Sesame Village

A joint initiative by MSSRF & Idhayam for improving the quality and increasing the yield of sesame in the farmer's field

M.S.Swaminathan Research Foundation

Chennai – 600 113

November 2007

MSSRF/RR/07/14

Project Team

Ms N. Shanthasheela

Dr Vijay R. Subbiah

Dr Sudha Nair

M.S. Swaminathan Research Foundation
3rd Cross Street, Taramani Institutional Area
Chennai – 600113, INDIA
Tel: +91-44-2254 2698/2254 2699
Fax: +91-44-2254 1319
Email: ecotech@mssrf.res.in
Web: www.mssrf.org

Design and printing: Amm Prints

Foreword

Location specific and need based agriculture extension services is a vital component for the small and marginal farmers, especially with the shifting from a production based to a market demand based system. It becomes imperative that the farmers are kept informed of the changing scenario, which is dictated by consumer preference. The complex equations that necessitate balancing the production cost to meet the competitive market, requires a multi-stakeholder participatory approach in the knowledge transfer process, to enable the farmers to take an informed decision.

The Sesame Village Project is one such initiative undertaken by M.S. Swaminathan Research Foundation. The project approach was jointly developed and implemented by MSSRF and M/s V.V. Vanniaperumal & Sons (Idhayam). The project was able to achieve its objective of taking knowledge, *i.e.*, creating awareness among the sesame farming community in following good agricultural practices for improving the quality and increasing the yield productivity. The approach adopted by the project could be scaled up and are applicable to other crops.

Sudha Nair
Director
JRD Tata Ecotechnology Centre

Acknowledgement

We would like to acknowledge the financial support provided by M/s V.V. Vanniaperumal & Sons (Idhayam), Virudhunagar for undertaking this initiative. We would also like to acknowledge the individual support, guidance and encouragement provided by Prof. M.S. Swaminathan, Chairman, MSSRF, Dr M. Velayutham, former Executive Director, MSSRF, Mr V.R. Muthu, CEO, Idhayam Virudhunagar, Dr V. Muralidharan, Director, Tamil Nadu Rice Research Institute (TNAU), Dr K. Rajeswaran, Business Consultant, Idhayam, Dr B.S. Nagarajan, Consultant and Dr V.K. Ravichandran, Professor and Head, Oilseed Research Station (TNAU).

We would also like to thank Prof. S.S. Duhoon, Project Coordinator, All India Coordinated Research Project (Sesame & Niger), for including this initiative for conducting Front Line Demonstration as part of the All India Coordinated Research Project for improving oil seed production and also Dr Shashi Banga, Senior Breeder (Oilseeds), Punjab Agricultural University and Mr B. Murugasen, Manager (Quality Control), Idhayam in carrying out oil analysis of the seeds.

We thank Mr G. Thangaraj Manager (Procurement), Idhayam and Mr V.S. Balaji Saravanan who provided valuable support in identifying the project area and for mobilising the farmers for participating in this project and Mr R. Muralidharan for his support in implementing the same.

We would like to acknowledge the support and technical guidance provided by the scientists from Cotton Research Station, Srivilliputtur, Oilseed Research Station, Tindivanam, Regional Research Station, Vriddhachalam, and the officials from the District Agriculture Department. We would also like to thank the officials at Market Committees who provided insights into the functioning of Market Committees. M/s T. Stanes & Company Limited and Coated Fabrics Business Division of M/s SRF Limited for their interest and supply of materials for field demonstration.

We would like to thank the sesame cultivating farmers who wholeheartedly supported and partnered in this initiative.

We would also like to acknowledge the contributions made at various stages of the project formulation and implementation by the following MSSRF staff, Dr P. Thamizoli, Dr A. Chandrasekaran, Dr R Rengalakshmi, Dr M. Nageswaran, Dr M. Ganesh, Mr Vishwanath M. Palled and Ms L. Gnanappazham. We would also like to acknowledge the secretarial support provided in the preparations of the various project related materials by Ms S Geetha, Ms D. Rojarani and Ms Santhilatha S. Kumar. We would also like to thank Ms. Shanthi Duraisamy for her inputs during the preparation of this report.

Contents

Introduction

The Technology Mission on Oilseeds was launched during 1986 for increasing oilseed production with the objective to create/manage conditions that would harness the best of production, processing and storage technologies to attain self-reliance in edible oils. Within a decade the Mission was able to achieve substantial progress in oil seed production and this transformation was termed as the "Yellow Revolution". The oilseed production in India is now estimated to be 25.5 million tones. India is among the top five countries of the world in oilseed production. Nine edible oilseeds are cultivated in India and sesame ranks fifth in production, following groundnut, rape seed, soya bean and sunflower.

Of this the sesame seed production is estimated at about 0.8 million tones. The growing domestic demand for edible oil, coupled with the emergence of sesame as a potential export crop, provides good opportunity for farmers to take up the cultivation of this crop and be assured of good market value. However, the gap between the potential achievable yield and the average yield of sesame is wide. Therefore it requires a dedicated and an integrated effort to find appropriate strategies that would be beneficial to all the stakeholders.

In India, the major sesame producing states are Gujarat, West Bengal, Karnataka, Rajasthan, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Maharashtra, Uttar Pradesh and Orissa (Annexure 1). While in the state of Tamil Nadu, the districts of Erode, Villupuram, Karur and Thanjavur are the areas where sesame is cultivated in a large area (Annexure 2).

The crop is mostly cultivated by small and marginal farmers under rainfed conditions and therefore it becomes

Sesame (*Sesamum indicum* L.) a species of the family Pedaliaceae, is found distributed in Africa, India, South-east Asia and Australia. It is a valued oil crop and is mainly cultivated in the tropics. China and India are the world's principal producers. Sesame oil, otherwise also referred to as gingelly oil, is one of the major sources of edible oil in India and is culturally associated from the Vedic period. The Sanskrit word for oil, *taila* is derived from the Sanskrit word for sesame *tila.*

necessary to develop mechanisms for reaching out and demonstrating the improved technologies under actual farm conditions. An integrated effort with support services would help the farmers realise higher yields and returns for their efforts. With this premise the various approaches provided here were charted out to achieve higher productivity with quality in a farmer's field.

Public Private Partnership: An End to End Approach

During the last few years there have been renewed interests in the agriculture sector, especially focusing on the welfare of the farmers. Various approaches have been suggested, all of which focus on developing strong linkages with all stakeholders in the agricultural services and with market linkages. To achieve this backward – forward linkages, Public – Private Partnership (PPP or P3) by way of contract farming, are being deliberated upon for reaching out to the farmers. Such an approach provides market linkages, credit and access to modern agricultural practices and has all the elements of an end to end to approach.

For the purpose of implementing this project, the approach adopted was similar to the practices adopted in contract farming but differs as there were no financial transactions involved between the partners nor was there any buy-back arrangement. The project limits itself to facilitate the transfer and/or create awareness among the farming community on the modern agricultural practices, provide basic extension support services and build linkages with other stakeholders and promote a sesame farmers group.

This phase of the project was more in the nature of explorative and confidence-building exercise among the key partners/stakeholders. The experience gained from this exercise would help in developing future strategies for such similar initiatives in other areas and crops.

Continuous interaction between farmers, scientists and industry helps in bringing about the desired increase in agricultural production. Their involvement in the project implementation process at all levels of operation brings about a transparency in operations and is an effective means of achieving the objectives of the project in a holistic manner. Such an approach also helps in ensuring the continuity of the gains made in the project, reaches the targeted group and an element of sustainability is built into the implementation process.

Project Objective

The objective of the three-year collaborative project was explorative in nature with the aim of demonstrating viable models for reaching out to the farmers for enhancing productivity in sesame cultivation. This was done by

1. Facilitating knowledge transfer and enhancing the skill of the farmers through training and capacity building on modern agricultural practices.
2. Providing need-based agricultural extension support services by facilitating linkages with other stakeholders.

Selection of Project Sites

The project was implemented between December 2004 and May 2007. It was envisaged that the activities would be carried out in areas that have strong functional regulated markets, where the farmers would be able to get the best returns for their yield through competitive bidding/auction. Erode District ranks first in the total area under sesame cultivation and productivity in Tamil Nadu. Therefore it was decided that the project activities would be initiated in Erode and the adjoining districts of Namakkal and Salem. It was also proposed that the area of operation could spread to other sesame growing regions in Tamil Nadu (Figure 1). Thirukoviloor in Villupuram District was identified as one of the potential area for expanding the project activities and for this purpose preliminary awareness programmes on good agricultural practices in sesame cultivation was conducted. Tindivanam was selected for conducting Front Line Demonstration (FLD) under the All India Coordinated Research Project in Sesame and Niger (ICAR) as a special case with technical support from Oilseeds Research Station (Tamil Nadu Agricultural University (TNAU)), Tindivanam.

In Erode District, sesame is cultivated in the second season (December to March) as a residual crop in paddy fields or as a second crop in groundnut/maize/sunflower-based cropping system in the garden land areas. In Namakkal and Salem Districts it is largely cultivated under rainfed system during October - November followed by irrigated conditions. In Villupuram District it is being cultivated as a rainfed crop during the season from October to March.

Constraint Analysis

The project activities were initiated after undertaking two studies on the socio-economic status of sesame-cultivating farmers and a survey to gauge the awareness levels regarding modern agronomic practices and the various constraints faced by the farmers.

The first study was conducted through a survey of 69 farmers from Thiruchengode, Namakkal District and 20 farmers from Avalpundurai, Erode District. The second study was a survey based on the responses of 143 respondents who had participated in the Farmers' Meet held at Mailampady. The data were analysed and the following points emerged:

Figure 1 Areas of project operation

Profile of Sesame Farmers: Nearly 55.2 per cent of the respondents were small farmers with an average household size of 4 to 5, 53 per cent of respondents were not a member of any association or groups, 55 per cent of respondents had access to irrigation facilities, 55.2 per cent of the respondents are regularly cultivating sesame in less then 2 acres. 77.5 per cent of the farmers use their own seeds. Nearly 56.2 per cent of the farmers' are getting the productivity of 240 – 320 kg/acre and remaining 38.2 per cent of the farmers average productivity was between 321 to 480 kg/acre.

Constraints: The farmers indicated that both inadequate knowledge in the application and practice of recommended agronomic practices and access to credit were the constraints found by them. Specific constraints identified were

- Availability of quality seed materials for sowing
- Low yield
- Pest and diseases
- Labour availability
- Lack of awareness of suitable management practices to ensure good yield
- High yield variation within the field
- Vagaries of nature
- Lack of good returns from sale

The knowledge gaps indicated were in the areas of seed treatment, use of seed drill, thinning, pest control measures, organic farming practices and application of micronutrients and growth regulators.

Project Interventions

Having identified the constraints, the project implementation followed a participatory, multi-stakeholder approach in which location-specific constraints were taken for intervention. The stakeholders at each location involved the farmers, officials from the agricultural department, agents from market and agro-services. It was done through understanding the constraints faced by the sesame cultivating farmers, identifying suitable location-specific techniques and management practices that would enable the farmers to improve the yield and quality. It was carried out based on interactive discussion with the concerned farmer combined with field visits and providing need-based agro advisories. Need-based training and capacity-building programmes were organised to

Interaction between farmers, scientists and stakeholders during the cultivation season in the field helps in finding agronomic solutions to the problems that the farmers' face and also provides a conducive environment and an encouragement for taking appropriate steps for improving the yield and ensuring good-quality production.

create awareness and impart skill on improved agricultural practices through learning by doing. The project also facilitated the visits of scientists and agriculture extension workers to the field during the cultivation season which enabled the farmers to discuss with the experts specific issues affecting the crop production.

A handbook on sesame cultivation in local language was prepared and shared with all the participating farmers as a resource material. It focused on field constraints faced by them in the selected regions and attempted to provide an integrated practice. It describes the detailed improved cultivation practices for both irrigated and rainfed systems. The next few paragraphs detail the implementation process and the results obtained. The concluding paragraph highlights the key learning for the way forward.

Farmer – Scientist Interactions

Interactive meetings between farmers and scientists were organised four times during the course of the last three years of the project for creating awareness on modern agricultural practices for improving the yield. The first of such meet was organised at Mailampady, Erode District, on 4 November 2004. The second meet was organised at Vriddhachalam, on 26 February 2005 with a view of expanding the project activities in this region. However, during the course of the project activities it was felt that the project activities should focus in the existing Namakkal – Salem – Erode project areas till the necessary level of saturation is reached since that would help in achieving a meaningful impact for facilitating autoreplication of scientific sesame cultivation in other areas.

Subsequently the third and the fourth Farmers' Meet were organised in Erode on 15 May 2005 and Avalpundurai on 22 April 2007 respectively. Each of these meetings was attended by stakeholders and around 300 – 350 farmers. Exhibits were also organised by Idhayam to create awareness among the farmers on the need for ensuring proper post-harvest operations, for improving the quality of sesame seeds, which in turn would improve the value of their products at the market.

Participatory on-farm trials in the farmer's fields

Need-based advisories on the improved method of cultivation was carried out in all the selected villages (Table 1). During the project period nearly 187 farmers participated and followed recommended practices covering a total area of 719.5 acres. These practices were carried out both under irrigated (7) as well as rainfed systems (2). The project also facilitated the visits of scientists and agriculture extension workers to the field during the cultivation season which enabled the farmers to discuss specific issues affecting the crops with the experts. In addition to providing need-based advisories and knowledge about the technique, the project had also undertaken programmes for creating awareness on improved agricultural sesame cultivation technologies at four locations.

The techniques which were part of the package of practices were emphasised. However, it was left to the farmers to adopt and practice them depending on the individual farmer's resource availability and preference as to inputs (fertilizers and pesticides). Table 2 gives a comparison between the

Table 1 **Project locations**

District	*Field trials*
Erode	Avalpoonthurai (Shanmuganathapuram & Velliampalayam villages) Muthur (Moothampalayam)
Namakkal	Manikampalayam Tiruchengode (Atthikadu, Chithalanthur, Chithampundi, Cholasiramani, Jameenellampalli, Pulliampatty, Sirupulampalayam, Solasiramani, Thottipalayam & Uppupalayam villages)
Salem	Poolampetti (Morasapatty, Oonamparai, Pillukurichi, Sullimanur, Vellagoundanurpetty, Veppamarathupatty & Veppampatty villages)
Villupuram	Tindivanam (Keelamavalangai, Kodium, Kodiumputur & Vitilapuram villages)

Table 2 **Comparison between existing and recommended practices**

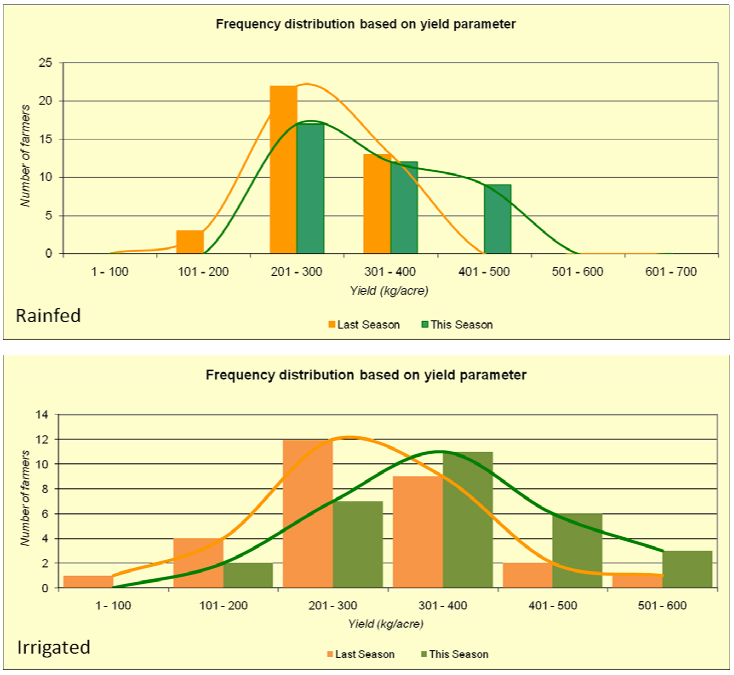
Recommendation	*Existing Practice*	*Benefits*
Importance of preparing the land to get fine tilth. It needs 2 to 3 ploughing	Normally ploughing is restricted to one or two times, which does not break the soil into fine particles	Fine soil particles ease the process of seedling emergence
Recommending soil testing and application of basal fertilizers, farm yard manure (FYM), Azospirillum, Phosphobacteria and application of micronutrients such as Zinc sulphate and Manganese sulphate based on the deficiencies observed	Soil testing is not done. Normally farmers do not apply fertilizer as it is raised as a residual crop. If fertilizer is applied than it is usually DAP at one bag per acre	Basal dose of FYM, fertilizers, Zinc sulphate, Manganese sulphate help in getting higher productivity
Treating the seeds with Trichoderma and Azospirillum	Seeds as such procured are used for sowing, mostly the seeds are not treated. However, seeds procured from Agriculture Department are pre-treated with Carbendazin/Thiram	Seed treatment helps in preventing seed-borne fungal diseases and helps in providing essential nutrients. Seeds coated with Azospirillum along with soil application also helps in reducing basal fertilizer cost by 25 %
Mixing 2 kg of seeds with 4 kg of fine sand for seed broadcasting or line sowing method with the help of a seed drill	Farmers use higher quantity of seeds; sometimes they use double the recommended quantity as they are not sure about the germination percentage	Ensuring good quality seeds and checking the germination rate can help in reducing the seed quantity used by the farmer. It is recommended that certified seeds be used for sowing

Recommendation	*Existing Practice*	*Benefits*
Cultivation of green gram and black gram along the outer periphery as a pest control method	No border crop	The pulse crops helps as a buffer in controlling pests
Importance of providing irrigation at the right stages of the plant growth such as during the early stage of vegetative growth, flowering and pod-setting stage. Recommended practice is that irrigation be provided during 25, 35, 55 and 60 days after sowing (DAS)	Farmers provide irrigation 3 times – after sowing, 15 DAS and 40 DAS	Irrigation helps in proper crop development
Carrying out weeding and thinning operations to maintain the desired population. Recommended practice is that weeding should be carried out twice during 15 DAS and 30 DAS	Farmers carry out weeding operation only once at 20 days after sowing (DAS). Thinning is normally not practiced	Weeding helps in control of weeds and simultaneous thinning ensures that the plants get all the required inputs in sufficient quantity including sunlight
Application of fertilizers as top dressing and growth regulators. Urea is recommended for application as top dressing during 35 DAS as this provides sufficient nitrogen which helps in the vegetative growth of the plant	This is not practised by farmers	Fertilizers provide essential nutrients for proper growth of the crop. Growth regulators, such as Green Miracle® or Planofix® helps in enhancing productivity by preventing flower drop and increasing the pod setting
Proper identification of pests and diseases and taking the correct control measure and removing diseased and affected plants and identifying the correct stage for harvest of crops and post-harvest protection from pests	Farmers normally approach local agro-service agents for help. No preventive measure is followed	Disease and pest control at early stages help in preventing higher loss
Harvesting at the proper time and post-harvest practices	The correct stage of harvesting the crop is normally guessed by the farmer and recommended post-harvest operations are not adhered to	The correct stage of harvesting is very important as it ensures uniform maturing of all the seeds. This stage is identified to be at the time when the stem and leaves are yellow in colour and when the pods in the centre of the plants are brown in colour

existing practice and those that were recommended. The farmers were free to follow and adopt the package as per their requirements. It may be noted that most of the farmers did follow the recommended practices.

Yield increase was observed in 96 per cent of the trials under irrigated conditions and 67 per cent under rainfed conditions. The average increase observed was about 88 kg/acre under irrigated and 50 kg/acre under rainfed conditions. The highest recorded yield in SVRP-1 variety under irrigated condition was 750 kg/acre at Thiruchengode and under rainfed condition it was 563 kg/acre at Poolampetti. The figures are higher than the expected yield potential of the crop and the average

Figure 2 **Graph showing the shift in yield increase under rainfed and irrigated conditions**



yield recorded for respective districts. Of the 261 farmers who followed improved practices, 209 (80%) farmers were able to get better yields compared to their earlier practices (Figure 2 and Table 3).

Both the graphs (under irrigated and rainfed conditions) indicate that when compared to the previous season, the number of farmers who are harvesting higher productivity is more during the current season.

Front Line Demonstration

Front Line Demonstration (FLD) was conducted as on-farm trials in the farmer's field to show the productive potential and benefit of following recommended agronomic practices in sesame cultivation. This was conducted as part of the All India Coordinated Research Project (Sesame &

Table 3 **Consolidated data of field activities season and location wise**

Project site & period	*Cultivation condition*	*Number of farmers who followed recommended practice (new + old trainees)*	*Area covered (acres)*	*Average yield (kg/acre)*	*Best yield observed (kg/acre)*	*Number of farmers who got better yield when compared to last season*
Thiruchengode December 2004 to February 2005	Irrigated	17 + 0 (total 17)	71	397	563	16 (94 %)
Avalpoonthurai April to July 2005	Irrigated	20 + 0 (total 20)	79	375	488	17 (85 %)
Poolampetti June to August 2005	Irrigated	17 + 0 (total 17)	61	357	525	16 (94 %)
Poolampetti September to November 2005	Rainfed	38 + 0 (total 38)	91	345	488	24 (63 %)
Thiruchengode January to March 2006	Irrigated	37 + 17 (total 54)	172.5	399	750	41 (76 %)
Poolampetti April to June 2006	Irrigated	12 + 17 (total 29)	93	370	600	25 (86 %)
Tindivanam November 2006 to March 2007	Irrigated	20 + 0 (total 20)	20	408	500	20 (100 %)*
Poolampetti February to May 2007	Irrigated	20 + 0 (total 20)	32	548	600	18 (90 %)
Poolampetti June to August 2006	Rainfed	8 + 38 (total 46)	100	375	563	32 (70 %)

* Current season comparison as per ICAR guidelines for conduct of FLD

Niger) of Indian Council of Agricultural Research (ICAR) in four villages near Tindivanam, with technical guidance from Oilseeds Research Station (ORS), Tindivanam. Twenty farmers had participated in this on-farm trial during November 2006 - March 2007 from four villages, viz. Kodium, Kodiumputhur, Keelmavalangai and Vitilapuram in the Villupuram District of Tamil Nadu. Five

farmers from each village were selected based on their interest. All of them are small and marginal farmers having facility for irrigation.

The soil at the site was red sandy soil and sugarcane, groundnut and green gram are the major crops cultivated.

Whole package of practices was adopted for the purpose of demonstration, which was compared with the farmers practice (Table 4). The trials were conducted using TMV3 seeds procured from ORS and cultivated under irrigated conditions. Inputs, such as seeds, fertilizers, growth regulators and pesticides were provided to farmers for use in FLD plots. The demonstrations were successful in creating the desired interest among the farmers for adopting recommended agronomic practices.

A farmer centric approach and working within the normal resource limits available with the average farmer of the region, helps the project to look for alternative solutions that are sustainable and site specific.

Due to the improved practices the productivity of the crops increased from 50-150 kg/acre to 250-500 kg/acre which helped to enhance the Cost-Benifit Ratio from 1: 1.16 to 1: 1.87. Apart from increase in the productivity which was mainly due to increase in the number of productive capsules per plant, the quality of the sesame got improved. The quality indicators such as size of the grain, weight of the grain (test weight), colour of the grain as well as oil content (squeeze method) were commonly used by the traders for assessment, which was high to very high under improved management practices. The improved management practices are quality seeds, maintaining optimum spacing, providing balanced nutrients with growth regulators application and timely pest control measures.

Cost of Production

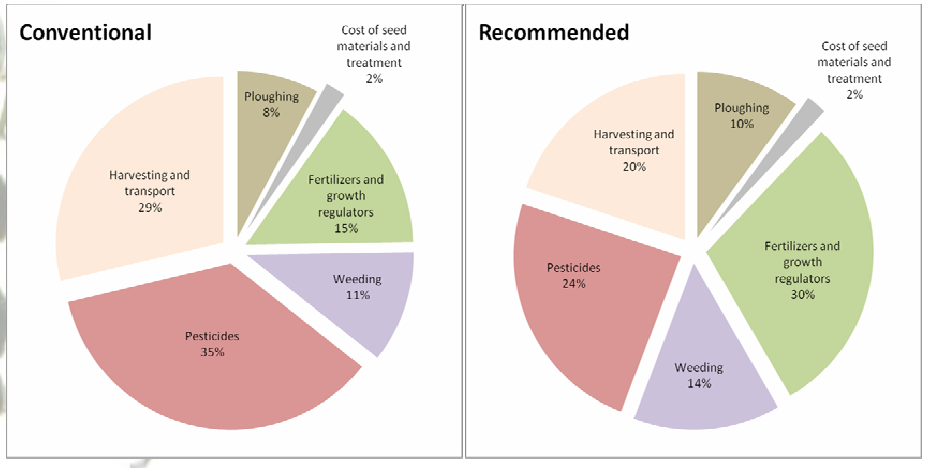
The project also looked into the production cost under recommended practices and conventional practices. The general trend observed suggests that (1) farmers do not apply inputs as per the recommended practice based on their perception of risk in market returns (2) management practices are minimum with a predisposition towards cost-cutting practices. Figure 3 gives a proportion and break-up of expenditure as reflected in a case study carried out at Thiruchengode for sesame cultivated under irrigated condition during January – March 2006.

It may be noted that good management practices (optimum plant population and density, and harvesting) and supply of inputs (balanced nutrient application, pest control) at correct time does benefit the farmer in improving the yield output, which compensates for the expenditure incurred by the farmer while following recommended practices.

Table 4 **Difference between the normal farmer's practice and those adopted under front line demonstration (average of 20 farmers)**

Field operations	Farmer's practice	Front line demonstration
Ploughing	1 – 2 times	3 – 4 times
Seed rate (kg/acre)	2 – 2.5	1.5 – 2
Seed treatment	No	Yes
Sowing method	Broadcasting	Line sowing and broadcasting
Row spacing between plants	Not uniform; varies from 10 – 30 cm	Uniform at 30 cm
Irrigation	Not following recommended practices	Followed as per recommended practices
Fertilizers/Micronutrients/ growth regulators	No	Yes
Weeding	Hand weeding done once	Herbicides used and hand weeding carried out twice
Thinning	Nil to 2 times	2 times
Pest and disease control measures (application)	Nil to 2 times	3 times
Yield kg/acre	50 – 150	250 – 500
Expenditure (average) in Rs/acre	946	4,093
Gross Profit (average) in Rs/acre	2,040	11,727
Net Profit (average) Rs/acre	1,094	7,634
Cost Benefit Ratio (average)	1 : 1.16	1 : 1.87
Seeds sold in the market at Rs/kg	20	29

Figure 3 **Generalised break-up of input cost under irrigated condition as per conventional and recommended practices**



The point of sale of farm produce observed in this study among the trainee farmers during the same period showed that 76 per cent of them had sold the produce in the regulated market and the remaining farmers preferred to sell their produce to local agents. The possible contributing factors for this decision may be based on the quantity and quality of the produce available with the farmer for sale.

Ensuring Quality Seeds

The project initially was envisaged as a means of creating awareness among the farming community on modern agronomic practices, but during the process of implementation it was felt necessary to take up the role of facilitating linkages for ensuring the availability of quality seeds to the farmers as part of its overall programme. Using quality seeds is an indispensable input in increasing yield output.

Studies on the yield performance of the seeds distributed after multiplication and from those procured from other sources (Figure 4) do support the need for making available good quality seeds to the farmers.

For the purpose of facilitating the availability of quality sesame seeds locally, the project had procured SVPR-1 breeder seeds from Cotton Research Station, Srivilliputtur and took up the task of seed multiplication, involving the farmers (producer), an agro-service agent (for marketing) and the State Agriculture Department (for certification). This exercise was carried out thrice at Poolampetti project area and once at Tiruchengode project area. During February – May 2007, 15 farmers had participated covering an area of 25 acres and the average seed yield was 467 kg/acre and the average Cost – Benefit Ratio has been 1 : 1.98.

Some of the issues identified as bottleneck in seed production for ensuring continuous availability of quality sesame seeds to the farmers are:

- Procurement of quality seeds for seed multiplication
- Certification process
- Purchasing, stocking and distribution of seeds
- Uncertainty in gauging the demand from the farmers
- Risk of litigation

The seed multiplication programme under the project is in the formative stage of implementation. However, an informal network of production and distribution of quality seeds have been established, which could be scaled up as per demand.

Farmers Feedback

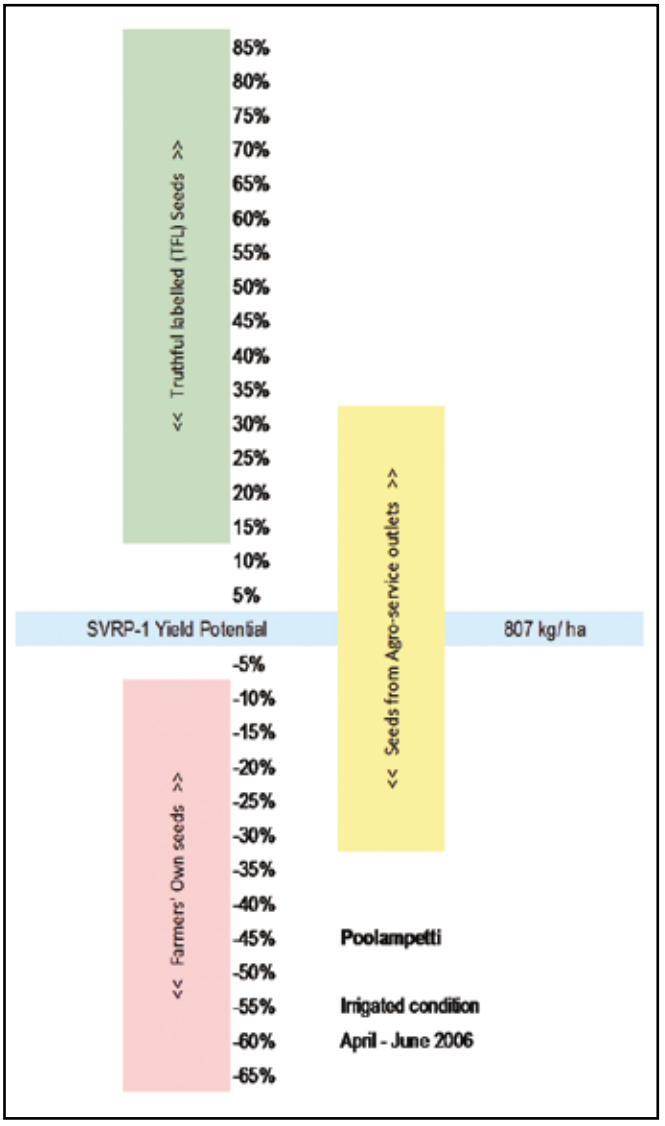
The cooperation and support of the farmers have been overwhelming and there have been requests for extending the project activities in other villages.

Mr M. Palanivelu from Thottipalayam, who has been cultivating sesame for the last 10 years said that the project has helped him in becoming aware of the importance of treating the seeds and using fertilizers, growth regulators and pesticides in a timely manner, which he has adopted in his practice.

Mr R. Muralidharan from Poolampetti village says that before the project intervention he had never carried out seed treatment nor used plant growth regulators which he has now adopted. He says that he benefited immensely through the interaction of the scientist from TNAU and from the quality SVPR-1 seeds made available through the project.

Only groundnut was popularly cultivated in his area says Mr S. Dhavaselvam from Kodiyam village near Tindivanam and when sesame was cultivated no inputs were given to the plants. But, he says, after the demonstration he has now understood the importance of providing inputs to the plants for getting better yields in sesame.

Figure 4 **Comparison of yield performance as a percentage of variation between actual and yield potential of SVRP-1 seeds procured from various sources**



These farmers mentioned earlier have also pointed out the problems still faced by them in sesame cultivation and have asked for solutions for the same. The common problems cited were non-availability of labourers during sowing and harvesting, control of root rot, powdery mildew, leaf spot, capsule and pod borer, high cost of pesticide, lack of irrigation and lack of access to credit facilities and absence of quality seeds for sowing.

Key Learnings

Based on the initial survey on constraints faced by the farmers the project has been able to address the issues related to

- Availability of quality seed materials for sowing
- Low yield
- Pest and diseases
- Lack of awareness of suitable management practices to ensure good yield
- High yield variation within the field

The following issues were beyond the scope of the project:

- Labour availability
- Vagaries of nature
- Lack of good returns from sale

Based on the experience gained from the project, the following points have been highlighted as key learnings:

- The adoption of recommended package of agronomic practices helped to achieve the potential yield of the crop as well as quality. The project was also able to show that the benefit-cost ratio improves when recommended practices are followed
- Quality seeds play an important role in enhancing the productivity
- Complete package of practices need to be developed, especially in Integrated Pest Management (IPM)
- The cooperation of the farmers, the support received from the agriculture scientists, agriculture extension officials and private individuals were the contributing factors that ensured a smooth approach to problem solving at the field which in turn ensured good yields due to appropriate and timely interventions. This facilitated in demonstrating visible yield improvement over the practices followed by the farmers
- Extension support for the farmers help in facilitating technology and knowledge transfer

Way Forward

This phase of the project looked solely at the production and related aspects as market linkages at the project site were not a constraint. The approach adopted by the project was to involve farmers who would be able to help spread the practices and technique locally among other farmers, *i.e.*, horizontal transfer of knowledge. However, it is felt there is a need for continuing this effort for providing an extension service support to the farmers until a threshold level for autoreplication could be achieved. It is also envisaged that the nature of the extension needs to be institutionalised

either as a farmers society, or as a cooperative or as an association or alternatively an institution could be established with external support, *i.e.*, from a private sector.

Technical support and constant interaction with the farmers help in building their confidence and clarifying their doubts. However, other external factors, such as vagaries of nature and availability of labourers, credit, inputs locally and market fluctuations are the major constraints faced by the farmers. Farm mechanisation would reduce the burden; however, mobilising the capital investment for the same would be difficult for the farmers.

- In is envisaged that a local resource centre would be able to facilitate the farmers in getting the technical, financial and marketing support.
- Reduced yield variability within the farmers fields and across the region needs to be addressed to get uniform growth and better productivity
- Since labour is a major constraint it is essential to devise gender sensitive labour-saving devices and farm machineries
- To achieve backward – forward linkages, Public – Private Partnership (PPP or P3) could be strengthened by involving all the stakeholders to ensure and facilitate market linkages, credit facilities and access to modern agricultural practices to the farmers.

Annexure 1

Statewise sesame area, production and yield (2005 – 2006)

States/UTs	Area ('000 ha)	Production ('000 tonnes)	Yield (kg/ha)
Andhra Pradesh	116.0	29.0	250
Arunachal Pradesh	1.1	0.7	636
Assam	13.9	7.7	554
Bihar	3.6	2.9	806
Chhattisgarh	24.3	7.2	296
Gujarat	364.0	143.0	393
Haryana	4.4	1.5	341
Himachal Pradesh	3.8	1.5	395
Jammu & Kashmir	2.6	1.2	462
Jharkhand	9.1	2.9	319
Karnataka	103.0	87.0	845
Kerala	0.6	0.2	333
Madhya Pradesh	150.1	58.1	387
Maharashtra	107.0	29.0	271
Manipur	0.1	0.6	600
Meghalaya	1.6	0.9	563
Mizoram	2.2	1.7	773
Nagaland	5.5	3.8	691
Orissa	54.7	13.0	238
Pondicherry	0.2	0.1	500
Punjab	11.3	3.8	336
Rajasthan	422.1	62.8	149
Tamil Nadu	65.1	30.6	470
Tripura	1.8	0.8	444
Uttar Pradesh	107.1	27.0	252
Uttaranchal	2.0	1.0	500
West Bengal	146.0	123.1	843
India	1723.2	641.1	372

• Source: IndiaStat.com

Annexure 2

Districtwise data on area under sesame cultivation and average yield rate

District	Area cultivated (ha)			Average yield rate (kg/ha)		
	Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total
Chennai	-	-	-	-	-	-
Coimbatore	340	1138	1478	665	429	484
Cuddalore	305	2325	2630	277	364	354
Dharmapuri	26	141	167	665	246	311
Dindigul	148	1311	1459	665	307	343
Erode	11301	2049	13350	803	677	784
Kancheepuram	2,078	126	2204	477	461	476
Kanyakumari	-	-	-	-	-	-
Karur	769	5889	6658	569	233	271
Krishnagiri	24	235	259	665	84	138
Madurai	22	1245	1267	665	299	305
Nagapattinam	5	132	137	665	465	472
Namakkal	403	135	538	665	371	592
Perambalur	289	2341	2630	665	320	358
Pudukottai	108	541	649	665	371	420
Ramanathapuram	24	1614	1638	665	169	177
Salem	620	1553	2173	944	611	706
Sivagangai	2	112	114	665	371	377
Thanjavur	621	5378	5999	677	425	451
The Nilgiris	-	-	-	-	-	-
Theni	43	556	599	665	496	509
Thiruvallur	1087	524	1611	353	597	432
Thiruvannamalai	771	269	1040	523	371	483
Thiruvarur	197	2117	2314	506	378	389
Thoothukudi	77	3250	3327	665	293	302
Tiruchirapalli	353	72	425	665	371	616
Tirunelveli	86	2026	2112	665	290	305
Vellore	352	442	794	319	371	348
Villupuram	1584	5256	6840	318	517	471
Virudhunagar	43	2663	2706	665	307	313
State	21678	43440	65118	665	371	469

• Source: Season and Crops Report of Tamil Nadu, 2004 - 2005