

**RECOMMENDATIONS OF THE TASK FORCE
ON
BIODIVERSITY & GENETICALLY MODIFIED
ORGANISMS (GMOS)**

**ASSESSMENT
IN THE
ENVIRONMENT AND FOREST SECTOR
FOR THE
XI FIVE YEAR PLAN**

PLAN (2007-2012)



सत्यमेव जयते

PLANNING COMMISSION

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PREFACE

The task force on Biodiversity & Genetically Modified Organisms (GMOs) for the Environment & Forests Sector for the Eleventh Five-Year Plan (2007-2012) was set up by the Planning Commission vide its notification of 21 August 2006. The detailed TOR and the composition are given below. Vide its order of 31 August 2006, the Planning Commission notified the appointment of representatives of the Ministry of Environment and Forests (MoEF) to each of the task forces.

Chairperson: - Dr. Suman Sahai

The task force report was prepared on the basis of inputs provided by Dr. Bala Ravi, Sri Dinesh Abrol, Dr. Ilse Koller Roleffson. Dr. Rajeswari Raina, Dr. Sagari Ramdas, Dr. S K Raina and Dr. Suman Sahai.

The representatives of the Ministry of Environment and Forests nominated to the task force were:

Dr. R. Warriar, Addl. Director

Dr. Sujata Arora, Addl. Director

Terms of Reference of the Task Force were as follows:

1. Review the current laws, policies, procedures and practices related to conservation and sustainable use of agro-biodiversity and proper management of GMOs and recommend correctives.
2. Similarly review the institution and individual capacities available to address issues related to conservation and sustainable use of agro-biodiversity and proper management of GMOs and recommend how they may be adequately strengthened.

3. Specifically examine the implementation of Biological Diversity Act and the Protection of Plant Varieties and Farmers' Rights Acts and ways of promoting synergies in their operation.
4. Also examine the possibilities of enacting an act to protect domesticated animal diversity and herders' rights
5. Explore ways of promoting the much needed inter-sectoral dialogue amongst Environment and Forest, Agriculture and Animal Husbandry Ministries to address issues related to conservation and sustainable use of agro-biodiversity and proper management of GMOs.
6. Ministry of Environment & Forests will provide basic information and data input to the Task Force as and when required.
7. The Chairperson of the Task Force will be free to co-opt any official / non-official as special invitee for its meeting.

The task force had its first meeting on 14 September 2006. Based on this meeting and other consultations, the report has been finalised.

MAJOR RECOMMENDATIONS

I. AGROBIODIVERSITY CONSERVATION

- The institutional system designed for conservation, monitoring and sustainable utilization of this biodiversity under Biological Diversity Act includes Biodiversity Management Committee at panchayat level and State biodiversity Board at state level. The BMC is required to establish and maintain people's biodiversity register. Establishment and continuous nurture of the BMCs constitute the brick and mortar of biodiversity conservation and national database on biodiversity and associated knowledge. In reality this will not be achieved without extensive capacity building at community level and support under BMC fund. According to this Act, the Central Government (meaning Ministry of Environment and Forests) is responsible for training and public education to increase awareness with respect to biodiversity. *Five years since the enactment of this law, nothing tangible on public awareness is done. There is urgency to take up this capacity building to grass root institutions and the communities. Here, apart from the government agencies, NGOs can play important role. Planning Commission may grant high priority to this institutional and public capacity building during the XI Plan.*
- An important strategy for conservation of agrobiodiversity should be identification of locations/regions, which are hotspots of the genetic diversity of each crop plant and taking focused measures to promote their *in situ* conservation in conjunction with *ex situ* preservation. It is important to recognise that only *in situ* conservation allows farmer influenced evolution of new variability adapting to the micro-dynamics of agro-ecosystem and the macro-dynamics of the environment, including climate change. This demands a national mapping of agrobiodiversity hot spots of all those crops for which such information is lacking. Those regions with

high concentration of genetic diversity on major and strategically important crops may be declared as 'gene sanctuaries'. Unlike the sanctuaries of wild diversity, agrobiodiversity can be conserved and enhanced only with continuous interaction with farming communities. Therefore, communities within such gene sanctuaries are to be encouraged for conservation and enrichment of diversity involving diversity-based income generation and compensation for opportunity cost along with institutional support and enhanced capacity. A slightly modified approach may be used for promotion of conservation of agro-biodiversity outside such gene sanctuaries.

- Agrobiodiversity conservation, wherever possible, may be promoted to create an economic stake in the conservation. However, every component of agrobiodiversity may not be amenable to this. Conservation is also associated with the cultural value system of the community. Therefore, approaches promoting conservation have to give emphasis on the associated cultural and economic aspects of the community along with new opportunities for value addition and marketing.
- While the right of every farmer and community to gain increased economic benefit from change over to HYVs, on their own choice, cannot be restrained, a strategy to persuade them for continuing with traditional varieties have to involve capacity in location-specific value addition and market access and financial compensation for the opportunity cost.
- Farmers' Rights are an important component of Indian law on Protection of Plant Varieties and Farmers' Rights Act. Realisation of these rights by farmers is important in promoting conservation and enhancement of agrobiodiversity by farmers. This Act has a framework to promote *in situ* and *ex situ* agrobiodiversity conservation by involving panchayat institutions, particularly in regions known as 'hot spots' of genetic diversity of each

crop with the assistance from National Gene Fund and by recognizing and rewarding farmers and communities engaged in conservation. Operationalising the National Gene Fund and a national recognition and reward system together with extensive capacity building of farming/tribal communities are important in promoting agrobiodiversity conservation. It is hence recommended that during XI Plan the Planning Commission may provide Rs 50 Crores to PPVFR Authority to support *in situ* and *ex situ* conservation of agrobiodiversity and another Rs 50 Crores for instituting a regular recognition and reward system for farmers and communities engaged in conservation. The PPVFR Authority also needs to be encouraged to involve NGOs in undertaking the capacity building of communities on conservation.

- An *in situ* as well as *ex situ* conservation program for traditional varieties must be established in areas known for their genetic wealth. Seed Exchange Programs of the kind being run for Paddy ,by the Jharkhand government should be stopped unless provisions are made to conserve the traditional varieties collected in exchange for HYV.
- It must be made mandatory that the EIA of all Schemes and Programs (specially related to Ministries of E.&F and Rural Development), must also assess the impact on the biological resources and the access of the major stakeholders (like farmers, herders to such resources, changes in cultivation and other livelihood practices) to biological resources.
This should apply to all Programmes and Schemes taken up by the Government and those sanctioned by the Government for implementation by private, civil society or other sectors.
- Initiate learning platforms for conservation of ag-biodiversity. These platforms should be active repositories of documentation of indigenous practices of seed storage, cultivation and conservation of all crop

plants/varieties, including their relevance in local ecosystems and application in local diets/cultures.

Several such documentation exercises exist (for example with ICAR, CSIR, and even ICMR institutes). But these documentation exercises have to be modified to enable validation of the scientific principles and to enable integration of these scientific principles and knowledge for conservation into contemporary cultivation patterns. Unlike documentations with research institutes, these learning platforms must be dynamic - they can provide regular monitoring and assessment information.

- Enhance local stakes in ag-biodiversity.
Build eco-tourism programs around theme of genetic wealth and conservation, to create a local stake in conservation of local ag-biodiversity which becomes a tourist attraction and source of revenue and helps to revive pride in the historic and cultural specificities of the genetic wealth of the area. Varieties of specific crops like ragi, tenai, etc. and types of rice like the traditional red rice of Kashmir, Tamil Nadu and Kerala, the black rice of Manipur etc. are potential tourist attractions and income for local people.
- Analyse annually, the cross-cutting issues/programmes related to ag-biodiversity within Government – Ministries, Departments, etc. and private/civil society activity that affect ag-biodiversity.
These analyses are essential to identify programmes that work at cross purposes or tangentially, and to enable convergence of these programmes to enable conservation. They can form the information base line to strengthen inter-ministerial linkages, monitor conservation and loss of germplasm or diversity, etc.

- For long term conservation, set up field level Gene/Seed Banks in all agro-ecosystems – particularly in areas that are rich in agricultural biodiversity, including wild relatives of crop plants.

India is a Center of Origin of major crop plants. Conservation in national level gene/seed banks must go hand-in-hand with local field level gene/seed banks with local ownership at the agro-ecosystem level or district level (whichever is smaller and more manageable). The current policy fascination at the State level for biotechnology parks or technology parks in general can be used to this end.

The field level gene/seed banks can be linked to local governance structures like panchayats, district development committees, watershed committees, gender and development commissions, etc.

- Create legal instruments to establish collective ownership and management rights of all local varieties and cultural practices documented.

This must draw from documentation of existing cultivation practices, herder's rights, etc. in 3 above (including historical analyses of changes/losses to these varieties and local rights that have happened since independence). Existing legal instruments like the RTI Act, and campaigns like the Right to Food Campaign may feed into creating and working these legal instruments.

- Conditions for DUS requirements for variety registration should be revised in the interest of conserving agrobiodiversity. There is an urgent requirement to develop the domestic legal framework affecting the national seed system in a compatible direction. There should exist not only a sufficient incentive but also an explicit obligation on all the right holders to provide for the maintenance and development of agro-biodiversity.

- Within the domestic legal framework, in India Protection of Plant Varieties and Farmers' Rights Act (PPVFR, 2001) provides for the protection of rights for both plant varieties and farmers varieties. At the core of PPVFR are the plant breeder rights (PBRs), In PPVFR, 2001, though the access to and control of genetic resources for the third parties is facilitated by the breeder' exemption and the farmers' right to sell, save and reuse, the criteria for variety protection –the so called “DUS requirements” on Distinctness, Uniformity/ Homogeneity and Stability of new plant varieties-impact on plant variability and can be harmful to Agrobiodiversity.
- Within the DUS requirements, the uniformity criterion puts an excessive burden that can have a deleterious effect on biodiversity. It aims at restricting genetic diversity within a plant variety, because in order to apply for PBRs it is necessary to do so. In the field, however, uniform varieties are less able to buffer stress (diseases, lack of growth factors) without suffering major qualitative and quantitative losses. At the same time, the uniformity criterion precludes the protection of old landraces and farmers varieties, which are frequently rich in genetic diversity within a variety. From a wider perspective, the uniformity criterion is identified as a factor that makes PBRs biased towards plant breeding for unsustainable agriculture.
- Further, compliance with the distinctness criterion also inclines breeders to develop varieties that are highly adjusted to production systems based on monoculture catering to large markets for providing maximum profitability in shorter and shorter runs. These varieties have lower adaptability. The exclusive focus on distinctness of characteristics, particularly when specified as being distinct in any one characteristic, is limited to focusing on phenotypic diversity. The degree of genetic diversity implied by phenotypical diversity neglects completely the issue of genetic distance or the relationship between varieties.

- In PPVFR, 2001, since the guidelines for the DUS requirements are in the process of being worked out at the moment, it is possible and necessary to frame the criterion in such a manner that the harmful effects of IPRs on Agrobiodiversity are duly minimized to the maximum possible.
- We should replace the uniformity requirement with a criterion requirement that does not prescribe homogeneity and permits sufficient heterogeneity. It is suggested that the uniformity criterion should be so framed that this may also allow the inclusion of farmer-varieties. Worked out as a requirement that fulfils the legal need for identifying the protected subject matter it will put in place in the implementation of legislation itself some safeguard against the erosion of the genetic diversity.
- Since the distinctness criterion tends to enable a low threshold for inventive step, permits cosmetic breeding and also creates lower adaptability for the commercial system of agriculture, we should enhance the threshold of distinctness by introducing a qualification for 'important characteristics' (which existed in UPOV 1978) such as 'traits of agronomic value'.

1.1.1 II. HARMONISING THE PPVFR AND BIODIVERSITY ACT

- Conservation is the mandate of both the Biological Diversity Act and the Plant Varieties and Farmers' Rights Act. While the purview of BD act is the biodiversity in its totality, that of PPVFR Act is limited to agro-biodiversity. The BD Act provides for a separate 'Agrodiversity Committee' under the NBA. Thus both these Acts have overlapping mandate on the conservation of agrobiodiversity. A closer examination of these Acts, however, reveals that while BD Act gives inclusiveness to the

agrobiodiversity in the scheme of things with regard to grass root level conservation and access by non-Indian entities, the PPVFR Act provides well defined process and institutional system including National Gene Fund and recognition and reward system for promoting conservation of agrobiodiversity. The PPVFR Authority instituted under PPVFR Act will be better equipped than NBA in supporting the agrobiodiversity conservation. It is recommended that required harmonization between PPVFR Authority and NBA is achieved on agrobiodiversity conservation.

- Similar overlap in the role and responsibilities of the NBA and PPVFR Authority exists in the case of benefit sharing. This is notwithstanding the Section 6 (4) of the Biological Diversity Act excluding NBA from the responsibility of determination and disbursement of benefit share arising from the grant of Plant Breeders' Right under the PPVFR Act. Despite this overlap, there is a gap in the roles of both these Authorities in this respect. The legal writ of PPVFR Authority is limited to the national boundaries. Its mandate on benefit sharing is limited to varieties registered for PBR in India. One important criterion for determination of benefit share is the commercial potential of the variety. This Act, however, has no role on issues concerning the export of seeds of registered varieties or on trade established in foreign lands using varieties originated from India, which are registered or not under PPVFR Act. The seed in trade is dealt as a merchandise and not as a component of biodiversity falling under the regulatory framework of BD Act. Hence seed is allowed for unregulated movement outside the country as exported commodity. Under the BD Act, benefit share becomes mandatory during a material transfer agreement with a non-Indian entity accessing a component of Indian biodiversity and when an IPR is established, either in India or elsewhere, on innovations based on Indian biodiversity component or associated TK. This gap related to benefit sharing from trade of seed outside the country needs to be bridged to make the benefit sharing on agrobiodiversity fair and

equitable. Also as suggested in another para, the seed export may be limited to varieties registered under the PPVFR Act and under Seeds Act.

- Some of the important regulations on seed trade provided under the Seed Act (also expanded in the recent Seed Bill) need to be harmonized with the concerned provisions of the PPVFR Act as well as the biosafety guidelines in place. The PPVFR Act allows farmers to save, share or exchange or sell saved seed. Any prospective legislation on seed has to be in conformity with this right of farmers on seeds. Similarly, the PPVFR Act provides for payment of compensation to farmers for underperformance of registered and commercially sold seed. There is an identical provision in the Seeds Bill with a different and less defined process for compensation. These provisions proposed in Seeds Bill need harmonization with existing Act, rules and regulations. The PPVFR Act provides 15 or 18 years for the exclusive commercial right on the seeds of registered variety. The registration period under Seeds Bill, when made exclusive on a variety either by IPR or by trade secrecy, has to harmonize with the duration provided in PPVFR Act. Another important aspect is the commercial transactions of GM seed, including seed production to be allowed under Seeds Bill have to be rendered totally consistent with the biosafety guidelines on GM crops already in place.
- The PPVFR Authority established under the PPVFR Act has the mandate to register plant varieties for the purpose of recognizing Plant Breeder's Right (PBR). The registration of plant varieties is done only on testing the varieties for distinctiveness, uniformity and stability (DUS test). This test is now being proposed to be done directly by the ICAR and SAUs, who will also be applicants for the registration. As the varieties nominated for registration may come from ICAR, SAUs, private sector and farmers, it is important that the institution conducting the DUS testing has to be independent with non-partisan interest in the test results. This calls for

neutral and autonomous institution associated with the PPVFR Authority, with out vested interest in any of the test entries for conducting DUS testing. Such independent institutional structure is available for DUS testing in UK and rest of Europe. Establishment of such autonomous and independent institution with linkage to PPVFR authority is important to render the DUS testing and the process of variety registration healthy, fair and transparent. One could call this institute as National Institute of Plant Variety Testing. This institution may also be entrusted with independent testing of varieties for their agronomic performance (as required under Seeds Bill). It is recommended that Planning Commission may grant a budget of Rs 100 Crores under XI Plan to establish and run this institute.

- The current free seed export facility and exemption of commodities like seed from the purview of Biological Diversity Act is causing unchecked and unauthorized flow of agricultural germplasm outside the country. Hence, seed trade should be regulated to export seeds of varieties registered under PPVFR Act, in substantially large bulk quantities of seeds of any variety or kind, whose production had been specifically under taken for the purpose of export. The regulation should prevent shipments of small seed quantities of seeds of any variety or kind, which is not registered under PPVFR Act and to the countries, which do not recognize the national law on variety registration.

III. PROPER MANAGEMENT OF GMOs

- There is an urgent need to radically change the composition and functions of the bodies that are designated to manage GM technology. Maintaining status quo and ignorance could lead to wrong decisions that could end up hurting Indian farmers. Choices made without adequate

communication and information could pose immense danger to the environment of this country and the health of its people.

- Create with immediate effect legally mandated State Level Committees and District Level Committees for release, monitoring and documentation, and analysis of GMOs.

The unbridled spread of the illegal Bt cotton, Navbharat 151 and the failure of the GEAC to control the situation even many years down the line do not inspire confidence in its capabilities. The fact that GEAC authorized commercial cultivation of Monsanto's Bt cotton even when there were no State or District level Committees to oversee and monitor its release and cultivation, did stir several controversies – some of which are campaigns against the biosciences in general. The lack of State and District level authorities, especially in any of the six states where Bt cotton varieties (legal and illegal) are being cultivated, raises disquiet about the GEAC's flagrant disregard of the law.

- All regulatory bodies - especially the GEAC should be technically competent. Specific competence on Risk Assessment and Risk Management of GM crops as also on Monitoring and Information Systems skills are necessary in regulatory bodies or committees.

At present members of the GEAC are not qualified to understand the process of Bio safety Assessment, Environmental Assessment or Environmental Impact Assessment, which are central to their functioning. This means that they are not qualified to interpret the data that is placed before them for evaluation. The regulatory structure must be competent and independent to inspire confidence. It should be able not just to assess Biosafety and should be able to seek/contract assessment of aspects like social and economic impacts. The latter are, particularly important to understand the processes of change induced by GMOs and impact on

small farmers, agricultural workers, other traditional livelihoods like traditional medicine, herding, etc.

- A process of consultation and redefining methods and best practices of risk assessment may be initiated for All-India and State levels.

The *UNEP International Technical guidelines for safety in Biotechnology* outline the following steps for identifying potential impacts and assessment of risks:

- Identify potential adverse effects on human health and/or the environment
- Estimate the likelihood of these adverse effects being realized
- Evaluate the consequences should the risks materialize
- Consider appropriate risk management strategies
- Estimate the overall potential impacts that may be beneficial to human health or the environment.

The Indian regulatory system for GMOs can draw upon this and add necessary modifications – to suit the diversity (and potential risks) among and within States.

- It is proposed that the regulatory function be divided into two parts, one Advisory, the other Statutory.

Advisory Body

The Advisory body should have a broad based multidisciplinary membership that includes all relevant scientific disciplines, social scientists, environmentalists, civil society groups, members of farming and *adivasi* communities, representatives of panchayati raj institutions, legal experts, and civil servants (bureaucrats). A person of the highest technical caliber and social commitment who has experience in the regulation of GM crops should head the GEAC.

1.1 Statutory Body

The statutory body should be an independent body staffed by people skilled in Bio safety Assessment, Environmental Assessment and Environmental Impact Assessment. This body should have overall responsibility for all aspects of risk assessment, risk management, risk communication leading up to decision-making about the safety of a GM crop for the environment, human and animal health and post release monitoring. It is important to ensure that there is no conflict of interest and rules should be framed in a clear and unambiguous manner so that it is not possible to stack the Agency with any particular kind of people.

The regulatory process should be transparent, accountable and technically competent. Data from field trials and the rationale for decision-making should be available to the public. A cost benefit and a risk benefit analysis should be conducted before decisions are taken and clear-cut channels should be created for the public to participate in the decision-making process and to voice concerns. There should be an annual review of the decisions taken on GM products and the rationale for these decisions. This review should be presented to Parliament. The future of biotechnology in general and GMOs in particular rests on the confidence that the country has on its regulatory authorities and processes.

- Develop protocols and reporting procedures for technology providers in GM crops/seeds: To manage GMOs it is crucial to have technical competence, transparency and accountability on the part of the technology providers so that they are made accountable for the GM seeds they sell.
- The Government of India must put in place a legally enforceable regime for liability and redress BEFORE any further commercialization of GM crops. Technology providers must be made accountable for any harm

caused by their products and be made responsible for the recall of dangerous products.

- Within research institutes/programmes, procedures and standards must be set with respect to varieties and locations, for the conduct of Field Trials, Large Scale Trials and for All India Coordinated Trials of GM varieties.

Right now this information is not public. Information on all these trials must be made public.

Right now, these trials and their actual and potential collaboration with others (private sector, panchayats, etc.) and processes of participatory varietal selection etc. have not been organically linked to the organizational practices and working conditions of scientists/technical personnel.

- Each State must initiate capacity building exercises for proper management of GM crops. Capacity must be built at the level of Panchayats, District Level Committees and State Level Committees to enable them to competently monitor trials and detect and report violations.
- The national regulatory authorities and the DBT itself must facilitate awareness and understanding within the judiciary on issues related to agro biodiversity, its conservation and sustainable use as well as the need for stringent regulatory systems for GMOs.
- Public participation must be ensured in key decision making bodies, including setting the research agenda, evaluating alternative research programmes to achieve stated purpose/goals, evaluating field trial data, assessing cost and risk–benefit analyses and final approval for commercialization.

- A Citizens Jury of eminent experts should be set up to monitor the overall direction of the GMO program in the country, suggest mid term correctives and hear public concerns.

This jury may be treated as a Supreme Court for GMOs, where every actor, the State, private and public sector organizations, farmers/indigenous communities, political parties, environmental movements etc. can register their views/complaints/criticisms and expect suggestions/advise on ways to address these issues. It must be mandatory that all actors respond to a query or suggestion made by this jury, with an explanation on agreement or otherwise, action taken or not, etc.

1.2 Creating appropriate Policy Framework for GMOs

- The policy framework for proper management of GMOs is located within a wider biotechnology policy, agricultural policy, S&T policy, and environmental policy. Proper management of GMOs will be confined to printing ink and paper unless and until policy dialogue among different compartments of the Indian bureaucracy that shapes or has an impact of Indian agriculture, is facilitated.

The Government of India, through its DBT must initiate this process, and a comprehensive policy for GMOs be developed within two years.

The national policy on GMOs should follow the recommendation of the M.S. Swaminathan Task Force on Agbiotechnology, which says the implementation of Agbiotechnology must seek the *'economic well-being of farm families, food security of the nation, health security of the consumer, protection of the environment and the security of our national and international trade.'* Thereby, specific issues to be considered are:

- ◇ To start with, a comprehensive biotechnology policy approved by stakeholder consultations must be put in place.
- ◇ The current ad hoc programs on GMOs in agriculture must be stopped until a policy framework has been finalized. A policy must be developed for transgenic varieties for which India is a center of origin and diversity, particularly rice. Commercialization of GM rice should be deferred until a body of data is built up on its safety under Indian conditions. India has a special responsibility to protect the native germplasm of rice from incursion of alien genes.
- ◇ There should be a consultative and participatory process to prioritize crops and traits for genetic improvement through biotechnology with the goal of addressing the needs of small farmers and Indian agriculture.
- ◇ Excellence must be built into public sector research institutions and novel gene discovery in crops of relevance to India should get highest priority
- ◇ Herbicide tolerance trait is a that will displace agriculture labor which does manual weeding, destroy vegetation that is used by rural communities as supplementary food, fodder and medicinal plants and disallow multiple cropping systems. State level and District level committees must be in a position to assess these contexts – of labour supply and demand constraints and estimate where and how GM crops with these traits can be cultivated.
- ◇ A program of awareness generation about GM technology must be undertaken to educate the public and a series of public debates should be organized across the country to elicit the views of the people, to channel it into policy making. The government should fund this exercise.
- ◇ The GM crop research agenda must be sensitive to India's trade interests. It would be foolish to indulge in Bt Basmati and jeopardize the Basmati export market to Europe . It would be to produce GM

soybean when India is the only certified non-GM soybean producing country in the world.

- ◇ Review the policy of promoting GM crops vs Organic crops , assessing the USP of particular agriculture zones like rain fed areas, hill states and mountain ecosystems.
 - ◇ The ministries of E&F, Agriculture and Animal Husbandry must set up an inter ministerial committee to review mandates and coordinate common or overlapping activities and evaluate the changes and rules and practices within each dept.
- A distinct law should be enacted to oversee Genetic Engineering and its implementation. This law must harmonize with other laws and national and international agreements, organization and management of R&D organizations, etc..

India must exercise caution in the IPR regime that it adopts. The current PPV-FR should be retained since it balances Breeders and Farmers' Rights.

- A statutory, independent National Biotechnology Regulatory Authority and a statutory National Bioethics Commission must be established. Specific functions/roles over and above current roles must include the following:
 - a. Alternatives to the GM approach must be carefully evaluated in each case before deciding on the GM route. A cost and risk benefit analysis must be conducted before deciding on a GM product.
- A protocol to assess long term environmental and ecological impact of GM crops must be developed. There should be provisions for post-market surveillance and monitoring of GM products.
 - There should be a moratorium on *commercial cultivation* of GM crops until the regulatory system is demonstrably improved. Research on GM crops, however, should continue.

- GM food crops must be evaluated with utmost caution using vastly improved food and feed safety testing systems before any decisions are taken on commercialization.
 - c. Develop a policy to deal with bio terrorism.
- Information modules on overarching issues related to safety, policy and regulation should be prepared and in-house training programs should be made mandatory in all science and technology institutions including ICAR, ICMR, ICFRE etc.
 - The bureaucracy has to be educated on the need for soft inter ministerial borders and cross learning across ministries must be facilitated.
 - The bureaucracy must be made accountable for departmental mandates and performance that hinders or impairs conservation or do not facilitate appropriate monitoring of GMOs or that impede essential and timely flow of information.

These can be taken up by the NBRA and the Citizens Jury and implemented by the DBT in collaboration with other actors as will be identified by the NBRA.

IV. SUI GENERIS LEGISLATION TO PROTECT THE INTELLECTUAL PROPERTY OF HERDERS AND LIVESTOCK KEEPERS

The inherent right of livestock keepers to use and develop their own breeding stock and breeding practices is coming under assault from commercial interests that are attempting to extend the current Intellectual Property Rights System to animal genetic resources although there is no international agreement on this.

It is proposed that a sui generis form of IPR protection be developed to grant rights to herders and livestock keepers over the genetic material they have so

carefully developed and the body of indigenous knowledge associated with domesticating, developing and conserving animal genetic resources.

- *The right to breed and make breeding decisions*

The key issue or central point is the continued right of farmers and pastoralists to make their own independent breeding decisions based on their individual production contexts, judgement, and preferences. In the light of commercial interest in the genetic traits of certain indigenous breeds, there is a need for formally protecting the right of livestock keepers to continue to use their breeds and their breeding practices. The breeding of livestock should be recognised as an inalienable right and as an important component of the Right to Food.

- *Formal acknowledgment as stewards of livestock diversity and as custodians of breeds*

Pastoralists and farming communities seek recognition for their contribution to the in-situ conservation of livestock biodiversity. Pastoralists, especially, conserve diversity in a general sense, by keeping their herds under close to natural conditions, so that they represent gene pools for various fitness traits. Their traditional systems essentially steward livestock diversity. In addition, many farming and pastoralist communities have developed specific breeds and the survival of these breeds is linked to the survival of their cultures. In future legal frameworks concerned with the sustainable management on Animal Genetic Resources (AnGR) the role of pastoralists and herders in conservation and breeding of distinct races must be explicitly recognised.

- *Recognition of the link between the conservation of the commons and of traditional breeds*

The conservation of traditional breeds is interlinked with the conservation of, and access to, the habitat in which they have been developed. Breeds

represent “embedded knowledge” and as such they can not be separated from their production and cultural contexts. In practice, this means that communities must have secure rights of access to the pastures and grazing areas where they developed their breeds.

- *Recognition of traditional breeds as communal property, product of indigenous knowledge and cultural expression.*

The documentation of breeds in their cultural and social contexts has been identified as an important means of proving community ownership and thereby preventing other parties to exert intellectual property rights on communally owned genetic resources. In the Karen Commitment, there is also a plea for keeping breeds in the open domain.

- *Right to participate in policy making processes on AnGR issues*

Since livestock breeding communities are crucial actors and key stakeholders in the sustainable management of animal genetic resources, their representatives must be systematically involved in all forums dealing with the issue at international, regional, national and field-levels.

- *Support for training and capacity-building.*

Livestock keepers from traditional communities urgently request and require training and capacity-building in IPR questions surrounding livestock, as well as in the mechanisms for establishing livestock breeders associations that would enable them to protect, develop and value-add to their animal genetic resources.

1.2.1.1 Legal and Institutional context of Livestock Keepers’ Rights

There has been little discussion on Livestock Keepers Rights and about the legal frameworks and policy regulations that could ensure their protection and implementation. These contextual arrangements are of utmost importance.

Farmers Rights – the right to save, sell, and trade seed – have been articulated in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and the nature and details of their implementation are a matter of national governments. It needs to be analysed whether this can serve as an appropriate model for animal genetic resources.

Farmers' Rights and Livestock Keepers' Rights constitute part of the concept of *Food Sovereignty* and were included in the Action Agenda of the 2002 NGO/CSO Forum on Food Sovereignty, which accompanied the FAO World Food Summit in Rome. The operational aspects of the Right to Food have been detailed in the *Voluntary Guidelines for the Right to Food* which commits governments and international organisations such as the FAO to place the human rights framework at the centre of the struggle against hunger and malnutrition.

V. FACILITATING INTER-SECTORAL COORDINATION AMONG DEPARTMENTS CONCERNED WITH AGRICULTURE

An inter ministerial coordinated policy framework for the regulatory oversight of Agbiotech/GMOs involving all ministries with jurisdiction over the subject is required. This coordination should be at policy, administrative and implementation levels.

- Develop a coordinated framework for central, state and local government oversight of GMOs , which includes enforcement and compliance.
- Develop a common web based database for regulatory oversight, with links to international biosafety websites.

- Develop an India policy on biosafety regulation based on domestic considerations. Keep out foreign intervention in biosafety policy formulation.
- Establish a biosafety and risk assessment grants program and a biotech awareness and education program
- Dedicate funds to conduct social science research on technology assessment and adoption
- Create appropriate structures to foster public participation in GMO decision making

Establish a National Board for Strategic Research in Agriculture

Based on the submission of the Planning Commission Task Force on Agriculture (2005) chaired by Dr MS Swaminathan

In order to coordinate the diverse government departments/ agencies funding research in overlapping areas of plant and animal sciences and to prevent duplication of efforts it is proposed to have a national level umbrella mechanism with necessary administrative and financial provisions to serve as an apex body for providing overall policy framework and priorities for promoting and supporting basic research, building strengths in emerging areas of S&T, and to coordinate various scientific departments/agencies for evolving a focused approach and avoiding overlapping areas of agricultural research and funding. Such an umbrella mechanism could be a *National Board for Strategic Research in Agriculture (NBSRA)*, structured on the lines of the National Science Foundation of the USA. A budgetary provision of Rs. 200 crores can be made for this Board.

The National Board for Strategic Research in Agriculture may be chaired by Member (Science) in the Planning Commission with the Director Generals of ICAR, CSIR, ICMR, DRDO and ICSSR, and Secretaries to Government in the Departments of Science and Technology, Biotechnology, Ocean Development

and Non-Conventional Energy Sources as Members. The Chairmen of Atomic Energy and Space Commissions, the President of the National Academy of Agricultural Sciences, the Chairman of the Agricultural Universities Association, the Chairpersons of the Scientific Advisory Council to the Prime Minister and the Scientific Advisory Committee to the Cabinet, as well as a few eminent women and men Scientists from the private sector, may be invited to serve as Members. The NBSRA may be assisted by a Standing Advisory Committee consisting of the Directors of IARI, IVRI, NDRI, CIFE, CFTRI, two Vice Chancellor's of the SAUs and two Directors of Private Sector R&D Institutions. ICAR should continue to provide leadership in the field of agricultural sciences, while NBSRA's role will be mobilizing science for agriculture.

The functions of NBSRA may include:

- Identifying and supporting inter-organisational strategic missions related to farming systems diversification, value addition, productivity and quality improvement, climate change and strengthening the ecological foundations of sustainable agriculture
- Identifying institutions and individuals, on the basis of competitive bidding, to carry out specific pieces of strategic research,
- Developing strategies for human resource development in frontier areas of science,
- Standardizing indicators for developing a Scientific Creativity Index and for performing environmental and gender audits,
- Strengthening regulatory mechanisms in appropriate areas, such as biotechnology and eco technology,

- Identifying areas for anticipatory research,
- (g) Developing a Code of Conduct for private-public sector partnerships, and
- (h) Promoting international partnerships in strategic areas of national importance

Developing Global Centres of Excellence

There is need for outstanding centres of global eminence in crop and animal husbandry, fisheries and post-harvest technology. Fortunately, these already exist in the form of IARI, IVRI, NDRI, CIFE under ICAR and CFTRI under CSIR. They constitute the mother institutions from where most of the faculty members of SAUs are drawn. Though IARI, IVRI, NDRI AND CIFE are deemed universities, their administrative autonomy is restricted due to the hierarchical nature of functioning by the ICAR unlike CFTRI of CSIR. They have therefore not been able to achieve the stature and efficiency of IITs.

It is recommended that IARI, IVRI, NDRI, CIFE, and CFTRI (under CSIR) may be declared as Institutions of National Importance by an Act of Parliament and vested with complete autonomy in administrative and financial matters, on the lines of IITs especially for IARI,IVRI,NDRI and CIFE as CFTRI under CSIR already have such autonomy and can be a role model for the other four organisations. In addition to fulfilling their national responsibility, they can equip themselves to become capacity building centres for fellow developing countries in Asia and Africa for synergising the agricultural research in the country by Networking.

In order to maintain close linkages with the Union Ministry of Agriculture, the Cabinet Minister in charge of Agriculture may be ex-officio Chairman of a National Council for Global Leadership in Agricultural Sciences and Education

which provides policy oversight to these four centers of ICAR, with the Minister for Science and Technology serving as Vice Chairman (for purposes of coordination). DG's of ICAR, CSIR, ICMR and ICSSR should be ex-officio Members of the Governing Bodies of such institutions of national importance for bringing about coordination.

A suitable legislation should be enacted by Parliament for this purpose.

SUGGESTIONS FOR NEW SCHEMES

I. A new, well funded scheme should be established for:

- the conservation and characterization of agro biodiversity and setting up farmer/field level gene/ seed banks to conserve traditional varieties of crop plants particularly those crop plants for which India is a center of origin.
- Characterization of the traditional cultivars using a set of standardized parameters so that the genetic potential of the material is identified for future breeding programs and for identifying useful genes
- Mapping the occurrence of wild relatives of crop plants within the Protected Areas Network. These genetically rich areas should be treated as 'Gene Reserves' and earmarked for special conservation efforts.

II. A new Center of Excellence should be set up with the mandate to identify useful genes and genetic markers

- in major crops facing productivity bottlenecks,(like legumes);
- crops of importance for domestic food and nutrition security

III. A biosafety and risk assessment grants program and a biotech awareness and education program should be set up with adequate funds

IV. Dedicate funds to conduct social science research on technology assessment and adoption