

Revitalizing Indian Seed Sector for Accelerated Agricultural Growth

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First of all, let me congratulate all those present today to mark the Foundation Day of the National Seed Association of India (NSAI). You all deserve to be congratulated for the great contributions made towards national self-sufficiency in foodgrains. From 'Begging Bowl' status to an era of 'Food Surpluses' could be possible largely through your strenuous efforts. We must, therefore, derive satisfaction on our past accomplishments. However, we cannot live on the past glory when present challenges of increasing food demand, higher cost of cultivation, degrading natural resources, nutritional security and climate change are indeed daunting. Therefore, occasion like Foundation Day is the most appropriate event for an introspection to revitalize our on-going efforts to charter an aggressive 'Way Forward' to achieve newer heights. I am, therefore, privileged to have been invited to share my thoughts on the first 'Foundation Day' of the reorganized National Seed Association of India (NSAI). An association of entire seed industry in itself is a remarkable achievement for which you all deserve to be congratulated.

It is well known that India recorded an unprecedented growth in agricultural production during the last 50 years. The significant first phase of agricultural growth was on account of 'Green Revolution' during the late sixties and seventies, with the introduction of semi-dwarf high yielding varieties (HYVs) of wheat and rice. As a result, substantial increase in food grain production from 50.3 mt in 1952 to 88.1 mt in 1971 was realized. During this period, significant role towards quality seed production of HYVs was played mainly by the public sector seed organizations viz., NSC, SFCI, State Farm Corporations, Indian Council of Agricultural Research (ICAR) Institutes, State Agricultural Universities, etc. The second quantum jump in the production was realized in the late 80s and early 90s,

mainly through the introduction of Special Foodgrain Production Programme and the New Policy for Seed Development by the Government of India (GoI), besides launching of an ambitious programme on Hybrid Research by the ICAR. In addition, a significant policy decision of the ICAR to share freely the parental seeds of hybrids with the Private Sector catalysed the process of increased productivity as well as cropping intensity (from 118.6% in the early seventies to 133.8% in nineties). Subsequently, Government enacted the Protection of Plant Varieties and Farmers' Rights Act (2001) to ensure faster growth of our seed sector. All these initiatives helped Private Seed Sector in India to play much bigger role, especially for the promotion of hybrid seed technology. As a result, use of hybrid seeds and the share of the private sector increased significantly in different crops (in some cases like maize, cotton and vegetables upto 80 per cent). Simultaneously, the ICAR accelerated the breeder seed production of field crops, which surpassed the total requirement of nearly 80,000 q in 2009-10.

Vegetables are the fastest growing sector in agriculture (AVRDC, 2006). Being high value per unit weight, vegetable seed segment has a significant share in the overall seed market. Though the actual contributions made by the public and private seed companies in vegetable seed market is difficult to assess, as per the industry estimates, the hybrid vegetable seed market in India is of about Rs. 1500 crore. The vegetable seed market segment grew at a rate of 10-15 percent per annum. There was an increase of 194% in vegetable hybrid seed market during 1998 to 2008, and it is expected to grow further. Public research institutes played a key role in establishing the vegetable variety improvement and seed production programmes in the country. However, the R&D in vegetables is also very active in the private sector. Out of about 110 vegetable hybrids released by the All India Coordinated Project on vegetables, nearly 60 percent are developed by the private sector. With the increased availability of quality seeds of improved varieties and hybrids produced by several reputed companies, the SRR in most of the vegetables, which were ~ 20 percent in the early 80s, rose to 60-90 percent in most of the crops by early 2000. Further, with the rapid pace with which biotech innovations are being tested, the market share of vegetable hybrids is expected to rise.

However, as stated earlier, a decelerating productivity growth rate, increasing prices and demand of food grains, shrinking natural resources and the emerging challenge of climate change have emerged lately as major concerns for the policy makers and the scientists alike. To attain a national GDP growth rate of 8 percent, it is necessary that we raise agricultural growth rate from 2 to a minimum of 4 per cent. Best way to achieve this is to bridge the existing yield gaps for most of the crops through greater coverage under HYVs and hybrids. For raising the agricultural productivity, seed is recognized to be the cheapest source, yet most critical single input. Use of good quality seeds can result in as much as 15-20 percent yield increase. Therefore, any attempt to turn around our agricultural productivity will largely depend on higher replacement rate of quality seeds of high yielding varieties / hybrids. Unfortunately, replacement rates in most of the crops both for varieties and hybrids are much below the optimum. The GoI has initiated several programmes / schemes to ensure that good quality seeds of high yielding and improved varieties (to sustain biotic and abiotic stresses) are made available to farmers at affordable costs. Besides providing subsidy support for certified seeds, the Government has proposed a new Seed Bill 2004, which is expected to address several emerging issues and technological innovations on one hand and the interest of the farmers on the other.

This paper highlights the key role of seed industry in accelerating agriculture growth, especially in view of farmers' specific needs, capability of both public and private sector, public-private partnerships (PPP) for strengthening quality seed availability and a regulatory mechanism that protects the interests of both farmers and seed industry alike. Despite our seed industry being vibrant and robust, one thing is clear that currently we are on 'cross roads' and a process of revitalization is needed urgently to accelerate the pace of seed development in order to harness the fruits of available innovations for increased productivity. It is with this objective in mind, I wish to make following suggestions for urgent consideration:

1. The National Seed Plan (NSP) had projected seed requirement of 2.54 mq for 2009-10, against which production of 2.8 mq has already been achieved. However, it is evident that there is considerable mis- match and seeds of new HYV and Hybrids

are still not sufficient to accelerate area coverage under them. Therefore, seed replacement has to be linked with new variety replacement too. Moreover, almost 70 percent of seed used by the farmers continues to be farm saved. In many crops, ideal seed replacement rates are much below than expected. Therefore, a rolling seed plan for each 5 year cycle will help in advance planning. NSAI, in collaboration with Department of Agriculture and Cooperation (DAC) and ICAR may aim to have a seed production strategy for the next ten years (2020). Accordingly, a policy paper on seed development must be attempted as a matter of priority.

2. For achieving desirable levels of Seed Replacement Rate (SRR), adequate seed needs to be produced first. Seed production programme should be organised in each State under a comprehensive and integrated State Seed Plan appropriate to region specific requirements. States should ensure production, multiplication and replacement of seed to increase SMR and SRR progressively, particularly in respect of regionally important crops/varieties. In this context, proactive role of concerned Seed Companies in each State will be desirable.
3. Production of hybrid seed needs to be promoted aggressively to improve crop productivity especially in crops like rice, maize, sorghum (rabi), pigeon pea, rapeseed mustard, castor etc. In this context, the efforts of Private Sector should also be covered by the Government for incentives on par with Public Sector seed production agencies, especially by identifying promising hybrids of different crops that can help in productivity enhancement. Acceleration of hybrid seed production in these crops by the Private Seed Companies is the need of the hour and hence an aggressive approach by NSAI, DAC and ICAR would go a long way in meeting the national targets.
4. Complementarily of the public sector policy and infrastructure and the private sector dynamism can be maximized through appropriate Public Private Partnerships (PPP). Successful models of PPP, as experienced in the recent past, could be replicated. Again, long term contracts can be entered between

state seed corporations, ICAR research institutes/state agriculture universities and the private seed sector, cooperatives of farmers or SHGs to undertake production and supply of quality seeds.

5. The success of partnership lies in trust, openness, and transparency. This can be built by regular interactions and dialogues, and appropriate policy framework to strengthen public-private partnerships. Therefore, a Standing Working Group in the Ministry of Agriculture (DAC/DARE-ICAR) or a National Seeds Board (NSB), as envisaged in the National Seeds Policy (2002), may be constituted as a matter of priority. This could include representations from DAC, ICAR, and NSAI and may act as a “Think Tank” and play an oversight as well as honest brokers’ role in promoting public-private-partnership (PPP). The proposed Working Group could also review the existing guidelines for incentives and rewards and suggest ways for building new partnerships while taking care of access and benefit sharing (ABS) mechanisms as well as interests of small holder farmers. Eventually, this body should draw a clear Road Map for accelerated growth of Indian seed sector.
6. Good models and success stories on PPP existing in the NARS and the CGIAR system, such as that of IARI, NRCPB, IIHR, ICRISAT, IRRI, etc., can be replicated or further refined, as needed, by other institutions/universities. However, some of these institutions have expressed concerns about the break in the continuous requisition of Breeder Seed by the contracted parties, which has to be addressed to build needed confidence.
7. In the National Seminar on ‘*Quality Seed for Food Security Through Public Private Partnership*’ organized jointly by the NSAI, TAAS and IARI in April, 2010, a path breaking agreement was endorsed for which I would like to congratulate you all for your support. Accordingly, for the access to new hybrids / varieties / genetic materials, the private sector will be willing to pay a royalty between 3-7 percent on sale proceeds, on a case to case basis, depending on exclusive / non-exclusive rights. The public sector seed corporations should also join hands in a similar way for the promotion in

popularization of improved varieties, especially the hybrids. In view of the poor conversion of breeder seed to foundation and certified seed, the public sector must now use the PPP mode to convert breeder seed into maximum of certified seed. The public sector should also be required to pay a royalty on breeder seed henceforth on mutually agreed terms, as otherwise applicable for private seed companies.

8. There is an urgent need to build crop-based / institution-based Technology Parks / Incubators so that scientists from both public research institutions and private seed sector could work together right from the beginning of the partnership in evaluating germplasm and breeding lines, and in developing, evaluating and producing Quality Seed for Food Security through Public-Private Partnership by commercializing varieties with the desired traits. This may encompass the development of transgenics, an exhaustive biosafety assessment, field evaluation, public awareness and release of the final product keeping in mind the national interest. Private Seed Sector must come forward to accelerate this process and take advantage of congenial environment that exists now. A lead role by NSAI in facilitating and catalyzing the process will go a long way in strengthening PPP.
9. Seed quality assurance requires considerable investment in terms of proper infrastructure, equipment and competent human resource. Seed certification agencies, have to be adequately equipped and made more efficient for certification of quality seeds. The Seed Testing Laboratories (6) in the private sector, that are accredited by the International Seed Testing Association (ISTA), may also be notified by the GoI for Seed Testing and Certification purposes. In this context, devolution of current centralized certification system by involving private sector, as was proposed in the new Seed Bill 2004, needs to be reconsidered. Also, adequate infrastructure for seed processing must be created by all States at the state seed corporations, agriculture universities and private seed agencies. For this purpose, the RKVY funds can be availed to provide assistance upto 50 percent of the cost of seed processing facilities and construction of seed godowns.

10. The Seed Bill, 2004 is currently awaiting Parliament approval. It has taken long time (more than four decades) to revise the Seed Act of 1966. Hence, there is an urgency to have it enacted soon. Provisions of variety registration will go a long way in meeting the demand of good quality seeds of varieties meeting the changing needs, whereas provision of farmers' exemption shall take care of their interest for reusing their own saved seeds as well as the sale of their produce. Also the interest of both farmers and private sector for seed development is being taken care of under the Protection of Plant Varieties and Farmers' Right Act 2001 (PPV&FRA).
11. Re-structuring and revamping the public sector seed producing undertakings is also required for product diversification/upgradation and for improving their governance, core competence and competitiveness. Several of the 15 State Seed Corporations are currently sick. State Seed Corporations should either be reformed/re-organized to make them vibrant organizations or should be closed to allow alternative mechanisms such as Private Seed Sector to play its prominent role. At all costs, complacency in seed sector must be avoided. State Seed Farms, having substantial capital assets and an important mechanism for efficient multiplication of seeds, require urgent attention as several of them are currently in a state of disuse and neglect. An approach for making optimal use of these farms is to involve progressive farmers in collaboration with the SAUs / ICAR institutes to produce certified seeds under contractual arrangements with assured incentives. Also, the concept of "Seed Village Scheme" will help in accelerating the pace of good quality seed production. This approach needs high priority action.
12. India has the potential to become a leading player in seed business sector in the developing world but its present share in global seed market is less than 2 percent. There are good export market potentials, particularly in the African and SAARC as well as South-East Asian countries, where India can win to achieve the target of 10 percent by 2020, as envisaged in National Seeds Policy (2002). Some of the Indian / MNC seed companies are already having business in some of these

countries, but there is a much bigger potential. Specific interventions through active involvement of National Seed Association of India (NSAI), to boost our seed exports, need urgent consideration. For this, enabling environment through single window system will be essential to accelerate productivity growth rates in agriculture.

13. Seed being the prime catalyst of increased productivity, it is strongly recommended that a National Mission on Seed be launched by the Central Government so as to provide an enabling environment for faster and an efficient quality seed production programme at the national level. In this Mission, adequate support for hybrid and quality seed should be ensured for higher Seed Replacement Rate. A strong public-private partnership through active involvement of farmers, for improved seed systems and seed increase is a need of the time. Subsidy on hybrid/ quality seed production has to be extended to the private sector as well. The farmer's participatory role for seed increase will ensure availability of quality seed at a faster pace.
14. Germplasm conservation through use can help in achieving both sustainable agricultural growth and development. Hence, it was emphasized that the national germplasm collection available at the NBPGR, being the national public goods, be made available more freely on request, to Indian scientists / institutions / seed companies engaged in crop improvement (R&D) programs. For this, the Standard Material Transfer Agreement (SMTA), as adopted recently by the FAO International Treaty on Genetic Resources for Food and Agriculture (ITGRFA) for multilateral access, can be adopted for immediate implementation, with necessary safeguards as needed. All data on available germplasm must be documented / catalogued and placed on NBPGR website.
15. Some of the policy related issues for consideration of the Central Government are:
 - + The Ministry of Agriculture must harmonize, to the extent possible, seed related regulations both at the central and state levels. The New Seed Bill, once passed by the

Parliament, will provide enabling environment for faster seed sector growth in the country.

- + All quality assured seeds, must qualify for seed subsidy. Subsidies need to be linked to promote area coverage under new HYVs and hybrids for increasing productivity, irrespective of whether produced by the public or private sector. This will benefit both farmers and the nation and avoid existing discrimination, which otherwise is counterproductive.
 - + For accelerating hybrid seed production, the present system of receiving indents of the parental lines of notified hybrids by the public/private sector (through NSAI to DAC) and fixing one uniform price, irrespective of their commercial value, needs revision urgently in consultation with the ICAR and NSAI.
16. R&D investments in the Public Sector have increased lately and many seed organizations have developed excellent research infrastructure and human resource. The share of Private Sector investment in plant breeding and seed development area has increased in recent years but is yet far below their 15-20 per cent as experienced in developing countries. This has to be accelerated especially in view of declining trend on plant breeding research in the public system.
17. For crisis management, we need to establish Regional Seed Banks as a contingency measure. Also, there is an urgent need for the creation of modern Seed Processing and Storage Facilities both by the public / private sector, on a fixed charge basis.
- Finally, an all out effort is needed to revitalize our national seed sector, for which a missionary zeal is warranted to accelerate the pace of Indian agriculture.



DR. RAJ S. PARODA

Dr. Raj S. Paroda is an accomplished plant breeder by profession and an able research administrator. He has made significant contributions in crop science research and is known for strengthening the national agricultural research system in India, as well as in Central Asia and the Caucasus. Dr. Paroda served as Director General, Indian Council of Agricultural Research (ICAR) & Secretary, Department of Agricultural Research and Education (DARE), Government of India during 1994-2001. Dr. Paroda has the unique distinction of being the main architect of the world's largest and most modern national Gene Bank at NBPGR, New Delhi. He was instrumental in establishing the Asia Pacific Association of Agricultural Research Institutions (APAARI), for which he has been the Executive Secretary since 1992 and the Asia Pacific Seed Association (APSA). He also served as first elected Chairman of the Global Forum on Agricultural Research (GFAR) from 1998-2001.

Dr. Paroda has been decorated with many honours and awards for his meritorious contributions. These include: the prestigious PADMA BHUSHAN (1998); Rafi Ahmed Kidwai Memorial Prize (1982-83); Federation of Indian Chamber of Commerce and Industry (FICCI) Award (1988); Om Prakash Bhasin Award (1992); Asia Pacific Seed Association Special Award (1995); Dr. Harbhajan Singh Award (2001); Dr. B.P. Pal Memorial Award (2003); Borlaug Award (2006) and Agriculture Leadership Award (2008). He is a Fellow of almost all the prestigious Science Academies in India and a foreign Fellow of the Russian, Georgian, Armenian and Tajikistan Academy of Agricultural Sciences as well as the Third World Academy of Sciences (TWAS), Italy. He served as President of the National Academy of Agricultural Sciences (India) from 1996-2001 and was elected as General President of the prestigious Indian Science Congress Association in 2000-2001. Dr. Paroda has also served as member of many international organizations such as Australian Center for International Agricultural Research (ACIAR), Commonwealth Agriculture Bureau International (CABI), Finance Committee of Consultative Group on International Agricultural Research (CGIAR), Global Biotech Advisory Council of Monsanto, Board of Trustees of IRRI, Chairman of ICRISAT Board of Trustees and Chairman, Program Committee of GFAR. In view of his outstanding scientific achievements, both American Society of Agronomy and the Crop Science Society of America awarded Dr. Paroda with their prestigious Honorary Membership in 2001. ICRISAT and Kazakhstan have named their Gene Banks after him.

His passion as Chairman, Trust for Advancement of Agricultural Sciences (TAAS) is to link science to society through needed policy reorientation and to work for the overall progress of the resource poor farmers in rural India. He is currently serving as a member of the High Level Taskforce for the Global Framework for Climate Services of World Meteorological Organization (WMO). He is also serving as Chairman of the Farmers' Commission of Haryana State and as a member of Rajasthan State Planning Board.