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Farmer Enabled Village Seed Banks as the Edifice of Integrated Seed System for Improved Access, Production and Supply of Groundnut Seed in Andhra Pradesh - A Case Study

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Non-availability ofgood quality seeds of high-yielding varieties in time is one of the major constraints contributing to stagnated yields ofgroundnut crop in Mahbubnagar district of Andhra Pradesh state. The crop is grown predominantly in postrainy season under irrigated conditions. The baseline studies carried out in the project area identified key problems related to groundnut seed supply system. Private seed sector is reluctant to produce and market seed of groundnut for economic consideration. The project devised an alternative seed delivery system, village seed banks; which ensure availability of quality seed of improved varieties at village level. It not only ensured timely availability of quality seed of farmer-preferred varieties at affordable price at local level but also enhanced crop productivity and community seed enterprise.

Keywords: seed banks, DRD, APSSDC, HACA, MARKFED.

Introduction

•In India groundnut is widely grown in five states namely Gujarat, Karnataka, Andhra Pradesh, Tamil Nadu and Maharashtra. Gujarat and Andhra Pradesh (AP) account for 60% Rainy season area. In India, 80% of the total produce is used for oil extraction, 11% as seed, 8% for direct food uses and 1% is exported. Groundnut is a major oilseed legume crop in India; it meets >30 per cent of the edible oil requirements. In India, the increase in annual groundnut production and yield was negligible between 2000 and 2009. During 2009 groundnut is cultivated in an area of 5.47 m ha with a production of 5.51 m t and yield of 1007 kg/ha (FAOSTAT, 2011). The average groundnut yield in the country is low compared to world average of 1522 kg/ha and far below the average yield of China (3356 kg/ha), where it is primarily cultivated under rainfed conditions. In Anantapur district of AP, one with largest area under groundnut, the crop attained prominence by replacing sorghum and millets. The district has over 0.8 m ha under groundnut cultivation but the yields are low, fluctuating between 200 kg/ha to 1200 kg/ha during the year 2001 to 2007. One of the main reasons for poor yields is cultivation of a poor yielding obsolete variety TMV 2, availability of improved varieties seed, accessibility to improved verities and cost of seed. The study in 2008-9 indicates that TMV 2 is most dominant variety occupying 88 % of groundnut area.

Good seed is the foundation of good agriculture. A seed system is well functioning if it efficiently and effectively meet farmers' demand for quality seed. Rules and regulations such as variety release procedures, intellectual property rights, certification programs, seed standards and contract laws influence the structure, coordination and performance of a seed system. Given the critical role that improved varieties play in increasing agricultural production-both crops and livestock - a key question is how to facilitate the development of a seed system that is capable of generating, producing and distributing seed varieties that meet the needs of resource-poor small-scale fanners in a cost-effective and timely manner.Developing a seed system based on greater integration, broader participation and decentralization is an attractive, technically interesting and purposeful strategy.

The process adopted to address the above issues of small-scale farmers through a project mode funded by Department of Rural Development (DRD), Govt, of Andhra Pradesh from 2009-2010. The questions addressed in the project were: How can farmers are assured of timely supply of quality seed at affordable price? How can informal seed enterprises be integrated into seed production and supply systems to ensure timely availability of quality groundnut seed at the farmer's doorstep? The project also attempted to illustrate pathways to a science-based integrated seed supply system geared toward enhancing productivity. With increasingly rapid changes taking place in the technic;!!, socioeconomic and policy environments, how these innovations are implemented forms an important issue.

Methodology and Results

The project implementation involved the following steps.

1. Reconnaissance survey in proj ect villages
   i) Existing groundnut seed systems
   ii) Constraints of seed systems
2. Alternate seed systems model: village seed banks
3. Farmer-participatory varietal selection
4. Capacity building
5. Institutional linkages
6. Source of capital
7. Impact

Reconnaissance survey

Five nucleus villages, each with four satellite villages, were selected for the project implementation in Mahbubnagar district of Andhra Pradesh, India to study the existing seed systems and constraints related to seed.

Existing groundnut seed systems

To get an overall picture of the existing post rainy season groundnut seed systems in the project area, a survey was conducted by interviewing informal farmer groups using the Rapid Rural Appraisal (RRA) method in selected cluster villages in each mandal. Informal group discussions were conducted with farmers who were classified into small (<2 ha), medium (2-5 ha) and large (>5 ha) farmers on the basis of their landholding. Further, individual interviews were conducted with village leaders, NGOs and progressive farmers. A good representation of small, medium and large farmers engaged in livestock and agriculture as their main occupation were thus identified and informal farmer groups were created. The project area had an average of 69% small fanners, 25% medium farmers and 6% large farmers (Table 1). Small and medium farmers formed the majority (90%) of farmers growing postrainy season groundnut in these project villages

Table 1. Composition of farmers in terms of landholdings in project villages in Mahbubnagar district, Andhra Pradesh.

Mandal/Clusfer	Village	Percentage of farmers*		
		Small farmers	Medium farmers	Large farmers
Wanaparthy	Khassim Nagar	66	24	8
Gopalpet	Jayanna Thirumalapur	68	28	4
Peddamandadi	Mojerla	78	13	9
Pebbair	Kambalapur	69	26	5
Ghanapur	Malkapur	63	31	5
Average		69	25	6

(' Small farmers <1 ha; medium farmers 2-5 ha; large farmers >5 ha.)

A generalized representation of the groundnut seed delivery system operating in the project villages is given in Figure 1.

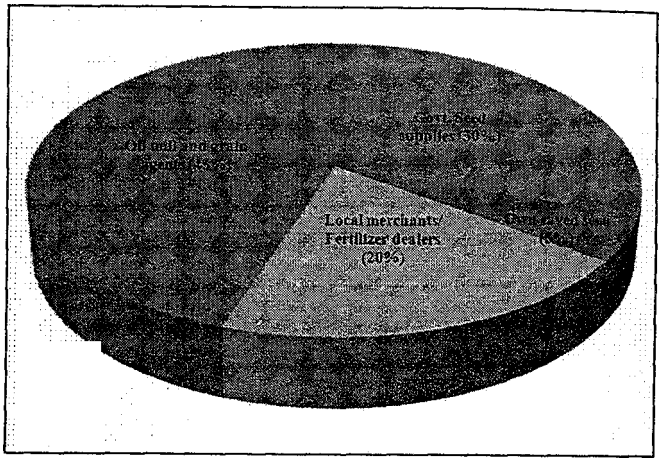

Fig. 1. Sources of groundnut seed in the project villages

It was evident from the farmers' responses that sourcing of seed was predominantly (70%) from informal sectors like oil mills, local merchants and little from own saved seed (Table 2).

Table **2.** Characteristics of groundnut seed supply systems in project villages in Mahbubnagar district, Andhra Pradesh.

Characteristics	Prevailing seed supply system
Seed supply channels	**- 97% of farmers procure seed from local markets (oil mills; grain brokers) and formal public sector (subsidized seed)** **- <3% farmers used own-saved seed**
Formal public sector	- Andhra Pradesh State Seeds Development Corporation - Cooperative sector - H ACA - ANGRAU, Hyderabad - MARKFED - Oilseeds Federation
Formal private sector	Absent
Informal sector	- Market middlemen (grain brokers) - Oil millers - Fertilizer dealers (not branded products)
Seed replacement	-High - Preferred every year because of belief that seed produced elsewhere yields a good crop
Grain to seed price ratio	1:1.6

There was little awareness of improved groundnut varieties in these villages where groundnut is a major crop grown in the postrainy season. Majority (> 90%) of the small and medium scale farmers are not aware of varieties they are growing and about improved varieties. Farmers grew an unknown variety called "Local (a mixture of many varieties)"with an average yield of 2000-2400 kg pod ha'" under irrigated conditions in the postrainy season.

Informal seed systems for postrainy season groundnut in Mahabubnagar district have shrunk due to various factors. The Government of Andhra Pradesh had to step in to fill this

gap with its subsidized seed supply through different formal seed supply agencies like the AP State Seed Development Corporation (APSSDC), the Hyderabad Agricultural Cooperative Association (HACA), MARKFED and the Oilseeds Federation. Seed sources are related to wealth status of the farmers. Big and large farmers, comprising 6% of the community, maintain their own seed stocks, and small farmers have to buy seed every year. The situation in project villages, where storage and borrowing of farm-saved seed has declined due to recurrent droughts, has been further aggravated by poverty and prevalence of storage pests such as the groundnut bruchid (Carydon serratus) apart from farmers' lack of knowledge of safe and scientific storage practices. There is a blind belief among groundnut farmers in the project villages that seed produced in other areas yields better than seed produced in their own land. Hence, a majority of farmers in these villages, irrespective of che size of their iandholding, have become dependent on the government's subsidized seed supply. Sixty to seventy percent of farmers depend on this source but it meets only 30-40% of their total seed requirement. The government supplies a .fixed quantity (90 kg) of seed (pods) to. each household irrespective of their need. Therefore, fanners look to other sources including oil mills and local groundnut traders, or buy seed within fee village from better-off farmers to meet their seed requirement.

Framers use high seed rate (200-250 kg kernels ha"') while the normal seed rate is (150 kg kernels ha"'), leading to close planting (the Chikku method) with a high plant population. The high seed rate is meant to compensate for poor germination and seedling mortality due to seedling rot/root rot disease. The cost of seed input constitutes 25-30% of the cost of production. The government's seed distribution is carried out through the formal supply system. The process adopted by public sector corporations for seed distribution is through calling tenders from seed traders to supply groundnut seed in a particular area and the lowest bidder gets the supply contract However, as there are specifications laid down by the government regarding the variety to be supplied in a particular agro climatic zone, the contract supplier usually procures the seed as per availability from the unorganized markets, oil mills, groundnut traders and even individual farmers. The seed is cleaned, graded (sometimes), packed and supplied to farmers without specifying the name of the variety. This often results in farmers receiviag arid sowing a mixture of several varieties. With this situation aggravated by frequent droughts and other constraints in the seed supply chain, efforts to increase fanners' productivity and income are not meeting success in the project area.

The formal seed sector has shown little or no interest in groundnut seed multiplication because of low seed multiplication ratio, bulkmess of the seed and quick loss of seed viability. Further, high transportation and processing, bagging and certification costs make the seed expensive for farmers and less profitable to the private sector. Corporate and cooperative sectors (formal seed sector) are currently not adequate to meet farmer needs in the case of groundnut seed in selected project villages in Mahbubnagar district; however farmers sourcing groundnut seed varies with season and geographical location with in Andhra Pradesh state (Ravinder etal.2007).

ii) Constraints of grosmdnut seed systems in project villages

Baseline studies done under the project identified key problems related to seed supply systems in groundnut. Timely availability of quality seed of high yielding varieties was one of the major constraints contributing to stagnant groundnut yields in the project area - which is characterized by postrainy season cultivation under irrigated conditions.

Constraints to own-saved seed

- Storage insect pests aad lack of proper infrastructure for storage at. farm/household level discourage farmers to save their own seed for the next season. They feel it is safer to dispose off their produce and procure seed every year from the local market or depend on the government's subsidized seed supply.
- Farmers also have financial and debt-servicing pressures which contribute to distress disposal of produce soon after the harvest.
- Farmers believe that using their own seed repeatedly year after year is detrimental and that seed from an outside source yields better than their own-saved seed.

Constraints to government seed supply

- Given the buikiness of groundnut seeds (pods), logistics are expensive and difficult to organise. Accordingly, the quantities supplied by the State Government to different parts of the district do not always match local demand.
- Due to procedural delays, the timely supply of seed is not assured. Often the seeds arrive when sowing season has already started.
- The State Government supplies only 90 kg of seed (pods) per fanner at a subsidised rate irrespective of the extent of

their landholding. This subsidised seed supply meets no more than 30-40% of the total seed requirement of farmers.

- Often the seed supplied is a mix of different varieties and ofpoorquality..

Given the high costs and other overheads, the subsidised seed supply is not sustainable.

Constraints oflocal seed suppliers

- Local seed suppliers, especially oil mill owners, procure produce for oil extraction , but, during the rainy season the same is sold as seed to farmers at a higher price.
- Local seed suppliers sell kernels and not pods. During shelling there is damage to seed, which affects germination. Further, kernels are rarely graded or chemically treated by the suppliers.
- Seed obtained from local suppliers or oil mills is usually a mixture of varieties and of poor quality.
- Due to poor seed quality (mixture of broken, shrivelled and seed coat-damaged seeds) farmers are forced to use high seed rate (80-100 kg kernels per acre). Generally, farmers follow closer spacing coupled with thick planting (chikku method) to maintain optimum plant population.
- There is no practice of seed treatment by local suppliers nor fanners. Seldom do big farmers take up seed treatment with Dithane M 45 recommended by seed dealer which is a wrong choice.

An analysis of existing seed systems, seed multiplication and seed delivery modules for groundnut in the project villages brought out the constraints that needed to be dealt with to making them viable and dynamic in the long run. Strategies to address these constraints were formulated to arrive at suitable solutions. The distinction between the problems of seed availability and seed access to small and medium-scale farmers was assessed, and the seed access emerged as a tough issue to answer. Most of the constraints were found strongly linked to information relating to poverty. Agricultural technologies for groundnut such as crop production, cultivation aspects, pests and diseases, storage pests and their control strategies were identified as crop-specific constraints in the local seed system.

Development of alternate seed system model: village seed bank

Based on survey findings and constraints of the seed supply in the project area an alternative seed supply model developed. Integrated seed supply systems are mechanisms to supply seed of new improved varieties to farmers by combining the methods of both formal and informal seed sectors (Ravinder Reddy et al. 2006 and 2007). Variety use and production of quality seeds and storage by fanners under local conditions, and seed exchange mechanisms are the three principal components of a dynamic integrated seed system that can form the most important groundnut seed source for small-scale farmers in the project villages. In fact, the strengths and weaknesses oflocal seed systems indicate that they and the formal seed systems are complementary.

Innovative, community-based seed production-through village-based seed banks (Ravinder Reddy 2007) and community seed banks (Lewis and Mulvany 1997) and distribution strategies coupled with supportive policies will have a positive effect on smallholder farmers' access to the products of national and international research centers. An alternative integrated seed system incorporating village seed banks has been developed to mitigate the constraints of postrainy season groundnut seed availability to farming communities in the project clusters in Mahbubnagar district in Andhra Pradesh.

The alternative . seed system model envisages integration of formal and informal seed systems to achieve the objective of providing quality seed of improved groundnut varieties at the right time and at reasonable price to small-scale farmers. However, it was essential first to identify farmer-preferred variety (ies) before the implementation of the alternate seed system. Thus, the model was implemented in two steps: farmer-participatory varietal selection and establishment of village seed banks.

Village seed banks

The concept of village seed banks envisages village self-sufficiency in production of quality seed by and distribution to fanners. Village seed banks operate under peer supervision with utmost transparency, mutual trust and social responsibility toward fellow farmers. Though this is not an entirely new concept to villagers, it is being promoted with the participation of farmers/ or farmer groups to reduce their dependence on external nonreliable seed sources, including government subsidized seed distribution. Village seed banks as a micro seed enterprise at the village level can be efficient. Some will have the potential to expand into specialized, small- or medium-sized local seed enterprises.

The concept of village seed banks was discussed elaborately in grama sabhas to sensitize the stakeholders. Fanners were mostly positive about the improved varietal

trials, but felt uncomfortable when the model spelt out self funding for procurement of seed and storage of seed. Earlier experiences with village seed systems and successful community initiatives at ADB and TATA-ICRISAT sites in Vidisha and Guna districts in Madhya Pradesh, India, and of ICRISAT-APRLP projects (Ravinder Reddy et al. 2007; Roothaert et al. 2006; Sreenath Dixit et al. 2005) provided an insight into the concept and helped identify gaps so that the concept could be refined and implemented in this project. The concept of village seed banks was promoted with participation of farmers as promoters in the project cluster villages.

| Alternative Seed Systems SWodel

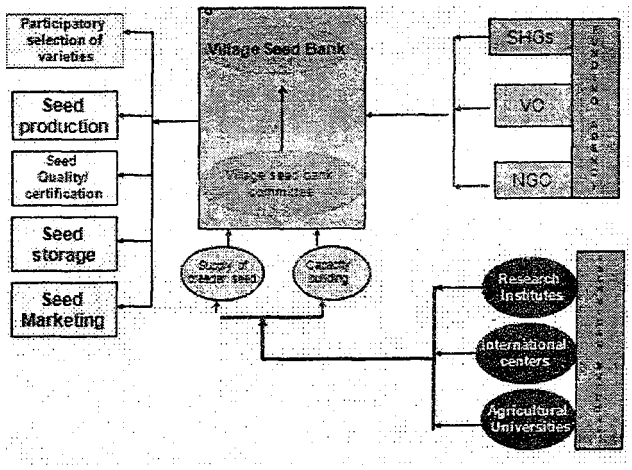

Figure **2.** Flow diagram showing the organization of a village seed bank.

Village seed bank committees

The main function of these committees is to help reduce seed production and delivery costs of groundnut seed and at the same time help farmers reduce their individual cost of production, processing and marketing. Village seed bank committees (VSBCs) selected seed growers (fanners) for the postrainy season in the nucleus villages. The ICRISAT team conducted a couple of focus group meeting with self-help groups (SHGs) to create awareness and explain the objectives of the village seed banks (VSBs). They were invited to invest in the VSBs as a micro seed enterprise for procuring seed produced in the village and storing it in the village seed bank for sale next season. This had two-pronged benefits to the communities: a dividend for the SHGs and good quality seed supply to farmers.

Once they become self-reliant, the associations serve as useful mechanisms to broaden the outreach of development programs at little or no additional cost. They help build rural social capital by establishing self-help linkages and encouraging broad-based collective action on village level seed enterprises. Our attempt at institutional development of farmers' associations or village seed bank committees in the project areas yielded a number of lessons and possibilities for future expansion.

The following guidelines were used for developing and strengthening seed bank committees.

- Make farmers understand the advantages of cooperation and associations.
- Allow all sections of the farm community to join the project.
- Understand small farmers' strengths, potentials and weaknesses in procuring seed.
- Empower women farmers (SHGs) to j oin the association to increase their potential in organizing and investing in developing micro seed enterprises.
- Link farmers' associations' to research institutions/ organizations for procuring foundation seed for seed production.
- Build capacities of farmers in crop production, production of quality seed and scientific storage methods.

Farmer-participatory varietal selection

Interested and resourceful farmers were identified in the project villages to take up trials/demonstrations of selected improved varieties under the guidance of scientific staff from the consortium institutions .The premises of step 1 were: (i) Resourceful farmers are capable of imbibing technology faster - along with the capacity to absorb shocks, if any - than small-scale farmers; (ii) External finance is not required, and resourceful farmers can absorb expenses pertaining to seed production; iii) Resourceful farmers can afford to take a risk in conducting the trials; (iv) The general tendency of small farmers is to follow examples set by big farmers and village leaders; and (v) The word of resourceful farmers on improved varieties and yields spreads easily in the village, and hence dissemination of results is faster and more effective.

To promote uptake of improved groundnut varieties having farmer-preferced characters and market traits, Foundation seed of selected varieties of groundnut was procured from various research institutions (consortium partner institutions) including ICRISAT. The seed was provided at subsidized rates to selected farmers in nucleus villages to take up on-farm trials in the summer season of2009 with their local varieties used as control with the assistance of

the village seed bank committee members . A total of 15 farmers were identified, three from each village, and given 30kg of "seeds of five improved varieties including two local varieties for comparison for conducting trials - ICGS 44, ICGV 00350, Kadrri 6 (K 6), APNL 888, ICGV 91114. These trials provided an opportunity for the selected farmers to evaluate the varieties under their own management conditions and to make a selection using criteria determined on the basis of their preference for specific traits. Regular monitoring visits jointly with fanners were undertaken to the trial sites during the cropping season and off-type plants were removed before harvest. Farmers were able to observe the different varietal characteristics (genetic and morphological) expressed by the varieties grown in their fields. Seed produced in the summer season was shared with other interested fanners for sowing in the 2009/10 postrainy season.

At the end of the season, VSBCs, VOs, SHGs and the farmers .were involved in the evaluation of the varieties included in the trial. Men and women farmers were grouped separately and their preferences were documented. This created awareness about the new varieties and gave farmers the opportunity to select their varieties based on criteria they themselves determined. The criteria used by the farmers for the selection of varieties were based on a combination of the following attributes: pod yield, haulm yield, seed size and color, plant vigor, growth habit, tolerance to pest and diseases and stay green character and capacity to withstand moistiure stress. Among the five varieties included in the trial, farmers selected two varieties, ICGV 00350 and ICGV 44 (Table 4), which gave an average of 80% to 98% more yield over the local variety.

Table 4. Varieties and traits in groundnut preferred by participating farmers in project villages in Mahbubnagar district, Andhra Pradesh.

Cluster	Farmers' preference
KhassimNagar	First preference- ICGS 44. Second preference- ICGV 00350. Farmers preferred the uniform pod size, tolerance to leaf spot and sucking pests in ICGS 44 and its stay-green character useful for fodder purposes, when compared to ICGV 00350. They also noticed the loss of some pods in the soil during harvest in the latter variety.
Jayanna Thirumalapur	
Mojerla	First preference - ICGV 0O350. Second preference- ICGS 44. Farmers liked more number of pods per plant in ICGV 00350 compared to ICGS 44 and the stay green plant character and tolerance for moisture stress. Compared to local variety requires 8 irrigations, whereas improved needed only 6 irrigations. Women farmers preferred a short-duration variety to avoid end-of-season moisture stress to the crop. Lack of water in the bore wells due to insufficient rains in the rainy season, limits the water availability as the crop approaches maturity due to season end drought.
Kambalapur	
Malkapur	

Capacity building

For successful implementation of effective and efficient alternate seed systems model at village level, it is essential that all stakeholders are properly trained in skills required in crop management, seed production, processing, storage and book keeping and in running cooperative enterprises engaged in seed production, storage and marketing. Enhancing the capacities of stokeholds underpin the sustainable issues to take forward the project activities once the project is completed.

Institutional linkages

To sustain village seed banks activity on long run, the management of these VSB relies on committee members (farmers) to realize tangential benefits from operating seed enterprise. Committee members were trained and linked with various institutions like Regional Agricultural Research Stations (RARS), ICRIS AT, KVK and local NGOs for supply of Breeder seed and technical backstopping. For procedural and legal advice on farmers' associations, they were linked with the Hyderabad Cooperative Society Ltd. to ensure administrative sustainability.

Source of capital

To sustain the VSBs, regular inflow of finances are essential for procurement of seed from seed producers and storage in godowns for eight months till the next crop season and to meet interest on the capital raised. VSBCs were strengthened in managing seed banks as a micro seed enterprise through investments from seed bank members, cornrnittee office-bearers, and SHGs. A micro seed enterprise business model was developed (Fig 3) to attract investors in the village, especially SHGs. These SHGs can get loans from scheduled banks at a low interest rate (0.25%) and they can invest in VSBs as a profitable venture. Apart from this, SHG members are also the members and office-bearers of seed bank committees, responsible for managing VSB activities by involving themselves from the beginning of the venture. This addresses the sustainability of VSBs by involving farmers in production, procurement, storage and distribution of seed. Variation in the procurement price and selling price of seed in the market has a wide gap because production, grading, transportation and storage take a major chunk of the selling price because of the bulkiness of groundnut seed. No private seed company has shown interest in trading in groundnut seed as profit margins are very low. Taking the advantage of this factor, seed production, grading and storing of seed within the village by farmers has a major sliding advantage in this model.

Hence it may be profitable as a micro rural seed enterprise.

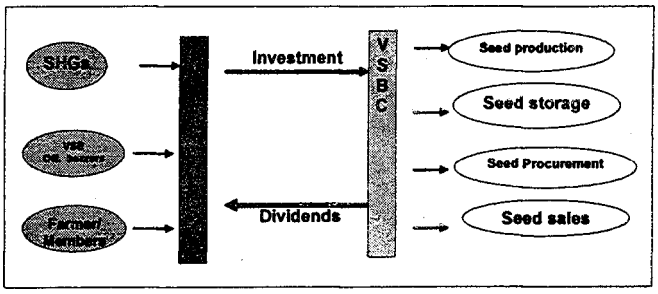

Figure 3. **Fund** flow **diagram** for **a village seed bank.**

Impact

The seed of selected varieties was procured from the seed growers by the committees and stored in the village seed banks. The seed procurement price was fixed by the VSBCs oa the basis of the market price at harvest time. It was decided by the VSBC to pay Rs. 100 per quintal above the market price to the seed producer. The seed producer benefited by getting a higher than market price and also saved on expenses like loading, transportation, market taxes and labor charges, etc. for selling the produce in the market yard. This usually amounts, to Rs 70-90 per 100 kg of pods. The details of quantity of seed procured by the VSBCs and the investment made by the community are given in Table 6. The seed bank committees of different villages differed in fixing selling price ranged from 3500 to 4500 per 100kg seed (pod). The total quantity of seed procured and sold by the VSBs was 18 tons distribute to 177 farmers in 25 project villages (Table 7) and net profit realized by the seed banks ranged from Rs. 260 to 153402in the year2009.

Table 6. Economics of village seed banks operation in five cluster villages

S.No	Cluster village	Quantity of seed procured (tons)	Expenditure incurred for seed procurement*	Expenditure incurred for processing (seed storage and sale)[s]	Total Amount invested byVSB (in Rs.) *	Total sale amount (inRs.)"	Net profit (inRs.)
1	Khassim Nagar	11.36	352160	2938	355098	508500 (4500)'	153402
2	Jayarma Thirumal apur	3.0	93000	1840	94840	[illegible]	25160
3	Mojerla	1.12	34720	1286	36006	44000 (4000)*	7994
4	Kambala pur	1.08	33480	1260	34740	35000 (350C*)»	260
5	Malkapur	1.48	45880	1390	47270	56000 (4000)'	8730
	Total	18.04	549,240	8714	5,67,9S4	7,**63**,500	1,95346

a Cost of a seed procurement price was Rs. 3100 for 100kg seed (pod)(fixedby respective VSBC)

b Expenditure towards, storage bags, pest *control „ labor* ***charges, and rent for store home***

c Investment from the members *of seed bank* ***for seed procurement and storage expenditure***

d Selling price ranged *from* ***Rs****.3500 to 4500for* ***100kg seed (pod) (fixed by respective VSBC)***

**** Numbers in parenthesis are the*** *sellingprice of* ***seed fixed by respective VSBC***

Subsequently, in the year 2011, the total quantity of seed produce in the project villages was about 262 tons sufficient to sow in 1000 ha with improved verities. (Table 7). The estimated impact of VSBs in the project villages was approximately 25% increase in yield and overall income of the farmer enhanced by 34% (Table **8).**

Table ***1,*** Total **quantity** of seed prodeeed aosd distributed byVSB

S.No	Cluster village*	Quantity (Kms)of seed produced and distributed ***m*** 2009	No. of fsjmers growing seed crap	Area (ha) under seed production 2010 '	, Quantity **(toiM)**of seed produced in 2011
1	Khassim Nagar	11.36	98	56	168
2	Jayarma Thinirnalapur	3.0	25	15	45
3	Mojerla	1.12	[illegible]	***i***	15
4	Kaunbalapur	1.08	17	***' i s ' '***	13.5
5	Malkapur	1.48	19	7	21
	Total	18.04	177	***sis'***	**262**.S

*Each cluster having 4 villages

Table 8: Estimated impact of alternative **seed system (village seed banks) in** the project area

S.Ko.	**Particular**	Groundnut **Seed** system		Benefits **from** alternative **seed** system model
		Ex&tiaf seed system	**Alternative seed** system (Application of **village** seed **banks** model)	
1	Total quantity **of** seed required **for** sowing 4000 ha * (250 **kg** pod **ha**[-1]**)**	1000 tons pod	' 800 tons	Total quantity **of** Seed requirement reduced by 20%
2	**Total** cost **of** the seed **procured** by the farmers @Rs. 50,000/ ton	5 cr./annum	* 2.48 cr./annum	Seed cost reduced by 50%
3	Average productivity	2 tons ha''	' 3 tons ha''	11 ha''' (25% increase in yield)
4	Total production (yield X 4000 ha)	8000 ions	12000 tons	50% increase in production
5	Total revenue from sale **of** produce (Selling price ***fet*** tusi - Rs. 30,000)	24 **cr./aiutam**	36cr./annum	50% increase in total revenue
6	Benefit to VSBs-a micro seed eriterpri&t at village level			0.72 cr./annum
7	Increase in gross income to the fasmer]		.	Rs.30,000 ha"
8	Savings on seed cost | -		.	Rs. 4000 ha"

*Total area under groundnut *stop* in the project villages (25)4000 ha

a. Seed (improved variety) required for sowing 4000 ha (200 kg pod ha"')

b. Selling price of seed by VSBs (Rs. 31,000/ton)

c. groundnut production using improved variety supplied VSBs

In spite of several advantages of village seed banks, we need to examine and streamline some of the constraints, which can come in their way of successful promotion and implementation. These are:

- Lack of proper seed storage facilities and management at village level

  Lack of availability of sufficient funds with FA/SHGs/NGOs for seed procurement, packing, storage and transportation.

  Absence of continuous technical support for seed production and its monitoring including quality control and seed storage.

  Limited availability and access for Breeder seed of improved varieties from research institutes for seed production on large area and at regular intervals.

HI. Advantages of village seed banks and their potential impact

- Availability of seed of improved varieties in sufficient quantities within the village itself
- Assured and timely supply of seed material to farmers
- Decentralized seed production
- Availability of improved-variety seed at lower prices
- Improved seed delivery to resource-poor farmers
- Reduced dependence on external seed sources and effective
- curbs on spurious seed trade

  Good opportunity for SHGs to invest and develop a village seed enterprise
- Encourages village-level trade and improves village economy
- Social responsibility of seed production and delivery system
- A step toward sustainable crop production
- Avoid introduction of diseases carried through seed (seed-borne pathogens) produced
- and imported from other agro-ecoregions
- Scope for farmer-participatory varietal selection and feedback to the scientific
- community on the performance of cultivars

  Availability of true-to-type varieties and healthy seed within the reach of farmers at
- affordable prices

  High sustainability of VSBs because of farmers' involvement from the beginning of VSB establishment and in seed production, storage and marketing through their own investment and sharing the benefits

Conclusions

An effective means of improved groundnut seed distribution is farmer-to-farmer seed exchange. This may be primed to a limited extent by the supplies of improved seed from public agencies, agricultural research stations and nongovernmental organizations to farmers in easily accessible villages. However, such a system is very slow and has its limitations. To speed up the flow of seed of adapted, acceptable, improved groundnut varieties to farmers, there is a need to form a network between research institutes, agencies involved in quality control and various nongovernmental organizations, community-based organizations (SHGs, farmer schools, farmer youth clubs, farmer associations) interested in various aspects of seed production and utilization. For crops like groundnut, the basic demand of a farmer is timely availability of quality seed of improved varieties at affordable price at local level. The most economical way is to produce seed at the village level through community-based seed systems and sell it to local communities without incurring the extra costs of transportation, processing and certification. Village-based seed banks provide an alternative solution to this problem and help farmers become self-reliant in their quality seed requirement. This initiative needs organized communities, institutional technical backstopping and continued interaction between various institutions, policymakers and stakeholders to strengthen local seed systems to enhance groundnut productivity in the project villages. VSB model is an community based integrated seed system, efficient and sustainable model for dissemination of improved verities at much faster rate. The principle of the model may be applicable to other open pollinated varieties of self-pollinated crops like chickpea or Pigeon pea. Due to use of improved and quality seed of farmer-preferred varieties, the. crop productivity enhanced in the project villages leading to overall positive impact on the livelihoods of farming communities.

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