Protect Indigenous Biodiversity and Knowledge

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It is estimated that 2 billion people worldwide are iron deficient, including 1 billion people who have iron deficiency anemia (IDA) In India75% of the children <5 y old and 60% of young women have anemia

Iron Deficiency: A Public health Emergency

Iron is necessary for many vital functions in the body including formation of haemoglobin, brain development and function, regulation of body temperature, muscle activity, and catecholamine metabolism. Lack of iron directly affects the immune system-diminishes the number of T-cells and the production of antibodies. Deficiency of iron in diet leads to Iron deficiency anemia. Iron deficiency in pregnant women is a major cause of maternal mortality and childbirth deaths.

Destruction of Biodiversity and iron deficiency

Nature has given us a cornucopia of biodiversity, rich in nutrients. Malnutrition and nutrient deficiency results from destroying biodiversity, and with it rich sources of nutrition.

Our indigenous biodiversity offers rich sources of iron. Amaranth has 11.0 mg per 100gm of food, Moringa (Sahjan or drumstick) 28.26, buckwheat has 15.5,neem has 25.3,bajra has 8.0,rice bran 35.0,rice flakes 20.0bengal gram roasted 9.5,Bengal gram leaves 23.8, cowpea 8.6,horse gram6.77, amaranth greens have 38.5, karonda 39.1,lotus stem 60.6, coconut meal 69.4,niger seeds 56.7,cloves 11.7,cumin seeds 11.7.mace 12.3,mango powder (amchur) 45.2,pippali 62.1,poppy seeds 15.9,tamarind pulp 17.0,turmeric 67.8,raisins 7.7……..

Iron absorbtion is increased with vit C, that is why we have always eaten chutneys with our meals. Cooking in iron vessels increases the iron content of food. The Green Revolution has spread monocultures of chemical rice and wheat, driving out biodiversity from our farms and diets.

And what survived as spontaneous crops like the amaranth greens and chenopodium (bathua)

Recommended Daily Dietary Allowance for Iron		
Men	Adult	8 mg
Women	Adult (age 50 on)	8 mg
	Adult (ages 19 to 50)	18 mg
	Pregnant	27 mg
	Lactating	9 mg to 10 mg
Adolescents (ages 9 to 18)	Girls	8 mg to 15 mg
	Boys	8 mg to 11 mg
Children (birth to age 8)	Ages 4 to 8	10 mg
	Ages 1 to 3	7 mg
	Infants (7 months to 1 year)	11 mg
	Infants (birth to 6 months)	0.27 mg

www.bcguidelines.ca/pdf/iron_deficiency.pdf

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Incidence of Anemia In India

STATE	1	2	3	4
India	69.5	55.3	57.8	24.2
Andhra Pradesh	70.8	62.9	56.4	23.3
Arunachal Pradesh	56.9	50.6	49.2	28
Assam	69.6	69.5	72	39.6
Bihar	78	67.4	60.2	34.3
Chhattisgarh	71.2	57.5	63.1	27
Goa	38.2	38	36.9	10.4
Gujarat	67.7	55.3	60.8	22.2
Haryana	72.3	56.1	69.7	19.2
Himachal Pradesh	54.7	43.3	37	18.9
Jammu & Kashmir	58.6	53.1	54	19.5
Jharkhand	70.3	69.5	68.4	36.5
Karnataka	70.4	51.5	59.5	19.1
Kerala	44.5	32.8	33.1	8
Madhya Pradesh	74.1	56	57.9	25.6
Maharashtra	63.4	48.4	57.8	16.8
Manipur	41.1	35.7	36.4	11.4
Meghalaya	64.4	47.2	56.1	36.7
Mizoram	44.2	38.6	49.3	19.4
Nagaland	"	"	"	"
Orissa	65	61.2	68.1	33.9
Punjab	66.4	38	41.6	13.6
Rajasthan	69.7	53.1	61.2	23.6
Sikkim	59.2	60	53.1	25
Tamil Nadu	64.2	53.2	53.3	16.5
Tripura	62.9	65.1	57.6	35.5
Uttar Pradesh	73.9	40.9	51.6	24.3
Uttarakhand	61.4	55.2	45.2	29.2
West Bengal	61	63.2	62.6	32.3
A & N Islands	"	"	"	"
Chandigarh	"	"	"	"
D & N Haveli	"	"	"	"
Daman & Diu	"	"	"	"
Delhi	57	44.3	29.9	17.8
Lakshadweep	"	"	"	"
Puducherry	"	"	"	"

1-Percentage of Children of age 6-59 months who are anemic
2-Percentage of ever married woman of age 15-49 years who are anemic
3-Percentage of pregnant woman of age 15-49 years who are anemic
4-Percentage of ever married men of age 15-49 years who are anemic
Source: http://www.medindia.net/health_statistics/diseases/Anaemia.asp

which are rich in iron were sprayed with poisons and herbicides. Instead of being seen as iron rich and vitamin rich gifts, they were treated as "weeds". As the "Monoculture of the Mind" took over, biodiversity disappeared from our farms and our food. The destruction of biodiverse rich cultivation and diets has given us the malnutrition crisis, with 75% women now suffering from iron deficiency. Many of our iron rich foods are becoming Forgotten Foods.

Banana : The Kalpatharu, the Food of the Wise

India is considered as one of the centres of diversity and origin of the banana. Banana is referred as "Kalpatharu" (The Divine Tree of Life or Wish Fulfilling Tree) due to its multifaceted uses in food, medicine, culture…..

India is the largest producer of banana in the world and also in Asia, and contributes 22.15 percent to global production from 7.4 % area (2009)

Banana flowers are one of the most important forage for Bees. Indigenous bee colonies thrive and develop on Banana crop. The main advantage is that the banana crop is a continuous process and there are always flowers that support bees, even during monsoons. However, the modern varieties like *cavendish* that are grown on mono cultures for which they destroy the flowers to get higher size and yield of Banana, that is dangerous to bees.

Like GM crops that have posed dangers to bees, the GM Banana would be causing double damage to the bees in India as they are the major food source. What kind of impact the GM banana will have on bee biology and what kind of traces

will be found in honey is a matter of great concern that has greater impact on ecology, biodiversity and human health.

The Bee is a indicator of diversity and GM banana can lead to destruction of honey bees. Already 75% honey bees have disappeared. Einstein had warned that when the last bee disappears, humans will disappear.

Considering the nutritive value and fruit value of bananas, it is the cheapest among all other fruits in the country. Banana is the most important fruit crop in India and accounts for 31.7 per cent of the total fruit production.

Health benefits of banana (without genetic engineering)

- Bananas are rich source of energy since it contains sugars such as fructose, glucose and sucrose.
- Because of its fiber (pectin) content it relieves constipation and diarrhoea. Banana with Curd is recommended for Diarrhea because it provides energy , has Kaolin Pectin, while curd has natural Lactobacillus , both acting synergistically It maintains electrolyte balance of the body because of its content of potassium.
- It is found from research that bananas can prevent age related loss of sight to a certain degree.
- Bananas help absorption of calcium from the gut thereby preventing osteoporosis.
- They maintain kidney health and help in prevention of cancer of the kidney.
- Bananas control hyper acidity and heart burn.

GMO bananas are a waste of time and money , an unnecessary risk and a strategy to take control of the banana in its centre of diversity and in the region with highest production and consumption

The Indian Department of Biotechnology has signed an agreement with the University of Queensland to do research/ field trials to develop GMO bananas for saving Indian women from childbirth death due to iron deficiency over the next 4-5 years and launch the GM bananas within 6 to 10 years in India.

Partners for the GM banana project will also include Australia's National Agri-Food Biotechnology Institute, India's National Research Centre for Bananas, the Indian Institute of Horticulture Research, the Bhabha Atomic Research Centre and Tamil Nadu Agricultural University.

India's Biotechnology Industry Research Assistance Council (BIRAC) will provide AUD$1.4 million (US$1.44 million) towards the QUT component of the project and INR80 million (US$1.43 million) towards the cost of the Indian component.

Bananas are rich in nutrition but have only 0.44mg of iron per 100 grams of edible portion. All the effort to increase iron content of bananas will fall short the iron content of our indigenous biodiversity. According to the BARC scientists, they can achieve a 6 fold increase in iron content in GMO bananas. This makes it 2.6mg, which is 3000% less than iron in turmeric, or niger ,or lotus stem, 2000% less than Amchur (mango powder). The safe, biodiverse alternatives are multifold.

Given the public health emergency of iron deficiency, and the inefficacy of the GM banana in providing adequate iron compared to indigenous biodiverse alternatives, the GMO banana project is an irresponsible waste of money, and a waste of time. It will take 10 years and millions of dollars to complete the research to not reach anywhere close to the options biodiversity gives us today. But meantime, governments, research agencies, scientists will be diverted from biodiversity based, women centred, low cost, safe, time tested, democratic alternatives. The National Banana Research Centre has already put GM bananas in its 2030 vision !

While the GM banana brings no benefits, it does bring numerous risks and costs.

First, the GM banana ,if adopted, will be grown as large monocultures, like GM Bt cotton, and the banana plantations in the banana republics of Central America. Since government and Aid agencies will push this false solution, as has happened with every "miracle" in agriculture ,our biodiversity of iron rich foods will disappear. This will further destroy biodiversity, and further aggravate malnutrition of different kinds.

The idea of "nutrient farming" of a few nutrients in monocultures of a few crops has already started to be pushed at the policy level. The finance Minister announced a Rs 200 crore project for "nutri farms" in his 2013 budget speech.

Humans need a biodiversity of nutrients, ,including a full range of micronutrients and trace

elements from a biodiversity of crops and foods. These come from healthy soils and biodiversity based farming systems. For this we need biodiverse organic agriculture based on principles of agro ecology.

Second, our native banana varieties will be displaced, and contaminated.

There is a perverse urge among the biotechnology brigade to declare war against biodiversity in its centre of origin. An attempt was made to introduce Bt brinjal into India which is the centre of diversity for Brinjal. GM corn is being introduced in Mexico, the centre of diversity of corn. The GM banana is being introduced to the two countries where banana is a significant crop and has large diversity. One is India, the other is Uganda, the only country where banana is a staple.

Third, Australian scientists are using a virus that infects the banana as a promoter. This could spread through horizontal gene transfer. All genetic engineering uses genes from bacteria and viruses. Independent studies have shown that there are health risks associated with GM foods.

The GMO banana project also risks the Biopiracy of our rich banana diversity. There is no need for introducing genetically engineered banana , which is a sacred plant and sacred food in India, when banana brings us many health benefits and we have so many affordable, accessible, safe and diverse options for meeting our nutritional needs of iron.

We have to grow nutrition by growing biodiversity, not industrially "fortify" nutritionally empty food at high cost, or put one or two nutrients into genetically engineered crops.

As the Navdanya report **Health per Acre** shows when an acre of farmland is used for organic mixed cropping in place of conventional mono cropping, 39 g of extra iron is produced. This amount is sufficient to nourish 16,250 lactating mothers with iron for a day. On a national scale, the extra amount of iron produced organically would be sufficient to meet the requirement of 20 billion hypothetical lactating mothers. Even if only part of this iron is absorbed, biodiversity offers us the potential of ending iron deficiency anemia, not just in India, but across the world.

There need be no iron deficiency if we intensify biodiversity in our farms and gardens and food. ❑

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