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To,

Sri Narendra Modiji, The Hon'ble Prime Minister of India,

South Block, Raisina Hills, New Delhi, 110001.

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Subject: The environmental release of GM Mustard, for seed production

- Reference:** 1. Press note on Environmental Release of GM Mustard by GEAC, MoEF & Climate Change, issued by Dr Himanshu Pathak, Secretary DARE and DG, ICAR dated 23rd Dec.2022 appearing in various media reports on during last few months.
2. Times of India Editorial Dated 26th Dec. 2022 on ICAR's GAG order to employees, ex-scientist is indefensible & can hurt scientists and farmers.
3. Our earlier letters by speed post addressed to PMO and Ministry of Environment, Forestry and Climate Change (1) Dated 6th July, 2017 (2); 20th June, 2020; (3) 05th Dec 2022, and (4) e-mail dated 10th Oct. 2021.

Hon'ble Prime Minister Sir,

With reference to the above subject, it has been observed that the press statement made by Dr Himanshu Pathak, Secretary, DARE and DG-ICAR, although said to be an official clarification, includes undue threat to the scientists on one side and warned the academicians opposing the decisions of ICAR or GEAC will be subject to administrative action. The biased assessment of the scenario emerging due to approval of GEAC to debatable GM hybrid DMH-11 (mustard) seed production, he considered the opponents' view as myth and lame allegations.

In this context kind attention is invited to the letters under reference from Krushi Vaidhnyanik Manch, Nagpur, where in an appeal was made to stop the GM crop varieties containing "Herbicide Tolerant Genes" having hazardous effects on overall Indian Agriculture as well on the health of Indian Population. The genetic modification with Bar, Barnase, Barstar genes, originating from 2 strains of bacteria which have never been part of human diet, and the insertion of a novel cassette which includes promoters, enhancers etc. can create novel proteins with unpredictable impacts. Further,

the Herbicide Tolerance (HT) genes embedded in the GM mustard hybrid will facilitate the spraying of a herbicide, glufosinate ammonium, which is damaging for health. Our regulatory mechanism is not effective to stop the spread of banned seed or chemical inputs reaching to the ignorant farmers.

Let it be very clear that we are not activists against Genetically Modified plant varieties. As a Scientific community we may support GM technology, when it is worth the benefit of human beings. However, in national interest the stand taken by Dr Pathak has found objectionable content, suppressing true scientific spirit in the ICAR systems, which are presented below for right action of the Government.

While showing favor to GM Mustard (very similar to the proponents of the hybrid DMH-11), Dr Pathak focused on the statistics of import of edible oil, without any data on the merits of GM hybrid over those high yielding varieties / CMS based hybrids. As per the data available on multilocation trials at 10 locations under AICRP on Rapeseed and Mustard, DMH-11 had 1.5% less average yield than the then non-GM check DMH-1. Thereafter the data of the yield trials of hybrid DMH-11 against recommended check varieties or hybrids used in AICRP-ICAR program had not been made available. It is illogical to meet out the import with a genotype with the yield levels lower than present varieties/ hybrids. The press note tried to present the irrelevant information and had not overruled the limitations of HT transgenic mustard hybrid, put forward by the opponents of DMH-11. Few questionable points given by Dr Pathak are elaborated below.

- The press note tried to explain the need for hybrid mustard on the basis of gap between domestic production and demand, the shortfall being managed through import. However, DMH-11 was found to be non-competitive in yield performance in the trials conducted during 2006-7 under AICRP-ICAR system. The hybrid is being posed to revolutionize Indian Agriculture, without further progress beyond DMH-11 evolved in 2002, during the last 15 to 20 years.
- To justify the GM hybrid, the theoretical basis of genetic divergence of the parents is being explained to the press. The learned plant breeders and academicians in the country are very much conversant with the phenomenon of heterosis and hybrid vigor. First elementary course on breeding hybrid genotypes, explains that heterosis can be useful positive as well as harmful (negative) in respect of yield,

quality, adoption etc. Practically farmers will be interested in useful heterosis, rejecting all those who are depleting yield or other traits for which hunt is there.

- Secondly, the term heterosis is further classified as heterobeltiosis (heterosis over better parent) and standard heterosis (over the best variety/ hybrid in vogue). In the interest of farmers, breeders are always looking for standard heterosis to have a better hybrid than the existing hybrid or variety. The proponent from Delhi University explained in one of their papers that DMH-11 has about 28 percent heterosis over its parental variety 'VARUNA', which has gone out of cultivation in Mustard growing region and replaced by other high yielding varieties for the last many years after the year 2006. Thus, this is heterobeltiosis (not standard heterosis), which is not useful when the better parent (Varuna) itself is low yielder than the ruling varieties. Thus, **the scientific term “heterosis” is not explained properly, but used for confusing the public.**

- **In the press DG, ICAR expressed 28% higher yield of DMH-11 over national check, which needs to be verified once again.** The statement of Dr Pathak mentioning “it is relevant to test DMH-11 against, current checks, and if it stands in significant superiority, it will be released” indicates that he is aware of the fact that the age old variety Varuna has been dropped from the list of national check as early as 2006 under AICRP-RM yield trials and replaced by the much better high yielding varieties and hybrids. It is already known from the data generated from Multilocation trials at 10 locations during 2006-07 that DMH-11 is not superior in yield and seed size than non-GM hybrid DMH-1. Now there is further good progress made in improvement through public as well as private sector breeding programs.

- **There is no comparison of DMH-11 in the BRL trials, conducted at very limited number of locations during 2010 to 2014 by Delhi University (DU) under NDDB sponsored project as the trials had been without the recommended national or zonal checks or the non-GM hybrid check.** Has it been the purposefully done by the planner (DU) to avoid the conflict? When the execution of the BRL trials, had been with DU, without practical involvement of AICRP-RM (except using its' centers/ locations), it lacked the transparency to doubt that the comparison was purposefully avoided. When, DMH-11 did not found better in yield than DMH-1 in national research trials, **“Why Dr Pathak wanted now to have yield testing**

of DMH-11, after about 16 years after 2006 against today's best checks?"
What is the sanctity of the statement of 28% yield advantage over Varuna?

A sensible Mustard Breeder or a crop improvement worker, working for good hybrid beyond DMH-11, must have brought higher level of production in a form of new HYBRID during past 2 decades of existence of old DMH-11 (2002 to 2022), which has not been done by DU. In this situation, we feel that DG-ICAR is using his undue weightage to favor DU or Ex-Vice Chancellor Dr Pental and suppressing the better high yielding varieties/ hybrids in progress of Mustard improvement at other conventional centers under the SEED ACT, 1966. Is it a special obligations on his part?

- Global higher average productivity of Rapeseed-Mustard (2.0 t/ha) against 1.28 t per ha in India is not due to hybridity alone. The environment and physical resources used and other conditions of the regions having high yields of >2.5 tones/ha are very different than those in our country. Hybrid is not a single solution, as we experienced the miracles of green revolution in the crops like wheat and rice through high yielding varieties not hybrids.
- **Barnase-barstar-bar male sterility system is being posed as an effective** for hybrid seed production as compared to presently used CMS system, without any substantial experimental evidence or comparison. Theoretical purity parameters of rapeseed-mustard are being focused, without its practical implications. **Seed standard has its jurisdiction under the Seed Act, 1966.** We allow the seed to be certified with 80% germination and 98% genetic purity, even when we can have the best 100% purity and germination. Definitely there can be improved efficiency of the existing CMS based seed production system, based on synchrony of the flowering and many more management aspects.
- GM sterility systems based on **the HT (in both the parents) and their enhancers in male parent are inherited to the hybrid**, which is the greatest risk for the Indian food crop production system in the form of...
- Enhanced possibility of expanding the hazardous weedicide use in annual food crops.
- Known inherent mechanism of the development of tolerance in the weed species to create super weeds, which are on scientific records.

- Glufosinate Ammonia is a hazardous weedicide to cause neurological disorders in humans and hence, extra cautious field application through a regulatory mechanism is needed, which is really difficult to execute. It has been experienced for the last few years, in case of expanding illegal use of banned weedicides and HT transgenic products like BG3 cotton and Bt Brinjal).
- The weedicide residue through runoff and percolating moisture can pollute groundwater resources to have a threatened biological life in the vicinity and expanded area through the flood water.
- With mass scale cultivation of HT variety or hybrid, the enhanced weedicide use cannot be ruled out, involving further damage to our conventional mix or inter-cropping system. Moreover, it can make our farmers dependent on the variety of seed under the custody of MNCs. Should we consider this as a 'MYTH'?
- The Barnase-Barstar system is "dominant male sterility" being suppressed temporarily in hybrid. The genetic segregation of the sterility genes in the hybrid can cause the out pollination to cause the irreversible damage to the productivity of the existing crop of the varieties of mustard.
- To conclude, Indian researchers and farmers are known for last more than 50 years (as early as 1965), to be well skilled to succeed in the CMS based hybrid sorghum, Bajra, Pennisetum, Maize **making India a GLOBAL SEED HUB with \$ four billion seed market**. The hybrid seed has been exploited in all possible ways. World breeders are aware that India succeeded to apply tedious mechanical processes of hybridization to produce hybrid seed of cotton and many vegetables on commercial scale. The Mustard can't be exception to use CMS in better way provided proper leadership like Dr CT Patel, Former Cotton Breeder from SURAT is allowed to do his job.
- The proposal, although recommended by GEAC in 2017, was rejected by MoE after a long debate on the issue. Now, it has been recommended by GEAC for seed production, without the consideration of past debated points. The risk prone GM male sterility system is being proposed to finalize new generation hybrids, without studying the merits of other available methods of seed production, is definitely a special favor to GE technology, without any

transparency in data exchange and discussions. Now, DG, ICAR has indirectly threatened the Academicians in the country, not to open the voice against the regulators even if they observe problems in the national interest.

Is it a special favor shown by ICAR to GEAC in respect of the DMH-11?

- **BIOSAFETY CONCERNS:** As reported in the scientific journals, it is very vague statement to say that the biosafety studies on toxicity, allergenicity, and environmental safety about the GM, which normally require few decades to visualize them in the target species passing through few generations of experimental plants and animal. If at all such experiments have been done, they should not be restricted for verification by interested parties. They should be publicized widely and made public rather than kept as confidential documents.

- There are few lines on bee visits to GM hybrid DMH-11 reported in DG's press note to compare transgenic against non-transgenic mustard. However, it is not clear what types of bees they studied, and what is the type of their activities in Mustard crop. It is very difficult to conclude from the limited locations and area spread, as the scientific reports from Canada and other countries reported the significant reduction of the bee activities due to the toxic environment created by the GM crop. Whereas, it is mentioned that **"the current approval has been given based on the international status on growth in honey production and number of bee colonies, particularly in CANADA, which has 95% of rapeseed area under Barnase/Barstar based hybrids"**. There are the references contradictory to this fact from Canada itself. This is the status of biosafety study agreed in press note itself. Who will confirm the biosafety, other than Ministry of Environment? Can the HONEY BEE research project/ institute (of Ministry of Agriculture) or some other institute of AYUSH MANTRALAYA will help in such studies to have more reliable and reasonable third party evaluation? Regulatory authority has nothing to do here and **it is very funny to agree that "as precautionary principle, GEAC has directed the developer of DMH-11 to generate the data..."**. Therefore, there is a space to doubt that important RISK ISSUES are being hidden and there is a special favor by ICAR and GEAC is promoting banned technology. How to allow

spread of hazardous Herbicide Tolerant transgenic food crops in this country without confirming various issues of biosafety.

- Another **point about the biodiversity has not been touched in the press note** justification given by DG, ICAR. It has more complications and more serious consequences to eliminate our local high yielding *Brassica* germplasm of Rapeseed Mustard group due to dominant nature of male sterility system.
- The medicos, Academicians and agricultural scientists in their appeal to the Hon'ble Prime Minister and other authorities made aware of the risk of loosing the sovereignty of indigenous seed of our conventional cropping pattern. It is being considered by Dr Pathak as "a lame allegation" and tried to justify that the proponent of DMH-11, has not claimed to thrust on the weedicide use in hybrid, and is limited to seed production. **Does our regulatory system is full proof to stop the farmers from using hazardous herbicides when the hybrid is tolerant to a particular one?** No one can, as we see that illegal availability of prohibited seed, chemicals, pesticides, herbicides etc. Reaching the farmer's fields. There is rampant unchecked use of 'Glyphosate' in annual crops like soybean, cotton, pigeon pea during last few years in this country. The seed of Bollgaurd-3, a Bt-HT hybrid cotton had been in the illegal market to which many farmers succumb due to ignorance.

To conclude, heterosis is not explained properly but it confuses the public. DMH-11 is not better in yield than current checks in national research trials. On biosafety concern, compliance is needed and GEAC has now directed the developer of DMH-11 to generate the data. The seed production of hazardous Herbicide Tolerant transgenic food crops in this country without confirming the yielding ability is not justifiable, sidetracking various biosafety issues? It is more critical when the **regulatory system is not full proof to stop the farmers from using hazardous herbicides and seed, when the hybrid is tolerant to a particular herbicide?** No one could stop the illegal use of prohibited seed, chemicals, pesticides, herbicides etc. reaching the ignorant farmers. The desirable aspect of transparency in the research in the interest of farmers as well as the consumers, is being over rided by the directives by Director General, ICAR.

It is therefore requested (1) to issue suitable directives to ICAR as well as to the Ministry of Environment, Forest and Climate Change to deal the HT transgenic with proper biosafety and environmental safety measures, considering the national interest; (2) to impose complete ban on all HT crops, including GM mustard which has herbicide tolerance properties, as increased use of herbicides is dangerous to health; (3) to implement rigorously, the recommendations of the Technical Expert Committee of the Supreme Court, and the reports of the Parliamentary Standing Committees and (4) to regulate the present illegal spread of GM crops seed (like HT cotton Bollgard-3) and illegal use of banned herbicides in annual crops.

Thanking you.

Yours' Faithfully,

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