

EXECUTIVE SUMMARY OF THE

STUDY ON

**PUBLIC AND PRIVATE PARTNERSHIPS IN THE SEED
SECTOR – A CASE STUDY OF ANDHRA PRADESH**

By

T Laxmi

**CENTRE FOR RESEARCH ON INNOVATION AND SCIENCE POLICY
(CRISP)**

For

**INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE (ILRI)
SOUTH ASIA OFFICE**

And

**GLOBAL THEME ON AGROECOSYSTEMS,
INTERNATIONAL CROP RESEARCH INSTITUTE FOR SEMI ARID TROPICS
(ICRISAT)**

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Agriculture plays a significant role in economies of developed as well as developing countries with 2.4 billion people worldwide are dependent on agriculture¹. Apart from being a source of income and livelihood, agriculture is also a source of raw materials for industry and national income in many developing countries. It is estimated that about 30% of the GDP in Africa and South East Asia, 20% in East Asia and the Pacific and 10% in Central Asia, Latin America and Caribbean comes from agriculture². Dependence on agriculture is higher among the small-scale resource poor farmers in the less favorable regions in the developing countries; in that sense they are more vulnerable to extreme situations and yield fluctuations. High Yielding Varieties (HYVs) introduced during the green revolution period increased agricultural productivity in favorable environments thereby enhancing food security in favorable environments of developing countries. The availability of seed plays a crucial role in transferring other technologies at the field level. In other words, availability of seed of an adapted variety at planting time determines the crop production potential; hence seed plays a crucial role in food production capacity at household as well as national levels.

Seed System

Historically, settled agriculture evolved through domestication of wild species by collecting and storing seeds and using them for next planting season. However with the development of agriculture into commercial activity, plant breeding with emphasis on development of new varieties and seed production to multiply and supply seed varieties has evolved into different disciplines. This specialization has brought about significant changes in seed supply systems, resulting in the evolution of modern seed industry in developed countries³. There have been several attempts to define the seed system/sector in which seed production and supply of modern varieties (formal sector) have been emphasized; this definition has been modified to include the informal seed sector as well. Van Amstel et al define the seed system as 'the total of the physical, organizational and institutional components, their actions and interactions that determine seed supply and use, in quantitative and qualitative terms⁴.' In this connection a distinction is also made as to formal seed delivery system as well as informal seed delivery systems.

Formal and Informal Seed Systems – Seed Security

In the formal seed sector, the following stages are involved i.e., development and distribution of improved seed production that involves several distinct and interdependent activities⁵. In the Varietal development and release stage, new varieties are developed

¹ Cromwell, E., S. Wiggins and S. Wentzel. 1993. *Sowing Beyond the State: NGOs and Seed Supply in Developing Countries*, ODI, London.

² CGIAR. 1997. *Agriculture Fast Facts*. In CGIAR News. Vol. 4, No. 4.

³ Groosman, A J A. 1987. *Technology Development and the Seed Industry in North-South Perspective: A Literature Survey*. Development Research Institute (IVO), Tilberg, The Netherlands.

⁴ Van Amstel, H., J. W. T. Bottema, M. Sidik, and C. E. van Santen (ed.). 1996. *Integrating Seed Systems for Annual Food Crops*, in *Proceedings of a Workshop, 24-27 Oct 1995, Malang, Indonesia*. CGPRT Center, Bogor, Indonesia.

⁵ Jaffee, Steven and Jitendra Srivastava. 1994. 'The Roles of the Private and Public Sectors in Enhancing the Performance of Seed Systems', *The World Bank Research Observer*, vol. 9, no. 1, pp. 97-117.

through selection, mutation, hybridisation or genetic engineering processes. The chain starts with the development and release of new varieties (or hybrids) through applied scientific research and testing, continues through the several stages of seed multiplication. The newly developed varieties are then evaluated for yield and other performance characteristics. In this stage certain amount of pure seed (breeder seed) of the variety is multiplied for producing seed (foundation seed) for commercial usage⁶.

Seed multiplication involves a three-stage process in which at the end of the first stage the 'foundation seed' would be available; the 'foundation seed' is multiplied one or two generations to get 'certified seed.' In case the seed is not officially certified, the last generation is commonly termed as 'commercial seed.' The third stage is seed processing that involves drying, shelling and sizing and removal of inert material and alien seed. During this stage, various chemical treatments are done to protect the health of the seed and also to combat insects, fungi and bacteria. In seed marketing and distribution phase, handling, transport, storage, market research, field demonstrations and advertising, wholesale and retail buying and selling operations, and the related functions of risk bearing and financing are involved. The above-mentioned steps are interdependent – both technically and economically in the sense that the outputs from each step serve as primary inputs into the subsequent activities and the economic returns of each activity rely on the effectiveness of the others. However, formal seed system encounters problems relating to rigid government policies, inflexible regulations, poor organizational linkages and inadequate infrastructure⁷. The informal seed system deals with small quantities of seed, semi structured and operates at community level⁸ and likely to depend on indigenous knowledge of plant and seed selection, its sourcing, retaining and management along with local diffusion mechanisms⁹. These systems are variously called farmer-managed seed system¹⁰, informal seed system¹¹ and traditional system¹². With an estimated 1.4 billion people dependent on agriculture in stress environment and 60% of resource poor farmers producing 15-20% of food production, integration of formal and informal seed systems is required to achieve seed security and enhancing food security.

Seed Industry – Indian context

⁶ Tripp, Robert, and Suresh Pal. 2000. 'The private delivery of public crop varieties: Rice in Andhra Pradesh', London: Overseas Development Institute (ODI)

⁷ Bishaw, Z and S. Kugbei. 1997. 'Seed Supply in WANA Region – Status and Constraints', in *Alternative Strategies for Smallholder Seed Supply: Proceedings of an International Conference on Options for Strengthening National and Regional Seed Supply Systems*, 10-14 March 1997, Harare, Zimbabwe (D. D. Rohrback, Z. Bishaw and A. J. G Van Gastel, ed.) Patancheru 502 324, Andhra Pradesh, India: ICRISAT

⁸ Cromwell, E., E. Friis-Hansen and M. Turner. 1992. *The Seed Sector in Developing Countries: A Framework for Performance Analysis*, ODI, London

⁹ Bishaw, Z., and M. Turner. A Regional Perspective on Seed Security from <http://www.fao.org/ag/agps/georgof/Georgo4.htm>

¹⁰ Bal, S S., and J E Douglas. 1992. *Designing Successful Farmer-managed Seed Systems*. Winrock International Institute for Agricultural Development, *Development Studies Paper Series*. Winrock, Arlington, USA.

¹¹ Cromwell, E., E. Friis-Hansen and M. Turner. 1992. *The Seed Sector in Developing Countries: A Framework for Performance Analysis*, ODI, London

¹² Linnemann, A R. and G H de Bruijn. 1987. Traditional seed supply for food crops. *ILEIA Newsletter* 3(2): 10-11.

Efforts were on in India since 1928 to establish mechanisms to produce good quality seed and its efficient distribution. During the 1950s, Department of Agriculture started the National Extension Service Blocks for multiplication of foundation seed of various crops. At present there are two national level organizations i.e., National Seeds Corporation (NSC) and the State Farms Corporation of India (SFICI) and 13 state Seed Corporations that are involved in production and distribution of seeds in the public sector. In the private sector, there are about 500 companies with intra-state and inter-state marketing; out of these 500 companies, 35 companies operate in collaboration with multinational companies (as in 2002). In the Indian context, the public sector institutions played a crucial role in developing new varieties; the private seed companies entered the picture in the 1980s with limited role and were restricted to vegetatively produced crops and horticultural crops. However economic liberalization during the 1990s has led to the opening of the Indian economy to the foreign companies led to the entry of multi national companies into the agricultural sector. Pray *et al* (2001) observes that the private sector investment in R & D has significantly increased since India took up the economic reforms¹³ and number of private seed companies engaged in R & D increased from 9 in 1985 to 40 in 1995. The corresponding growth in R&D expenditures (in actual terms) between 1987 and 1995 was from 13.1 million rupees to 46.5 million rupees¹⁴.

Seed sector in Andhra Pradesh

The major crops grown in Andhra Pradesh are paddy, jowar, bajra, maize, ragi, chillies, sorghum, sugarcane, cotton, groundnut, sesame and turmeric; in this state, rice is cultivated on most of the irrigated land. The state is divided into seven agroclimatic zones depending on the soil type, rainfall, temperatures etc. In Andhra Pradesh, the A P State Seeds Development Corporation was established in 1976 as part of the National Seeds Project (NSP – I). The corporation is involved in the production of varieties of paddy, pulses, oil seeds and vegetable and hybrids of sorghum, cotton, bajra and maize. It performs the role of market intervention and Andhra Pradesh has the unique distinction of producing huge quantities of hybrid seeds of different crops i.e., cotton, sorghum, maize, pearl millet, sunflower, rice and forage sorghum in addition to oil seed crops and pulses. The quantity of certified seed produced during 2001-2002 is 9 lakh quintals; the quantity of research hybrid seeds produced during the same period is 10.96 quintals. The total seed distributed in the state during 2001-2002 is 12.52 lakh quintals for the different crops under cultivation.

In addition to the public sector institutions involved in the production of hybrid seeds, the private sector has an equally important role to play. The state's share in the private hybrids market is estimated to be 50% (as in 2002). Table 1 table indicates the share of

¹³ Pray, C. E., Ramaswami, B. and Kelley, T. 2001. 'The Impact of Economic Reforms on R & D by the Indian Seed Industry', *Food Policy*, Vol. 26, No 6, pp. 587-598

¹⁴ Rao, Hanumantha, C H. 1987. 'Science and Technology Policy: An Overall View and Broader Implications', in *Agricultural Development in India: The Next Stage* published by Indian Society of Agricultural Economics, Bombay, pp. 27-31.

private hybrid seeds produced in Andhra Pradesh as compared to the national production (as in 2002).

Table 1: Comparison between national level hybrid seeds at National level and Andhra Pradesh

Crops	Quantity of Hybrid seeds marketed at national level (Quantity in packets)	Quantity of Hybrid seeds produced in Andhra Pradesh (Quantity in packets)	% of seed produced in AP out of total quantity marketed
Cotton	8000000 (Packets)	4689000 (packets)	59%
Maize	700000	600000	86%
Sorghum	125000	116000	93%
Pearl millet	150000	95000	63%
Sunflower	30000	25000	83%
Hybrid rice	60000	48000	80%
Forage sorghum	18000	17500	97%

(Note: Quantity is in packets of 450 Gms for cotton, while it in quintals for other crops)

(Source: Yogeswara Rao, S Venkat Reddy and S Iftequar Ahmed. 2002. Seed Industry in Andhra Pradesh – A Profile, Hyderabad: Seedsmen Association of Andhra Pradesh)

In Andhra Pradesh there are 9840 seeds dealers in the state who play a crucial link between the farmers and seed companies, which is indicated in the table (Table 2) below.

Table 2: District wise distribution of licensed dealers in Andhra Pradesh

S No	District	No of Licensed Dealers
1	Srikakulam	129
2	Vizianagaram	261
3	Visakhapatnam	82
4	East Godavari	541
5	West Godavari	517
6	Krishna	257
7	Guntur	1050
8	Prakasam	448
9	Nellore	114
10	Kurnool	582
11	Anantapur	466
12	Cuddapah	184
13	Chittoor	201
14	Ranga Reddy (including Hyd)	536
15	Nizamabad	383
16	Medak	230
17	Mahbubnagar	518
18	Nalgonda	475
19	Warangal	1126
20	Khammam	335
21	Karimnagar	942
22	Adilabad	463
Total		9840

From the above table it is evident that Warangal has the highest number (1126) of licensed seed dealers and Visakhapatnam has the lowest number of licensed seed dealers. It would be interesting to look at the reasons for this trend, which can provide useful insights into agricultural scenario along with market dynamics in that particular region.

Key Players in seed sector in Andhra Pradesh

At the moment, the key players in this scenario are the farmers who are directly affected by the quality of seeds, organizations affiliated to the National Agricultural Research System (NARS), international research organizations (like ICRISAT) that are engaged in development of new parental lines, intermediary products and varieties of seeds to NARS and private sector companies. Under integrated watershed management model developed by ICRISAT and NARS (Wani et al. 2002, 2003) the consortium has undertaken an initiative to provide breeders seed of crops varieties to the farmers, the NGOs working at the field level¹⁵. In close interaction with the consortium partners with technical backstopping and with the suitable training, the farmers and NGOs have established seed banks; and the government agencies like the departments of agriculture and animal husbandry of the state government have played important role of converging and facilitate the process¹⁶.

Significant research questions

Being a feasibility study, significant research questions for the present study are

- Who are the key players in seed distribution in the State i.e., Andhra Pradesh?
- What are the major roles of each actor in the process of seed distribution?
- What is the nature of interaction between the different players? Are some of the players interacting more or less with one another? If so what are the reasons?
- What are the perceptions of each player towards the other?
- What are the expectations of the individual players in forging this kind of alliance?
- What are the bottlenecks and/or the opportunities, which are likely to weaken and/or strengthen the alliance?

Objectives of the study

The overall goal of this study is to identify the existing links between the private sector seed companies and research institutions (national and international) and study the full process of seed distribution for identifying the strength, weaknesses and opportunities for establishing the effective seed delivery systems for increasing the productivity of

¹⁵ Wani, S.P., Pathak, P., Tam, H.M., Ramakrishna, A., Singh, P. and Sreedevi. T.K. 2002. Integrated Watershed Management for Minimizing Land Degradation and Sustaining Productivity in Asia. In Integrated Land Management in Dry Areas. Proceedings of a Joint UNU-CAS International Workshop (Zafar Adeel, ed.), 8-13 September 2001, Beijing, China. pp. 207-230.

¹⁶ Wani, S.P., Pathak, P., Sreedevi, T.K., Singh, H.P. and Singh, P. 2003. Efficient Management of Rainwater for Increased Crop Productivity and Groundwater Recharge in Asia. CAB International 2003. Water Productivity in Agriculture: Limits and Opportunities for Improvement. (Eds. W. Kijne, R. Barker and D. Molden) pp. 199-215.

agricultural crops with dual purpose food-feed varieties/hybrids, particularly with the rural poor. The specific objectives of the study are to:

- Study the existing linkages between private seed companies and research institutions and its benefits for increased yields of dual-purpose food-feed crops for the rural poor.
- Study the strengths, weaknesses, opportunities and constraints to make these linkages beneficial to all stakeholders and
- Develop/suggest a way forward for harnessing the synergies through private sector seed companies and research institutions.

Strategy for Future Action

The current report is based on secondary information available through literature and documents available with us. One of the major constraints faced in this process was that realization regarding the acute shortage of the data regarding the fodder seed sector in the state. For the purpose of data collection with regard to the participation by the public and private sector institutions, information need to be collected from the state government departments (like the department of agriculture, animal husbandry and livestock development). Also it would be useful to interact with the community-based organizations (CBOs like BAIF and ANTARA) working on fodder related issues to find out the constraints at the village level; apart from this the farmers and villagers who are directly affected also would be interviewed. Also documenting the nature of activities of each firm would enable the reader to get a rough estimate about the types of crops in which the private sector are interested. Presently, it seems that the private sector seed companies are interested in crops that would provide them with profits while the public sector institutions are engaged in activities involving crops that are of significance to the small and marginal farmers in different eco systems. Also considering the profit motive of the private sector companies, the seeds that are developed through these companies are likely to be more expensive than those developed by the national agencies.

However these are some of the issues that would be explored during the course of the present study. This estimate would be useful in making comparisons for the crops the public sector has been doing research on for a long time now. In addition to providing the general picture about the crops covered by the private sector companies, it would be useful discussing with the different stakeholders the potential of collaboration and partnership between the public and private sector companies. This would bring the perceptions that the different stakeholders with regard to each other to the forefront and identify the bottlenecks in the process of dialogue. They would also be able to articulate as to what steps could be taken up to improve the situation, if they perceive that there is need and scope for improvement. This project in that sense could be viewed as a process of initiation of dialogue between the different stakeholders involved in the process. The methodology to be followed would be collection of primary as well as secondary data with regard to the availability of seeds of food as well as fodder crops and see the nature of organizations (whether public sector institutions or private firms) involved in seed production and get the perspective from each of the stakeholder. At a later point, a similar study could be taken up at a national level to map the situation at that level.