Truths\\_1.1.p](http://earthopensource.org/files/pdfs/GMO_Myths_and_Truths/GMO_Myths_and_Truths_1.1.p)



Greenpeace is a global organisation that uses non-violent direct action to tackle the most crucial threats to our planet's biodiversity and environment. Greenpeace is a non-profit organisation, present in 40 countries across Europe, The Americas, Asia and the Pacific.

It speaks for 2.8 million supporters worldwide, and inspires many millions more to take action every day. To maintain its independence, Greenpeace does not accept donations from governments or corporations but relies on contributions from individual supporters and foundation grants.

Greenpeace has been campaigning against environmental degradation since 1971 when a small boat of volunteers and journalists sailed into Amchitka, an area north of Alaska, where the US Government was conducting underground nuclear tests. This tradition of 'bearing witness' in a non-violent manner continues today, and ships are an important part of all its campaign work.



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