FICCI

Evaluation of the PPPIAD Project on **COTTON**



Documentation of the project on
Improving productivity of Cotton in Maharashtra by
Nuziveedu Seeds Ltd and
Department of Agriculture, Government of Maharashtra

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Executive Summary



Executive Summary



Maharashtra is the first state in India to implement projects under the Public-Private Partnership for Integrated Agriculture Development (PPPIAD) scheme. In 2012, the State Department of Agriculture rolled out projects focusing on improving value chains for crops as well as developing integrated value chains for specific crops through public private collaboration and co-investment. In the first year the partnership was rolled out with the aim of reaching out to at least 200,000 farmers in the state.

FICCI undertook the evaluation of Cotton project implemented by Nuziveedu Seeds ltd in the year 2013 .The objectives of the study were to assess the outcomes in terms of increase in productivity of cotton, improvement of farm incomes, document the processes of linkage of farmers with input and output markets, and to identify the process that enable a successful partnership between the Government, private industry and farmers.

The project on cotton aimed at improving the standard of living of small and marginal cotton growing farmers by enabling/empowering them to be self-reliant through supply of high yielding planting materials, providing agronomic support, assisting in adopting advanced agri practices, providing market linkages, and sharing experiences of research and development in cotton cultivation.

Direct connect with the farmers, well-planned training programmes and field demonstrations have played a key role in engaging the farmers and informing them about the modern methods of farming of cotton.

The project has been able to enhance the productivity of cotton with the application of right kind of inputs (seeds, fertilizers) and knowledge about appropriate farming practices such as increasing the plant population by maintaining plant spacing efficiency. Regular advice on extension services by project partners has contributed to the adoption of best practices resulting in enhanced cotton productivity to 11-12 quintal/acre.

Developing the right package of practices and its education to the farmers has been a central element of the project. Disseminating information and awareness regarding importance of ginning activities have been central to the project interventions. Farmers were educated about higher profit margins if kappas is first ginned and sold as bales.

There is a well-defined institutional mechanism created both at the Government and at the company level to oversee the implementation and monitoring the progress of the project with periodic reporting and assessment across all levels. PPPIAD project has created a framework where the Government and the private company have worked in tandem, supporting the development of the back end supply chain along with providing the market linkage opportunities to the cotton growing farmers.

Based on the interactions during primary survey, three important focus areas for further strengthening the cotton supply chain are as under:

- The prospects of agro technologies to provide cost effective sustainable cotton production are enormous. For instance, indiscriminate and unscientific use of fertilizers cause high financial burden to the farmer rendering serious damage to the plant health and soil characteristics. Therefore integrated nutrient management, training on high density plantation system and promotion of soil testing efforts should be scaled to have larger impact on crop yield improvement.

- Forward integration for selling the produce and value addition by ginning the kappas to bales is a very critical link for increasing the farmer income. Approximatley ninety three ginning groups were formed under the project for this. This needs to be promoted in a big way.

- Labor consists 47% of the total cost of cotton cultivation for a one acre land. Mechanization is a logical choice when the country is looking for improvement in yield and ways for managing agriculture labor concerns.

It was felt that the project has further scope of introduction of new technologies such as water conservation technologies, opening of collection centres during harvesting period, creation of scientific storage godowns, encouraging warehouse receipt financing and promoting mechanized solutions during planting and harvesting period of cotton.

The Agriculture Department can explore initiating an award/ certificate scheme for farmers/ farmer groups who have done exceptional work in the delivery of the project goals for encouragement. While the first year has seen initial success, it is important to maintain the momentum so as to provide enhanced opportunities to the farming community and maximize the outcome. The project will be able to leave a lasting legacy by way of transforming the way cotton farming is practiced with the engagement of the Government.



Public Private Partnership for Integrated Agriculture Development (PPPIAD)

Public Private Partnership for Integrated Agriculture Development (PPPIAD)



Agriculture and allied activities supports more than 50% of the country's population and accounts for 13.7% of gross domestic product (GDP) at constant prices (2012-13). India ranks first in the world when it comes to production of milk and pulses, second in rice, wheat, sugarcane, groundnut, fruits and vegetables and cotton production. It is also a leading producer of spices and plantation crops.

A number of private sector companies are active in agriculture and agri-business, directly engaging with the farmers and improving their farm incomes. While most of these initiatives are successful, they are limited to specific geographical regions, crops and limited number of farmers. On the other hand, the Government has increased funding to farmers through a variety of schemes/subsidies for improving productivity/market linkages, etc. Unfortunately, the outcomes do not commensurate with the quantum of Government spending, mainly due to the limited extension capabilities leading to gaps in execution, delivery and results.

The Federation of Indian Chambers of Commerce and Industry (FICCI) has been working on devising policies and suggestions that contribute to increasing farm income, productivity and global competitiveness of Indian agriculture. Over the years, through its long standing collaboration with the Ministry of Agriculture, Government of India, FICCI has worked to promote public-private partnerships in various parts of the agriculture value chain including warehousing, farm mechanization, extension, secondary agriculture, risk management and agri-marketing reforms. FICCI was instrumental in developing a policy framework for public-private partnership for integrated agriculture development (PPPIAD) jointly with the Ministry of Agriculture, Government of India (GoI). The Ministry issued the guidelines on August 14, 2012. The main objective of the PPPIAD scheme was to facilitate large scale integrated projects led by private sector in the agriculture and allied sectors, with a view to aggregating farmers, creating critical rural infrastructure, introducing new technologies, adding value and integrating the agricultural supply chain. The PPP model aims to reduce the transaction costs and enhance the access to subsidies/schemes for farmers through a facilitator i.e. the company and motivate them to build a profitable/self-sustaining model for improving the entire supply chain. The PPPIAD program embodies the following principles:

- Combine operational efficiencies of the private sector and the investment by the public sector;
- Quantifiable outputs with defined timelines and strategies; and
- Move away from business as usual approach replacing traditional methods of farming by modern and scientific methods.

FICCI is engaged with the Small Farmers Agri-Business Consortium (SFAC), Government of India, for promoting the adoption of the guidelines. It is involved in increasing the awareness amongst the private sector for PPPIAD.

Download PPPIAD gudielines - http://www.nhm.nic.in/Archive/PPPIAD-Brochure.pdf



Overview of Cotton and Significance of Mahrashtra

India in World Cotton Map

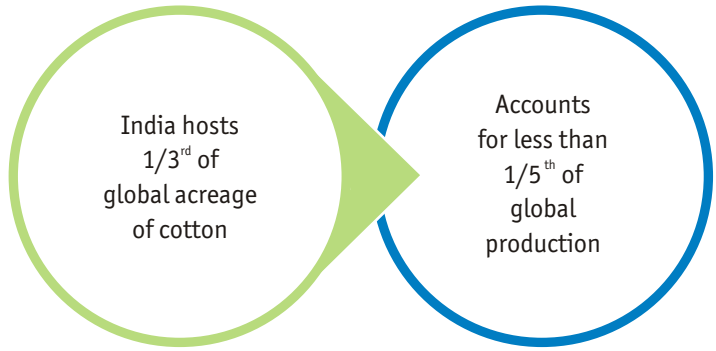
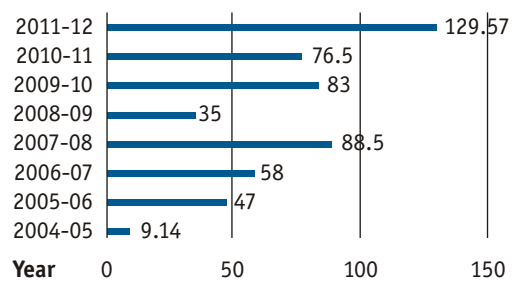
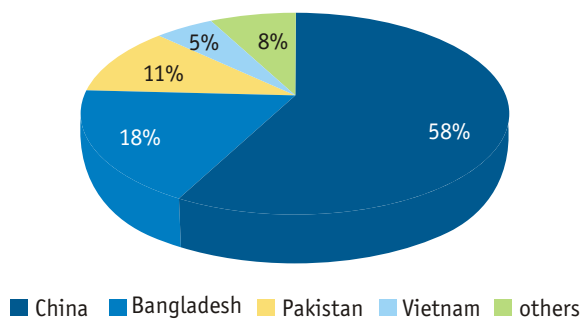


Table 1: Indian Cotton Exports (lakh bales of 170 kgs)



Source: cotton advisory board

Graph 1: India's key export destinations



Source: DGFT, Ministry Of commerce

- ✓ The total value of textile products exported from India was estimated at US$ 40 billion in FY 2013.
- ✓ India has overtaken Italy and Germany, and is now the second largest textile exporter in the world.
- ✓ India was the third-largest supplier of textiles and clothing to the US in 2013, contributing about 6.01 per cent of its total imports.
- ✓ China is the biggest importer of raw cotton from India. The other major cotton importing countries from India are Bangladesh, Egypt, Taiwan, Hong Kong among others

Overview of Cotton and Significance of Mahrashtra



A. Global Cotton Scenario

Cotton is an important commodity in the world economy. Grown in more than 100 countries, cotton is the most traded agricultural commodity, with over 150 countries involved in cotton trade. Currently, the world's yearly production of cotton is about 117 million bales. China is the world's largest producer of cotton and produces 32.0 million bales. India follows China at the number two position with a production of 29 million bales.

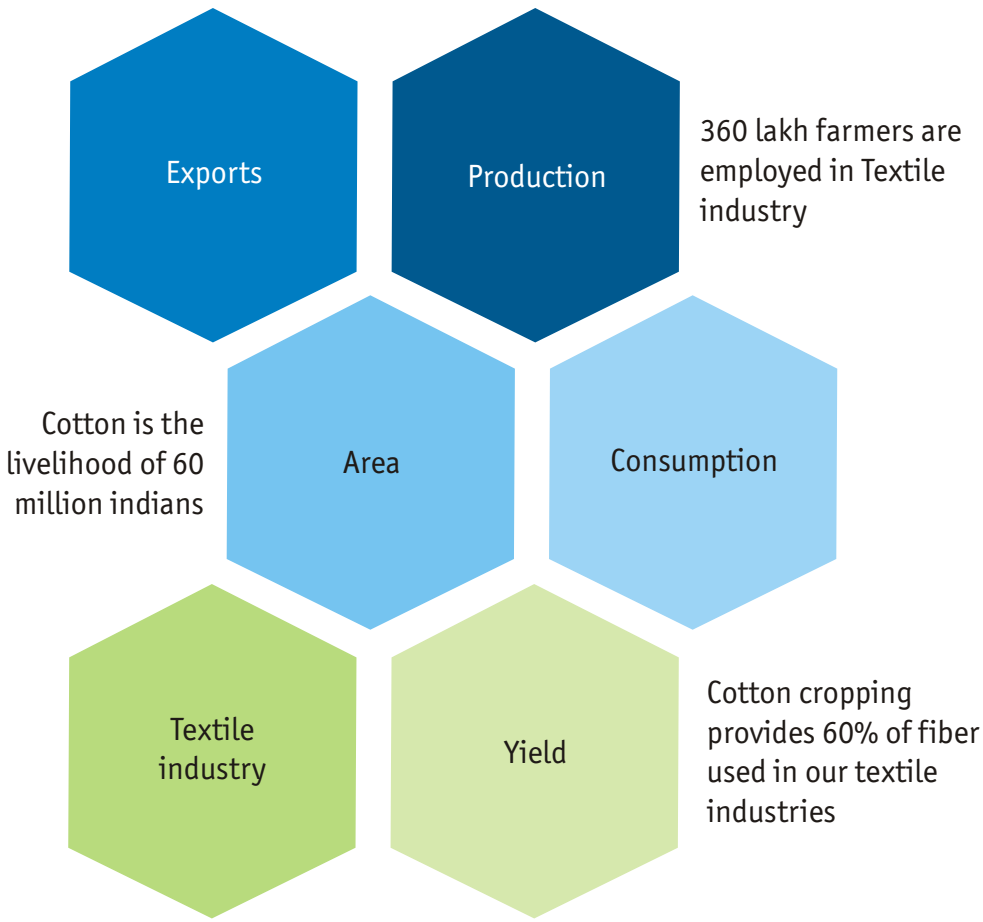
Global production of Cotton has grown at a CAGR of 4.43% from 2004 to 2013-14 . The area under cotton cultivation in the same period has increased at a CAGR of 2.78%.

Cotton represents nearly half the fibre used to make clothes and other textiles worldwide. With cotton prices above historical averages in recent years, trade and production has evolved substantially. Developing countries now play a greater role in the production, movement and processing of cotton into a finished product. One of the most important developments of the past decade has been China's rise as the largest importer of cotton, accounting for 36 percent of world cotton imports in 2012/13.China has consistently been the top cotton importer of cotton in the world.

B. Importance of Cotton to Indian economy

India is the second largest producer of cotton in the world after China accounting for about 18% of the world cotton production. It has the distinction of having the largest area under cotton cultivation constituting about 25% of the world area under cotton. In India cultivation of cotton provides livelihood to an estimated 6 million farmers. Cotton cropping provides 60% of the fiber used in textile mills, supplies more than a million tons of cooking oil, and another million tons of quality animal feed and 40 million tons of biomass in form of cotton stalks.

Indian Cotton Scenario



C. Indian Cotton at a Glance

Cotton is an important cash crop in Indian agriculture. However despite being second largest producer of cotton in the world next only to China, India ranks far behind in terms of productivity. This can be achieved through disseminating innovative agro technologies. This section highlights the fact that efforts to improve productivity of Indian cotton can be led from Mahrashtra and which would be a combined effort of Government, Industry and farmers.

C.1. Significant boost in area and production of Cotton in India- propelled by Government intervention

Government of India has encouraged cotton cultivation in the country by way of incentivizing farmers through increase in MSP. The MSP of cotton has increased for medium staple from Rs.3600 per quintal in 2012-13 to Rs. 3700 per quintal in 2013-14. Similarly for long staple it has been increased from Rs.3900 per quintal in 2012-13 to Rs. 4000 per quintal in 2013-14. The increase in MSP acts as a positive indicator for the farmers to allocate their land for cotton cultivation.

C.2 Cotton has witnessed the highest growth in acreage, as well as production over the last 10 years- however lower productivity remains a challenge in India

Table 2: Growth rate of area, production and yield of principal crops

CAGR (2004-05 to 2013-14)	Area	Production	Yield
Barley	0.40%	3.30%	2.90%
Cotton	2.78%	4.43%	1.82%
Millet	-1.10%	0.70%	1.70%
Sorghum	-4.50%	-3.00%	1.60%
Wheat	1.20%	2.90%	1.70%
Rice	0.30%	2.60%	2.30%

Source: USDA and Cotton corporation of India Ltd

When compared with other principal cereal crops such as Wheat and Rice, Cotton has recorded the highest growth rate of 2.78 per cent in the cultivable area and 4.43 per cent in production from 2004-05 to 2013-14.

C.3. Trends in Cottton Production and yield

Table 3: Global Cotton scenario

	Area (Lakh ha)	Yield (Kg/ha)
Australia	4.3	2351
Brazil	8.9	1427
China	53	1403
USA	38	971
Uzbekistan	13	729
Pakistan	30	697
India	119	518
World	341	759

Source: ICAC & CAB

Current average yield of cotton is around 518 kg/ha in India and this is significantly lower compared to other economies like Brazil (1427 kg/ha), China(1403 kg/ha), USA(971 kg/ha) .Therefore there is a significant scope to increase the productivity through modern agro technologies.

C.4. Yield of Indian cotton is increasing at CAGR 1.8% whereas consumption by 3.07%

Graph 2: Yield Vs consumption of Indian Cotton

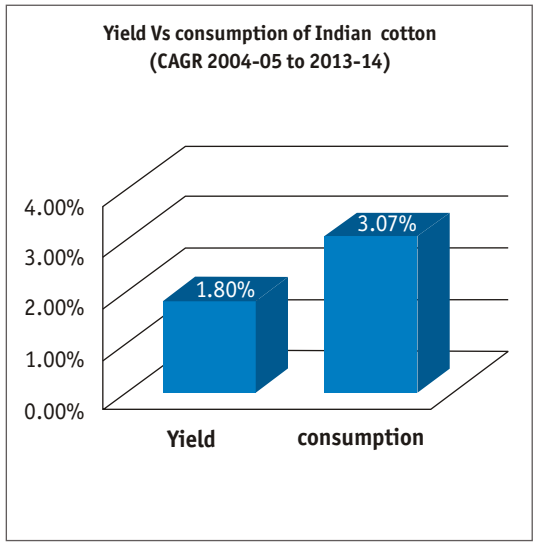


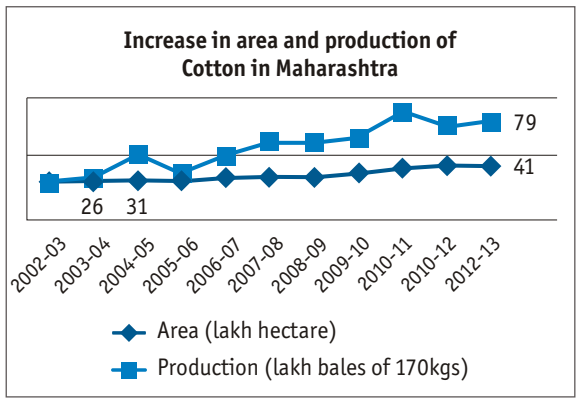
Table 4: Variation of Cotton yield in different states

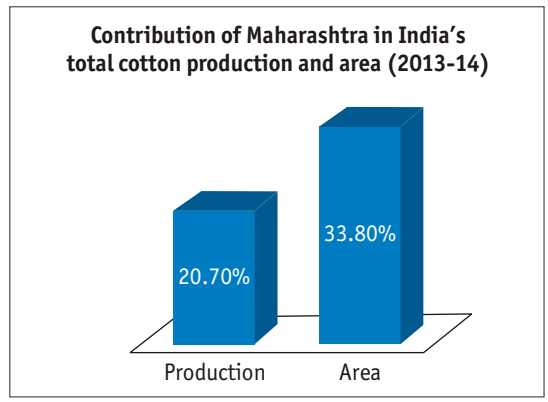
State	Area under cultivation	Production	Yield
	Lakh hectares	Lakh bales of 170 kgs	Kgs per hectare
Punjab	5.6	20	607
Haryana	6.41	26	690
Rajasthan	4.7	18	651
Gujarat	29.62	122	700
Maharashtra	41.25	76	313
MP	7.06	18	433
AP	18.79	60	543
Karnataka	5.54	15	460
Tamil Nadu	1.33	6.5	831
Orissa	1.02	3.5	583
Others	0.46	3	739

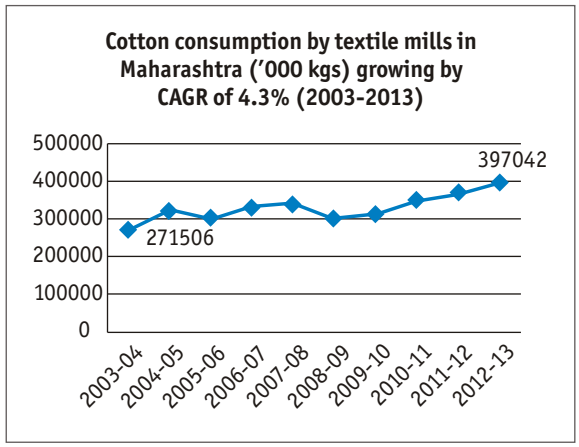
source: FICCI analysis, Cotton Advisory Board

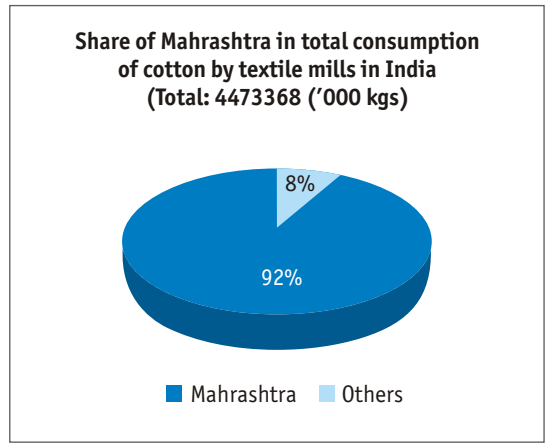
As evident above, cotton consumption is growing at CAGR of 3.07% whereas the yield of cotton has increased at a CAGR of 1.80% from 2004-05 to 2013-14. This signifies that increase in consumption of cotton have placed new pressure on cotton production. Production of cotton in India is dominated by Maharashtra and Gujarat which consists 54 per cent of the total production in 2012. Therefore undertaking any effort to improve productivity of cotton in Mahrashtra can bring noticeable results at a national level.

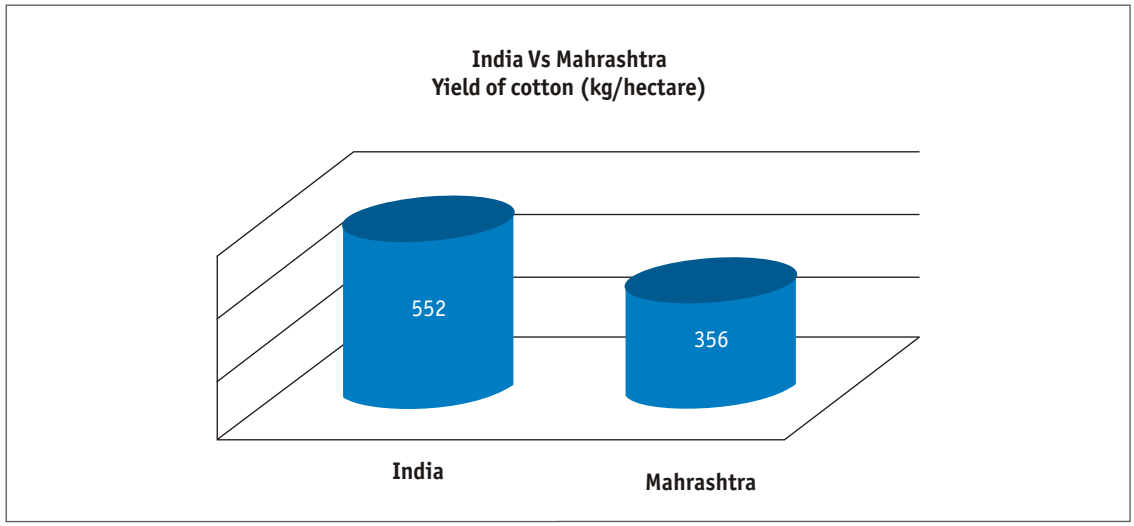
D. Significance of cotton in Mahrashtra











Source of all graphs: Cotton Corporation of India Ltd

Contextualizing Maharashtra- improving cotton productivity scenario in country

Cotton consumption has witnessed a sustained increase due to growing demand by Indian textile industry. The consumption of cotton by textile mills in Maharashtra is growing at a CAGR of 4% between 2003 to 2013. It is predicted that India's cotton consumption will rise to 29.7 million bales in FY15, driven by strong mill consumption. In such a scenario, improving the cotton productivity will go a long way in fulfilling the future demand of cotton.

In 2013-14, Maharashtra had 33% share in the total area cultivated under cotton in India. However, Maharashtra contributed 20.7 % to the total cotton produced in the country. Over the years the productivity of cotton in Maharashtra has improved but still needs to match the average yield level of the country. This highlights huge opportunity for improvement in cotton productivity by working closely with farmers.

Mahrashtra has the potential of becoming the leader in cotton. Having realized the fact that new technologies for sustainably increasing the crop yields are essential, PPPIAD project takes a holistic approach to provide end to end solutions to the cotton growing farmers in Mahrashtra. The PPPIAD project on improving the productivity of cotton crop in Maharashtra looks at major reasons for low productivity in cotton- such as poor soil fertility, use of low level of inputs like manures, fertilizers and crop protection chemicals, high labour cost and crop loss due to diseases, lack of resistant varieties and post-harvest losses.

Addressing these challenges on a mission mode will not only enhance productivity, profitability and quality of produce but will also improve the financial status of the cotton growers in the state.

Agriculture in Maharashtra

Agriculture in Maharashtra including allied activities, accounted for 12.4% of the Gross State Domestic Product at current prices in 2011-12 but its role in State's economy is much wider as agriculture continues to be the main occupation of the state. Around 64.14% of the people are employed in agriculture and allied activities. During the XI Five Year Plan (FYP), an average growth of 4.3% was achieved against the target of 4%. The growth target for agriculture and allied activities sector in the XII FYP remains at 4%, as in the XI FYP.

Agri marketing reforms in Maharashtra

Agricultural Produce Marketing (Development and Regulation) Act in 2006 has opened up the market to competition and encouraged private investment in infrastructure development and agro- processing. Maharashtra was one of the first few states to amend the APMC Act in 2006. The amendment of the APMC Act has enabled licensed direct marketing agencies and private markets to participate actively in the agricultural marketing. Farmers in the state are now able to sell their produce in open markets and not constrained to the APMC (Agricultural Produce Marketing Committee) market yards.

The Maharashtra APMC Act was amended on the lines of the Model Act suggested by the Central Government. The amendments include provisions for establishment of proper markets, some elements of direct marketing, special commodity markets, farmers-consumers markets and single licensing system for all APMCs. Restrictions or regulations on storage are imposed as per the directives of the Central Government under the Essential Commodities Act.



Project Brief:
Improving Productivity of Cotton

Project Brief: Improving Productivity of Cotton



A. Project objectives and activities

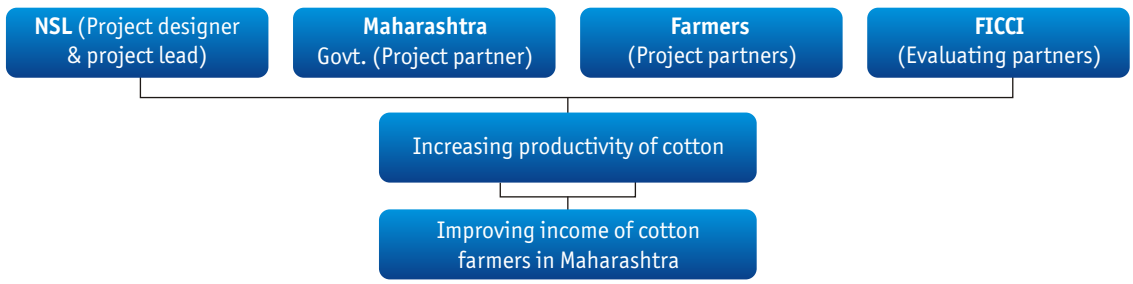
Under the PPPIAD Project with State Government of Maharashtra, Nuziveedu seeds ltd introduced new technologies for cotton cultivation such as (a) promoting high density plantation (b) use of growth regulators(c) application of integrated pest and nutrient management for cotton cultivation (d) training on post harvest management (e) creating market linkages.

Regardless of the extent of the project, it is important to measure the success of the project implemented under PPPIAD. Undertaking a review of each project provides an opportunity to evaluate if the project is meeting the desired objectives – increasing productivity, increasing farmer incomes, and development of the value chain. In this review the endeavor has been to provide valuable information on whether the project met its target objectives, the delivery of outputs and the level of project scope, time, cost and quality. FICCI, which has been involved in the formulation of the PPPIAD guidelines with the Ministry of Agriculture, Government of India was therefore entrusted the task of evaluating the pilot project on increasing productivity of cotton in Maharashtra and also for dissemination and advocacy.

The evaluation study will assess the objectives (mentioned below) set by the project team:

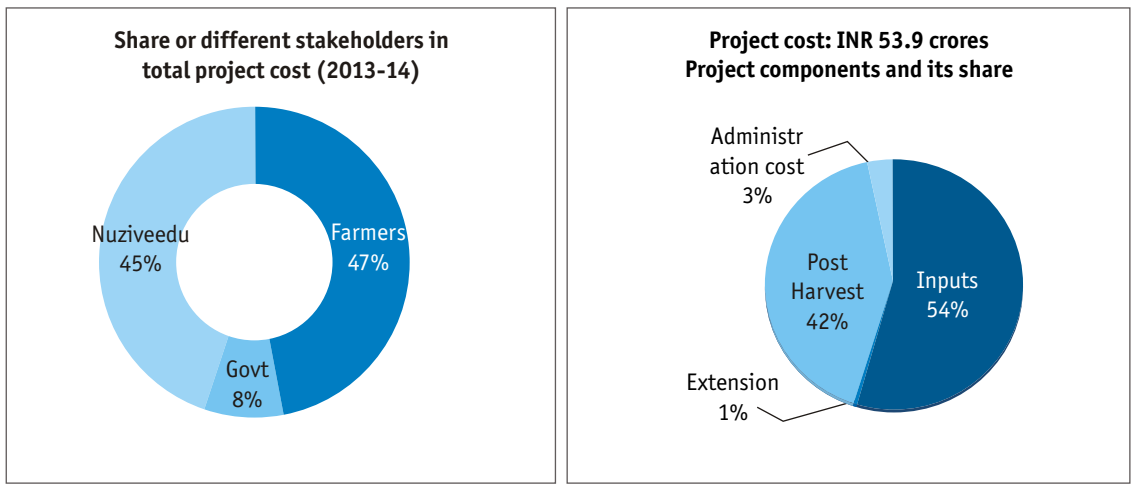
1. Increase the yields of the farmers by 50% compared to their last year's average yields.
2. Train the farmers for cultivation of cotton crop under high density plantation.
3. Train the farmers to follow integrated nutrient and pest control management.
4. Train the farmers to realize the addition profit margins by ginning their kappas and selling it as cotton bales than as kappas.

Role of Various Stakeholders in Project



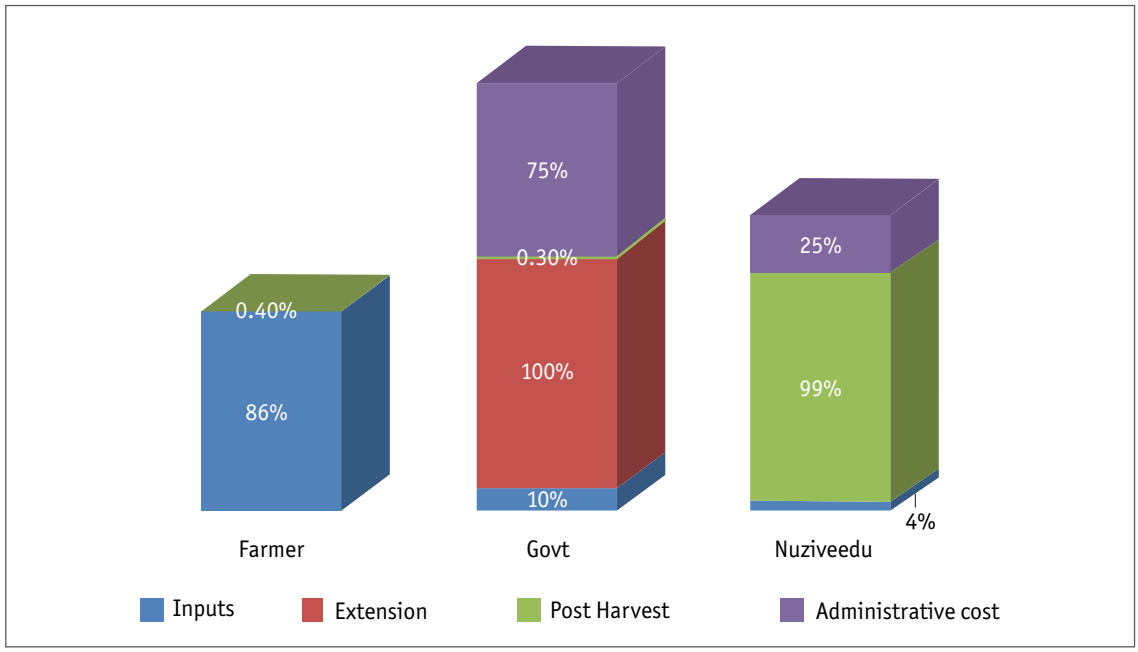
B. Project Cost

Graph 3: Project components and share of different stakeholder's



The total cost of PPPIAD project on cotton is INR 53.9 crores. Out of the total project cost, Nuziveedu seed pvt ltd has made a contribution of 45%, cotton growing farmers contributed 47 % and remaining 8 % i.e.Rs 4.4 crore was provided in form of subsidy by the Agriculture Department, Government of Maharashtra. The core components of the project can be divided into four categories, namely, agri inputs, post-harvest activities, extension trainings and administrative cost. As evident in the below graph, financially, maximum contribution of approx. amount of 54% of the project cost, is on supplying agri inputs to the cotton growing farmers. Expenditure on post-harvest management is 42% while agri extension activities and administrative cost consists 1% and 3% of the total project cost.

Graph 4: Share of stakeholders in different project components



B.1. Project Cost on agri inputs:

The total cost on agri inputs incurred in the project for the year 2013-14 was 29.3 crores out of which 86% was farmers' contribution followed by Government's share of 10% and NSL share of 4%. Among all the agri inputs used in the cotton cultivation fertilizers were the most expensive followed by cost of seeds and plant protection chemicals.

Table 5: Share of Stakeholder's in Agri Input Cost (%)

Inputs	Cost (Rs)	Stakeholders share (%)		
		Farmer	Govt	NSL
Fertilizers	60093000	100%		
Seeds	56086800	89%		11%
Plant Protection	50077500	100%		
Land preparation	30046500	100%		
Weeding &Intercultivation	24037200	100%		
Micronutrients	16926195		80%	20%
FYM	16024800	100%		
Drip Installation	12800000	50%	50%	
Sowing	10015500	100%		
Herbicides	7245000		72%	28%
Topping	6009300	100%		
Growth regulators	2634076.5		50%	50%
Soil testing	1387500		100%	
Battery Operated Machine	50000	50%	50%	
Total input cost	29.3 (87%)	25.2 (87%)	2.79(10%)	1.2(4%)

B.2. Project cost on agri extension:

The total agri extension cost incurred in the project for the year 2013-14 was Rs 21.3 lakhs, The financial contribution for undertaking extension activities was made by State Government of Mahrashtra. The training programmes are conducted in four phase of the entire cropping cycle of cotton.

Table 6: Share of Stakeholder's in Agri extension cost

Agri Extension	Cost (Rs)	Farmer	Govt	NSL
1st Training	916000	0	100%	0
2nd Training	951040	0	100%	0
3rd Training	268960	0	100%	0
Total Cost	2136000			

B.3. Project cost on post-harvest management:

The total cost of post-harvest management in the project was Rs 22.5 crores. This cost is inclusive of bales formation and investment on ginning. The cost contribution by different stakeholders includes contribution of 50% by cotton growing farmers, 33% contribution by State Government of Mahrashtra and 17 % by Nuziveedu Seeds Ltd.

Table 7: Share of Stakeholder's in Post-harvest management cost

Description	Cost (Rs)	Farmer	Govt.	NSL
Bales formation	1800000	50%	33%	17%
Ginning investment	224000000	0	0	100%
Total Cost	22.5	0.09 (0.39%)	0.06 (0.26%)	22.4 (99%)

B.4 Administration cost:

Total cost for administrative activities was approx. 2.92 crores. State Government of Mahrashtra made a contribution of 75%, while Nuziveedu seeds ltd contributed 25%.

Table 8: Share of Stakeholder's in administrative cost

Description	Cost (Rs)	Farmer	Govt	NSL
Administration cost	18132000	0	75%	25%

MAJOR PROJECT COMPONENTS IN DETAIL



AGRI Inputs

- Seeds
- Soil
- Pre emergence herbicides
- Growth regulators
- Micronutrients
- Fertilizers
- Plant Protection chemicals
- FYM
- Drip irrigation
- Battery Operated Machine



AGRI Extension

- High Density Planting System (HDPS)
- Capacity building (farmer's training)



Post Harvest Mahagement

- Procurement and bank support
- Ginning
- Baling / Packaging
- Storage

A. AGRI INPUTS

1. **Seeds:** High Yielding Varieties (HYV) developed by NSL are being given to farmers at reasonable cost under PPPIAD project. The seed varieties used for HDPS are malini, sona, bhakti, bhadra and suraksha. These varieties are suitable for varied agro-climatic conditions and are drought tolerant. These varieties have following characteristics:

   - Erect and open plant type, suitable for high density planting
   - Suitable for rainfed conditions.
   - Big boll size, good boll weight and easy picking
   - High yield i.e more number of bolls per plant
   - Good rejuvenation ability
   - Sucking pests tolerance

   NSL provided a discount of Rs 100 for a packet of hybrid cotton seeds (of 450 grams), costing Rs 930.

2. **Soil testing:** Cotton growing farmers under PPPIAD programme are trained about the benefits of soil testing and the right method of collecting samples from their fields for testing. State Government of Maharashtra provided free of cost soil testing facilities under the programme. Soil testing based fertilizer application helped farmers in decreasing cost of production for cultivating cotton.

3. **Pre-emergence Herbicides:** The farmers under PPPIAD programme were trained for proper application for herbicides. Pre emergence herbicide named (Stomp Xtraa) – at a dose 700ml per acre was provided free of cost under the project. With the application of pre-emergence herbicide farmers experienced lesser weed growth and improvement in crop yield.

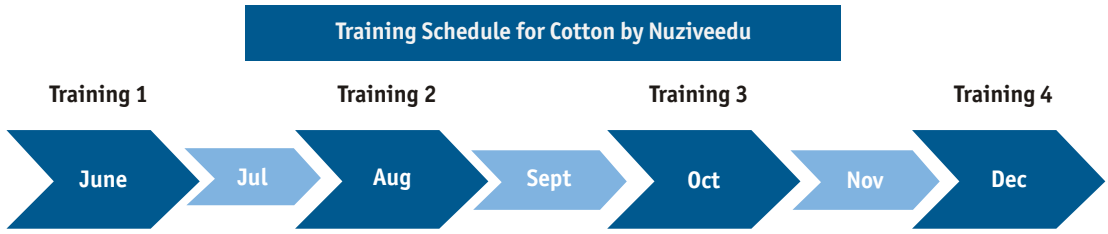
4. **Growth Regulator:** Growth regulator reduces the plant height, increases the boll weight and delay the maturity. It helps in balancing the vegetative and reproductive growth of the plant and increases the productive branching. The farmers in PPPIAD project were trained for use of growth regulators under high density planting for cotton crop.

5. **Micronutrients:** Under PPPIAD programme cotton growing farmers were trained for integrated nutrient management practice. Approx. ten kg micronutrient/acre and magnesium sulphate was provided to farmers for PPPPIAD project.

B. AGRI EXTENSION

1. **Encouraging farmers to adopt high density planting system (HDPS):** HDPS aims to maximize productivity per unit area. In India, traditionally cotton was sown in lines with distance between rows ranged from 30 to 60 cm. The common spacing was 30 to 55 cm in Marathwada, 45 cm in Khandesh and Vidarbha (all Maharashtra) with average yield of 6-7 Qtl/acre. Under the PPPIAD project, the cotton growing farmers were trained for sowing cotton crop under high density planting with spacing ranging from 3X1 ft and 4X1 ft. While in the 67.5 cm X 60 cm system, the number of plants is 2,4691 in one hectare whereas in HDPS the average plant population maintained was around 11,000 to 12,000 plants per acre and cotton yields went up by 50-60 per cent.

2. **Capacity Building:** Farmer training programmes are organized for farmers at different crop stages.



Training 1: Before sowing - Under this training programme, the farmers WERE trained for sowing techniques for HDPS, fertilizer management, FYM management and water management.

Training 2: Integrated pest management - Under this, the farmers WERE being educated about the use of plant growth regulators, integrated pest management and application of secondary fertilizer dosage.

Training 3: Before harvesting – Farmers were trained about the harvesting techniques, storage and management, bales management, ginning and processing technologies

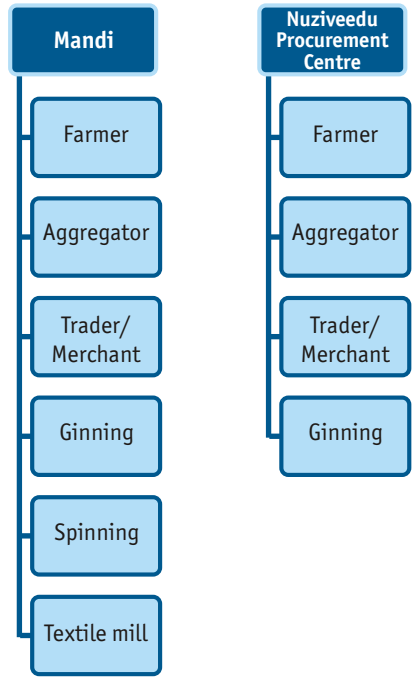
Training 4: After harvesting – Farmers were educated about the marketing knowledge, farmer group formation, use of marketed related information and value addition.

These trainings were conducted by scientists from Department of Agriculture, scientists of Nuziveedu and also guest lectures were arranged for the farmers.

C. POST-HARVEST MANAGEMENT:

1. **Procurement and bank support:** NSL have established cotton procurement centers at the ginning mills within the catchment area of 50 km, 30 km and 9 km where farmers sold their produce and got higher returns as compared to the local mandi.

   Nuziveedu facilitated the opening of bank accounts for all the farmers with the local bank. The processes adopted at the procurement centers were completely transparent and payments made to the farmers were timely. There were no middlemen in the operations as is the case with the local mandis, thereby saving time and harassment to the farmers.



By selling the produce at Nuziveedu procurement center, farmer gets an additional income of Rs 100-500/ quintal.

1. **Ginning:** The cotton growing farmers under PPPIAD programme were explained about benefits of ginning. Assured market and better price encouraged farmers to sell their produce at ginning mills.

   Note: Ginning is a process, which separates cotton fibers from cottonseed. The cotton is passed through ginning mill where the lint and seed gets separated. The cotton first goes through dryers to reduce moisture content and then through the cleaning equipment to remove foreign matter. These operations facilitate processing and improve fiber quality. Ginning helps in obtaining maximum length of fibre on seed without breakage and lint free of trash and contaminants. Ginned cotton fetches more price as compared to non-ginned cotton.

2. **Baling/ Packaging:**

   Farmers under PPPIAD project were encouraged to convert cotton into bales. Bale formation helped farmers in storing produce for longer duration in addition to maintaining fibre quality. This helped farmers fetch better price for their produce in market.

   Note: Cotton is packaged, stored and transported in units called bales. A cotton bale consists of cotton fibers removed from cottonseed during the ginning process and packaged for convenient handling, storing and transporting. Bales are formed at the end of the ginning, drying and cleaning process by accumulating cotton fibers and compressing them into stacks weighing 170 kg each which is finally covered with a cover. Cotton bales are then moved to a warehouse for storage until it is shipped to a textile mill for use.

3. **Storage:** Farmers were provided with the storage facility of baled cotton at the premises of Nuziveedu' s ginning mill. A minimal amount of Rs 18/- per month per bale is charged from the farmers for availing this facility.



Research Methodology and Approach

Research Methodology and Approach



This evaluation study on PPPIAD project for improving cotton productivity in Maharashtra aims at evaluating and documenting the efficacy of the major initiatives taken by project partners in Maharashtra. A primary survey was conducted, which aimed to evaluate the impact of efforts put in by NSL and the Government of Maharashtra. This chapter sheds light on the research methodology adopted to evaluate the major outcomes of the project.

A. Research Objectives

Three major research objectives were considered during the study which are as follows.

- To assess the outcomes of the project in terms of increase in productivity of cotton
- Document processes of linking farmers with input and output markets.
- Document a process which enables a successful partnership between government, private industry and farmers in improving cotton productivity.

B. Approach and Methodology

The FICCI team, for the purpose of evaluation, undertook the following steps:

a) **Discussion with Dr. Sudhir Kumar Goel, Additional Chief Secretary, Government of Maharashtra:** Discussion with Dr. Goel was held in Mumbai to understand the initiation of PPPIAD projects in the state and get his insights on study design and methodology.

b) **Review of secondary literature and developing the questionnaire:** Secondary information was obtained from the PPPIAD secretariat, Department of Agriculture, Government of Maharashtra and Nuziveedu. The documents included the proposal, baseline study, progress reports and presentations. Based on the review of literature and baseline information, focused group discussions were organized for collecting responses from the farmers on important parameters like inputs, capacity building, increase in yield and incomes, procurement and feedback on the delivery of the project.

c) **Visits to the project sites:** The districts covered under PPPIAD were Aurangabad, Beed, Jalna, Jalgaon, Dhule, Yuvatmaal and Wardha. The evaluation team visited the districts of Aurangabad, Beed and Jalna to undertake the survey and held focused group discussions with farmers and officials of the project implementation team (both Government and Nuziveedu officials). A total of 137 farmers were surveyed across three districts. The list of respondents is given in Annexure.

d) **Interactions:** Interactions with officials of Maharashtra Government and Nuziveedu were held to understand the delivery of the project and elucidate responses on the project implementation, outcomes and improvement areas. Discussions were also undertaken to understand the perception of the Government and private sector on key areas requiring attention in scaling up the project.

e) **Collation of findings and developing the first draft of the report:** Based on the review of secondary literature, results of the questionnaire survey and one-on-one as well as group discussions, the report was developed.

c) **Sample Composition and Sample Size:** Nuziveedu Seeds Ltd has been working with farmers of this region for long and had established linkages with them. With the introduction of the PPPIAD project in 2013-14, the first step was to select farmers. The cotton growing farmers with an area of 2-5 ha were selected. The farmers' selection for cotton cultivation was based on willingness of farmers to go for ginning. Those who were ready to give the produce for ginning were preferred.

Table 9: PPPIAD project and primary survey details

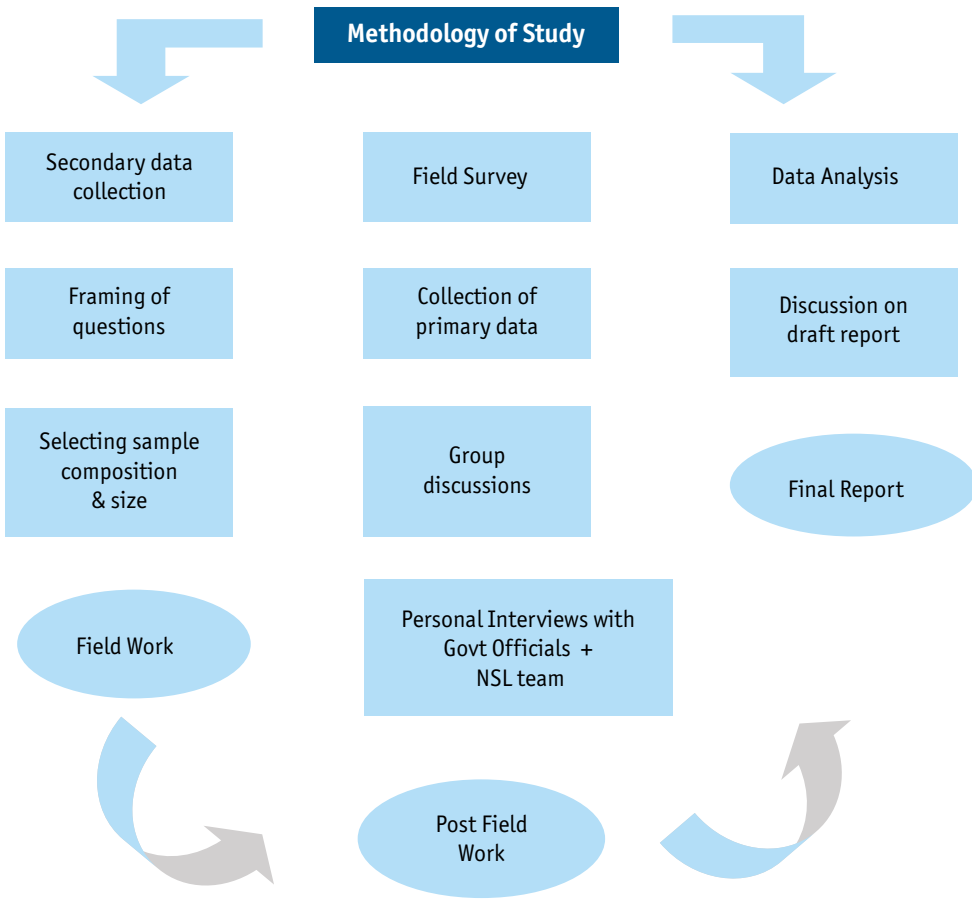
Nuziveedu PPPIAD project		Primary survey detail	
Total districts	7		Number
Name of districts	Area under each district	Districts surveyed: Aurangabad, Beed ,Jalna	3
• Aurangabad	3125	**Villages surveyed:** Akoladev , Asegaon , Devdefal, Delegavan, Khamkheda, Kasoda, Longaon, Pathroud, Pamud	9
• Beed	3125		
• Jalna	3754		
• Jalgaon	1479	Stakeholders surveyed	
• Dhule	1500	• Farmers surveyed	137
• Yavatmal	4039	• Government officials	3
• Wardha	3009	• Company officials	29
Total area	**20031 Acres**	**Total sample size**	169
Total farmers	**11100**		

C. Selection of sample Area

The selection of Aurangabad, Beed and Jalna for evaluating the impact of PPPIAD on cotton growing farmers was done purposively so as to compare the results between the region which comes under assured rainfall zone with one which comes under moderate rainfall zone. Parts of Aurangabad and Jalna come under moderate rainfall zone which receives approx. 700 to 900 mm of rainfall and 1130 mm respectively. However, Beed comes under assured rainfall zone.

Assured rainfall zone	Moderate rainfall zone
• Parts of Aurangabad	• Parts of Aurangabad
• Parts of Beed	• Parts of Jalna
• Parts of Jalna	

Methodology



The report presents a matrix of performance measure worksheet to evaluate the outcomes of the project interventions. The team has tried to validate the outcomes through some measurable outcomes wherever possible. The qualitative analysis is also documented in chapter named "stakeholder analysis".

Stakeholder Analysis



Stakeholder Analysis



As elaborated in previous sections, PPPIAD project on cotton rests on an effective partnership with cotton growing farmers, State Government of Maharashtra and Nuziveedu seeds pvt ltd. For the project farmers, the benefits have been manifold. Under the project, farmers are advised regarding advanced package of practices starting form soil sampling till their produce is sold as kappas and bales.

In this chapter, the responses of cotton growing farmers and other stakeholders are analyzed.

A. Improvement in productivity level of cotton and farmers perception about factors behind increased productivity

Table 10: Improvement in Cotton productivity

Districts	Last year average yields (qtl/acre)	Achieved Yields (2013) (qtl/acre)	Percentage Increase in yield
Aurangabad	5.89	10	69%
Jalna	5.68	11	93%
Beed	6.27	9	43%

Source: primary survey, FICCI analysis

The primary survey confirmed that yield of cotton has increased in PPPIAD covered areas. The hybrid seeds provided by Nuziveedu seeds pvt ltd is suitable for high density plantation. The seeds bear big boll size, good boll weight and more number of bolls per plant. This offers viable opportunities to increase crop yield and land use efficiencies for farmers. Farmers agreed that improved package of practices for better cotton cultivation gave higher yields. Farmers were responsive towards the modern agronomic practices taught under the extension activities in the project and appreciated the support provided by stakeholders in helping them achieve improved crop yield.

B. Increase in yield due to modern agronomic practices

Table 11: Modern agronomic practices under PPPIAD

Modern agronomic practices		
Old practise	New technologies	Increase in cost (per acre)
Sub optimal plant population	High density plantation, hybrid seeds	Increase in cost of seed (INR 1000)
Non scientific nutrient management	Integrated nutrient management	Soil testing (INR 300)
No use of growth regulators	Plant growth regulators used@400ml/acre	Growth regulator (INR 400)

Graph 5: Impact of modern agronomic practices on cotton

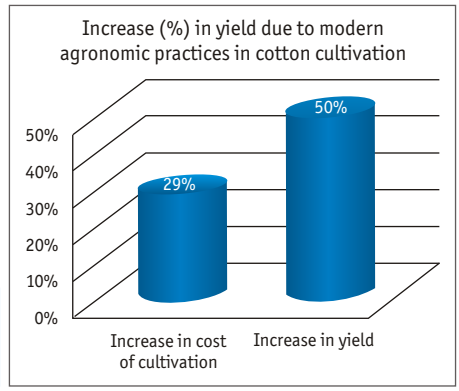


Table 12: Increase in farmer income under PPPIAD

	Normal farmer cost	High density - Rainfed	Percent increase
Cost of cultivation(INR/acre)	11600	17000	29%
Increase in income(INR/ acre)	19500	39000	50%

Source: primary survey, FICCI analysis

Farmers were asked if they are willing to incur additional cost for applying improved technologies in cotton cultivation. Farmers were significantly influenced by the increase in yield of the crop due to modern production technologies and agreed to follow the best cultivation practices for future also. As evident in above graph, for an increase of 25-29% in cost of cultivation of cotton, there is a resultant increase of 50-60% in yield of crop.

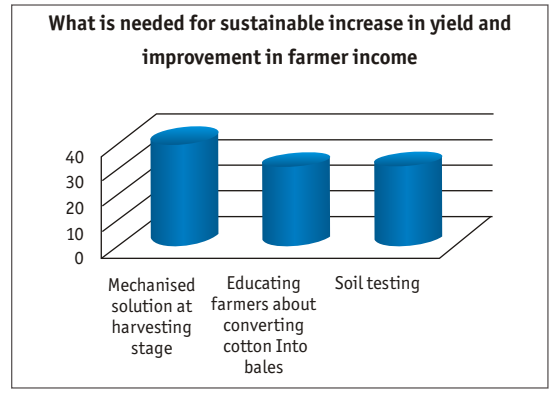
C. Increase in farmer income

Table13: Share of different operations in cotton cultivation

Total cost of cultivation INR 14290/ acre(excluding labour charges) INR 26090/ acre(including labour charges)

Particulars (*including labour charges)	Percent share in total cost of cultivation
Soil testing	1%
Land preparation	6.5 %
seeds + sowing	11%
Fertilizers	15%
Herbicides+ plant Protection	13%
Weeding /Intercultivation	7%
Growth Regulators	2%
Micro nutrients	4%
Cotton picking	32%
Transport and marketing	4%

Graph 6: Suggestions for sustainable improvement in cotton



As mentioned in exhibit above, cotton picking and cost of fertilizers are the two costliest operations in the cultivation of cotton. Any effort to minimize these costs will determine the overall cost of cultivation of cotton. Thus, providing mechanized solutions at harvesting and planting stage can tackle the problem of increasing cost of labour and enhancing awareness about soil testing based application fertilizer dose can bring noticeable change in the cultivation of cotton and consequently improve farmer income.

Secondly, farmers should be taught about advantages of converting cotton into bales. Cotton bales are not only easy to store, but at the same time quality of fibre can be maintained for longer duration in form of bales. Educating farmers about importance of bales can help them earn better price for produce.

D. Improvement in marketing

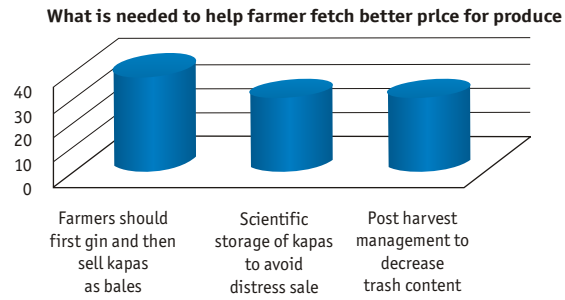
There is huge scope for improvement in creating market linkages. Industry officials were asked about what can be the three important steps that can help farmers fetch better price for cotton. As per the response received by majority of respondents the three crucial steps relates to (a) educating farmers about first ginning and then selling kapas as bales (b) scientific storage of bales (c) importance of post harvest management to decrease trash content. Farmers should be taught about the marketability aspect of the produce right from the beginning, so that they may not end selling their produce at sub standard price due to lack of knowledge, and at mandis.

Table14: Yield and market price of cotton

Name of village	Yield (qtl/acre)	Market price (INR/qtl)
Pathrod	8	4500
Devnipal	10	4500
Longaon	10	4600
Devgaon	7	4800
Shindewada	7	4800

Source: primary survey, FICCI analysis

Graph 7: Suggestions for increasing farmer income



E. Cost of labour in total cost of cultivation and need for mechanized solutions

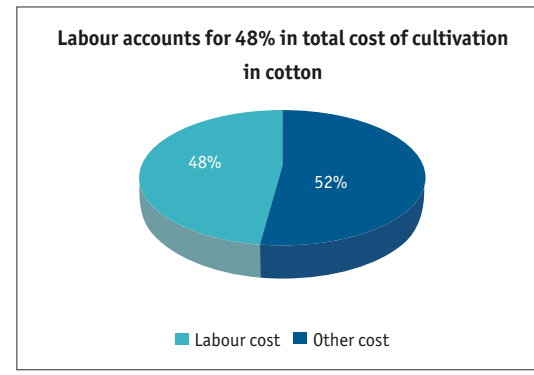
As depicted in the exhibit, 47% of the cost of cultivation of cotton consists of labour cost. Harvesting and weeding are the two most labour extensive operations in cotton cultivation. Availability of labour for agricultural operations is a challenge. This indicates significant opportunity for mechansiation in cotton. Battery operated cotton pickers were introduced under the project, however the response towards the benefits of the machine were not encouraging.

Table 15: Labour cost in different activities

Components	No. of labours	Labour Cost
Land Preparation	3 male	750
FYM	2 female	300
Seeds	2 female	300
Fertilizers	2 male	500
Herbicides	1 male	250
Plant Protection	1 male	250
Weeding & Intercultivation	5 female	750
Growth Regulators	1 male	250
Micro nutrients	1 male	250
Cotton Picking	5-8 female	8400
Transportation	2 male	500
Total labour cost		12500

Source: primary survey, FICCI analysis

Graph 8: Cost of labour in cotton cultivation



F. Perception about farmer adaptability level

Officials of NSL were asked about the variation in farmer response in terms of understanding the concept of modern farming, adoption of scientific agro technologies at critical crop stages etc. As evident in table farmers in Beed region were much more responsive to extension activities compared to Aurangabad and Jalna.

Table 16: District wise variation in farmer adaptability

	Total cotton area(ha)	Number of farmers	Farmer adaptability level
Aurangabad	332900	1250	Medium
Jalna	303300	1250	Low
Beed	276800	1500	High

Source: primary survey, FICCI analysis

G. Farmer perception about marketing facilities

Farmers appreciated the support provided by the State Government and Nuziveedu in helping them improve the productivity of the crop. However the transportation cost and distance from mandi are the two major concerns at the marketing end. Farmers suggested that opening up collection centers would be really beneficial for them for efficient marketing of their produce.

Table 17: District wise agri market facilities

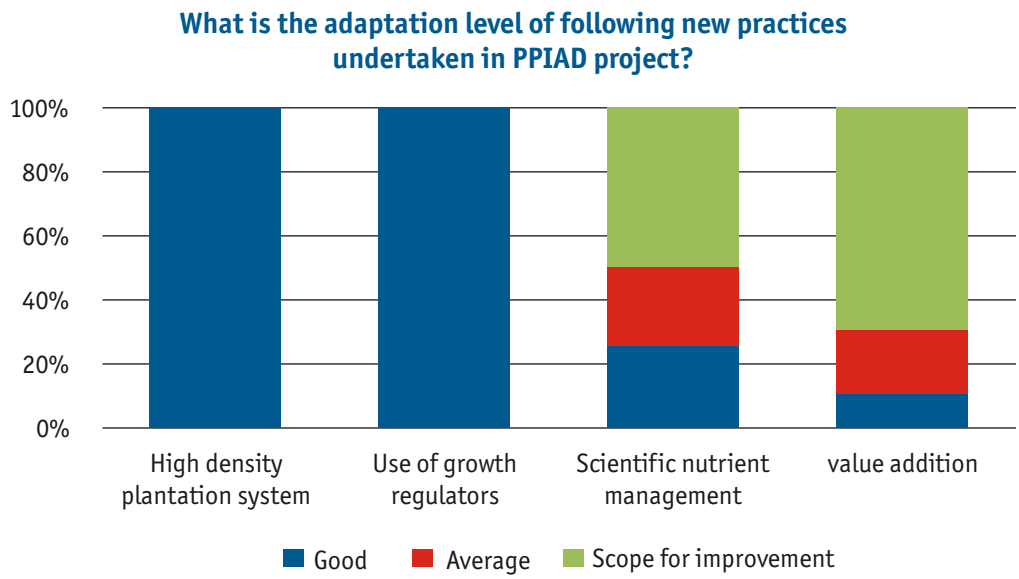
Districts	Name of Village	Nearest market (mandi)		Transport mode	Approx transport cost (Rs/qtl)	Waiting time at mandi (days/hr)	Payment mode
		Name	Distance (Km)				
Jalna	Akoladev		40 (gm)	SCV	50-100	1 day	Cash
	Delegavan	Jalna	40	SCV	50-100	1-2 days	Cash
	Khamkheda	Jalna	25	SCV	50-100	1 day	Cash
Beed	Devdefal	Telgaon	7	SCV	50-100	1-2 days	Cash
	Longaon	Majalgaon	15	SCV	50-100	1 day	Cash
	Pathroud	Telgaon	4	SCV	50	1 day	Cash

SCV: Small commercial vehicle
GM: ginning mill
Source: primary survey, FICCI analysis

H. Areas for improvement

Farmers were asked to give their views about the need for agri extension in cotton cultivation and their perception on various components under it. Surveyed farmers were satisfied with agri extension services provided by NSL under PPPIAD. However the analysis of primary survey depicts that there is scope for improvement in widening the application of nutrient management and encouraging farmers to focus on bale formation, scientific storage and decreasing trash content at their end.

Graph 9: Areas for improvement under PPPIAD



PPPIAD project not only aims at improving productivity of cotton, but also undertake allied initiatives to provide end to end solutions to farmers. Few recommendations to strengthen and scale such initiatives in cotton are given in next chapter.

Performance Measure Framework



Performance Measure Framework



Goal	Approach	Monitorable Indicator	Outcome	Impact
1. Cotton development	(a) Refinement and adoption of location specific farming modules.	(a) Showcase best cultivation practices in cotton cultivation.	(a) New interventions undertaken under best cultivation practice includes (1) integrated nutrient management (2) high density planation (3) use of growth regulators	• Even in low rainfall period farmers could attain yield of 10qtl/acre • Yield improvement of 50% due to adoption of better cultivation practices.
	(b) Integrated cotton development	(b) Trainings in pre harvest , harvest and post-harvest phases	(b) Number of meetings: Pre sowing: 1 (at each taluka) After Sowing: 1 (at each taluka) within 50 DAS (days after sowing) Pre harvest: 1 50-120 DAS Post harvest: 1 Common on each G & P unit Post harvest: 1 At potential villages for procurement/ ginning.	
	(c) Climate resilient agriculture	(c.1)Use of seed that is less water intensive	(c.1)Even in low rainfall period a yield of 8-10qtl/ acre could be received by using HYV seeds	
		(c.2)Impact of drip irrigation on improvement in yield	(c.2)In comparison to traditional method, double the yield was received when drip irrigation was used.	

Goal	Approach	Monitorable Indicator	Outcome	Impact
2. Increase in cotton yield	(a) Impact of improved cultivation practices in increase in yield.	(a) Overall Increase in yield due to better/modern cultivation practice such as: (a) Good quality seed (b) Plant spacing efficiency(HDPS) (c) Use of growth regulators (d) Use of micronutrients (e) Drip irrigation	(a) Yield improvement in traditional vs modern cultivation practice Yield (qtl/acre) (1) Traditional method: 5 qtl/acre (2) Modern cultivation practice: 11-12 qtl/acre	• Big boll size, good boll weight and more number of bolls per plant offers viable opportunities to increase yields and land use efficiencies. • Modern cultivation practices creates such plant types which also support much needed mechansiation of various farm operations like sowing, picking, which contributes in timely operations and thus increase yield.
3. Increase in farmer income	(a) Increase in yield of cotton by better cultivation practices	(a) Increase in yield of cotton	(a) Approx 10 quintal/acre increase in cotton yield	• Approx 10 quintal/acre increase in cotton yield • Saving of Rs 100-500 qtl/acre by selling at ginning mills • Saving in agrochemicals due to soil test based fertilizer application
	(b) Helping farmers to earn good market price for cotton	(b.1)Number of post harvest trainings (b.2) Increase in farmer income by selling produce at ginning mil	(b.1) Post harvest meeting done - 1 common on each G & P unit and 1 at potential village. (b.2) Farmers save 100Rs/qtl by selling at ginning mills and not at mandis	
	(c) Educating farmers to decrease cost of production	(c.1)Number of soil testing done (c.2)Saving in agro chemical due to soil testing	(C.1)Number of soil testing: 4377 (C.2)Saving in agro chemical • Urea: 25 kg/acre • MOP : 50 kgs/acre	

Goal	Approach	Monitorable Indicator	Outcome	Impact
4. Improving marketability of produce	(a) Helping farmers to earn good market price	(a) Characteristics of seeds that improve marketability	The seed varieties used in project for high density plantation system: are malini, sona, bhakti, bhadra and suraksha. Seeds have (a) Good germination & varietal purity b) Sucking pest tolerance c) Short duration (drought escape/tolerant) d) High yielding & easy picking	• Training of farmers to realize additional profit margins by ginning their kappas and selling it as cotton bales made a very positive impact on improving the marketability of cotton in project.
		(b) Training farmers on post harvest management	Post harvest: 1 (Common on each G & P unit) Post harvest: 1 (At potential villages for procurement/ ginning)	
		(c) Facility for bale formation and ginning	(c) Procurement from farmers in Ginning mill:14665 metric tonnes in 2013	
		(d) Facilitate for warehouse receipt finance through various banks	(d) Number of meetings organised with bankers : two at Aurangabad	
5. Strengthening extension service	Development of market oriented extension system	(a.1)Training on growth regulators (a.2)Training on high density plantation system	(a.1) Training of farmers organised on use of growth regulators@ 400 ml/acre in three doses at different stages (a.2) Trainings organized on high density plantation (around 10,000-14,000 plants /acre)	• Integrated end to end approach through extension activities were appreciated by farmers.

Recommendations



Recommendations



1. **Reduce cotton contamination at field level:** Contamination in Indian cotton has reduced significantly as a result of upgradation of ginning and pressing factories. However, there is need for reduction of contamination at farm level also. For this, farmers should be taught about post harvest operations with a view to reduce contamination at field level.

2. **Encouraging farmers for value addition of the produce by ginning kappas and selling it as bales:** The marketing of cotton commences from harvesting of kappas and ends after lint is procured by miller. Between these two points cotton is passed through several stages and is open to dust, trash. Therefore, farmers should be encouraged for bale formation at a wider scale.

3. **Collection centers at village level:** PPPIAD project has been successful in terms of increasing the productivity of the cotton crop. However as the marketable surplus increases with the farmers there is urgent need to also link them with markets. Opening up collection centers in vicinity of villages is very crucial in this regard.

4. **Strengthening farm mechansiation in cotton:** Due to non-availability or higher cost of labour, farming activities often suffer due to untimely/inefficient operations. This in turn results in poor yields. Bringing mechanized solutions at planting and harvesting stage by introducing cotton planter and cotton picker machine is very important.

5. **Promotion of water saving technologies:** Micro irrigation confers many agronomical advantages including early and uniform germination with less of water. Policy support is much needed and recommended to help disseminate and enable extensive adoption of water harvesting and water saving technologies such as micro irrigation.

6. **Integrated nutrient management:** PPPIAD project promoted the use of integrated nutrient management which included fertilizers application dose advised after thorough study of soil sample report. This should be promoted in big way.

7. **Warehouse receipt finance from various banks:** Farmers should be educated about benefits of scientific storage of cotton and subsequently bankers should be invited to be a part of this project by way of promoting warehouse receipt finance for farmers.

8. **Soil analysis laboratory:** PPPIAD project has been successful in creating awareness about importance of soil testing among farmers. Farmers have realized the benefit of soil testing which has a direct impact on the inputs and cost of production. However, the lack of soil testing labs in vicinity and time taken to get results is acting as deterrent for them to continue with practice of soil testing. Therefore, soil analysis laboratories should be opened to cater to the needs of the farmers.

9. **Timely subsidy:**There is an interest amongst farmers to adopt micro irrigation owing to the scarcity of fresh water resources for irrigation. However, Government needs to create an enabling environment for the speedy adoption of micro irrigation for farmers. The delay in subsidy of micro irrigation acts as a major deterrent for farmers to invest in large sum of money for installing micro irrigation system. There are instances where the farmers have not received the subsidy from the past two years, conscious efforts from Government are required on this matter.

Annexure



Annexure: List of Respondents

List of Farmers

S. No.	Name of Farmer	Land Holding Size of Maize (acres)	Village	Taluka	District
1	Harichand Bhimraj Hiwale	4	Kasoda	Gangapur	Aurangabad
2	Bhausaheb Baburao Gaikwade	5	Kasoda	Gangapur	Aurangabad
3	Bhausaheb Ramchand Nawale	4	Kasoda	Gangapur	Aurangabad
4	Gorakhnath Eknath Shelke	12	Kasoda	Gangapur	Aurangabad
5	Baban Keshas Hiwale	10	Kasoda	Gangapur	Aurangabad
6	Kantilal Ambadas Girabone	2	Kasoda	Gangapur	Aurangabad
7	Arun Ramnath Girbone	3	Kasoda	Gangapur	Aurangabad
8	Baban Bhaula Gangave	5	Kasoda	Gangapur	Aurangabad
9	Subhash Haribhau Devbane	4	Kasoda	Gangapur	Aurangabad
10	Babasaheb dattu Pithle	6	Kasoda	Gangapur	Aurangabad
11	Eknath Totiram Chame	2	Kasoda	Gangapur	Aurangabad
12	Kailas Bhimraj Hiwale	2	Kasoda	Gangapur	Aurangabad
13	Sakarchand Haribhau Devbone	3	Kasoda	Gangapur	Aurangabad
14	Amol Chandrakant Chame	6	Kasoda	Gangapur	Aurangabad
15	Kalyan Kashinath Hiwale	3	Kasoda	Gangapur	Aurangabad
16	Eknath Baburao Nawale	5	Kasoda	Gangapur	Aurangabad
17	Gorakhnath Namdeo Vaidya	4	Kasoda	Gangapur	Aurangabad
18	Sanjay Baburao Kardile	7	Kasoda	Gangapur	Aurangabad
19	Laxman Sheshrao Jadhas	5	Asegaon	Gangapur	Aurangabad
20	Raosaheb vishwanath B	4	Kasoda	Gangapur	Aurangabad
21	Gangadhar Balchand Nawale	8	Kasoda	Gangapur	Aurangabad
22	Sanjay Baburao Debone	5	Kasoda	Gangapur	Aurangabad
23	Kisan Baburao Deobone	5	Kasoda	Gangapur	Aurangabad
24	Shakar Baburao Gandale	2	Kasoda	Gangapur	Aurangabad
25	Bhausaheb Thakaji Charan	2	Kasoda	Gangapur	Aurangabad
26	Baban Raibhan Kardile	10	Kasoda	Gangapur	Aurangabad
27	Dadasaheb Gangahar Nawale	13	Kasoda	Gangapur	Aurangabad

S. No.	Name of Farmer	Land Holding Size of Maize (acres)	Village	Taluka	District
28	Suryabhan Bhikan Bochare	4	Kasoda	Gangapur	Aurangabad
29	Raoshaheb Kadurao Mate	5	Kasoda	Gangapur	Aurangabad
30	Kadubau Bhikaji Chavan	2	Kasoda	Gangapur	Aurangabad
31	Pratap A shinde	2	Pathroud	Majalgaon	Beed
32	Siddiqui Mahtasham Naim	3	Pathroud	Majalgaon	Beed
33	SiddiquiMauzaim Naim	3	Pathroud	Majalgaon	Beed
34	Momin Mukhtar Md Bd.	2	Pathroud	Majalgaon	Beed
35	Momin Md. Isd.	3	Pathroud	Majalgaon	Beed
36	Ankash D Jangle	3	Pathroud	Majalgaon	Beed
37	Nando Sindy	2	Pathroud	Majalgaon	Beed
38	Eknath s Kale	2	Pathroud	Majalgaon	Beed
39	Inderjeet d Shinde	3	Pathroud	Majalgaon	Beed
40	Venyrao Shavrao Kalse	2	longaon	Majalgaon	Beed
41	Ganesh Bhamrai Kalse	3	longaon	Majalgaon	Beed
42	Motrao Ganpat kalse	2	longaon	Majalgaon	Beed
43	Gopal Maluradas Lovate	3	longaon	Majalgaon	Beed
44	Mohan Laximan Kalse	3	longaon	Majalgaon	Beed
45	Anna Shripat Solanke	2	longaon	Majalgaon	Beed
46	Vasant Manadev Gogdand	2	longaon	Majalgaon	Beed
47	sadakar Machnd agga	2	longaon	Majalgaon	Beed
48	Shivage Eknath Solande	2	longaon	Majalgaon	Beed
49	Hanubhau Gangram	2	longaon	Majalgaon	Beed
50	Takaram Angod rakh	2	Devdefal	Dhanu	Beed
51	Ramdas Moret rakh	3	Devdefal	Dhanu	Beed
52	Radabai Angad wade	1	Devdefal	Dhanu	Beed
53	Shep Prabkar Shamrao	3	Devdefal	Dhanu	Beed
54	Deepak Atramee Bude	1	Devdefal	Dhanu	Beed
55	Nachabai Ganprao	3	Devdefal	Dhanu	Beed
56	Dattu Manik	2	Devdefal	Dhanu	Beed

S. No.	Name of Farmer	Land Holding Size of Maize (acres)	Village	Taluka	District
57	S K Ahul SK Biban	3	Devdefal	Dhanu	Beed
58	Nivruti Shynona Bade	2	Devdefal	Dhanu	Beed
59	Samha ji Shivaji Bade	2	Devdefal	Dhanu	Beed
60	Angeed Govindrao Rekh	1	Devdefal	Dhanu	Beed
61	Mavnath Trumhar Bade	1	Devdefal	Dhanu	Beed
62	Abhiman Govinraon Rakh	3	Devdefal	Dhanu	Beed
63	Digambar Kulkarni	3	Devdefal	Dhanu	Beed
64	Laxman Sundar Bade	2	Devdefal	Dhanu	Beed
65	Bhagawan Vishna Bade	3	Devdefal	Dhanu	Beed
66	Madava badke	2	Devdefal	Dhanu	Beed
67	Bade Ankush Sadeseve	3	Devdefal	Dhanu	Beed
68	Shak Khaum sk Musa	2	Devdefal	Dhanu	Beed
69	Dhyeshva Vishna Bade	1	Devdefal	Dhanu	Beed
70	Deepak Alram Bade	1	Devdefal	Dhanu	Beed
71	Ramrao Dhynewha Andle	3	Devdefal	Dhanu	Beed
72	Madeva Nareyan Bade	2	Devdefal	Dhanu	Beed
73	Bandu Villha bade	3	Devdefal	Dhanu	Beed
74	Shaikh Issa Ibrahim	3	Pathrud	Majalgaon	Beed
75	Shaikh Fajulu Rehman Ibrahim	3	Pathrud	Majalgaon	Beed
76	Dhananjay S Shindey	3	Pathrud	Majalgaon	Beed
77	Dhananjay R Kale	3	Pathrud	Majalgaon	Beed
78	Shinde O Maniurao	3	Pathrud	Majalgaon	Beed
79	Shinde Maniurao B	3	Pathrud	Majalgaon	Beed
80	Shaikh Abed Raisuddin	3	Pathrud	Majalgaon	Beed
81	Momin Rasiodin	3	Pathrud	Majalgaon	Beed
82	Gani Ismail Atar	2	Pathrud	Majalgaon	Beed
83	Ismail balemiya Atar	3	Pathrud	Majalgaon	Beed
84	Ismail Babamiya	2	Pathrud	Majalgaon	Beed
85	Momin M Idrish	3	Pathrud	Majalgaon	Beed

S. No.	Name of Farmer	Land Holding Size of Maize (acres)	Village	Taluka	District
86	Narhari Shinde		Pathrud	Majalgaon	Beed
87	Maran Navara Raut	3	longaon	Majalgaon	Beed
88	Mahadev Appa Raut	3	longaon	Majalgaon	Beed
89	Bharat Moral kalse	3	longaon	Majalgaon	Beed
90	Ashraha bawari kalse	1	longaon	Majalgaon	Beed
91	Amoul Datta Rau	2	longaon	Majalgaon	Beed
92	Rajabhau Baleram Rai	3	longaon	Majalgaon	Beed
93	Anant Dagely Kalse	2	longaon	Majalgaon	Beed
94	Desai Morey Kalse	3	longaon	Majalgaon	Beed
95	Appa Namdev Kalse	3	longaon	Majalgaon	Beed
96	Sahabrao Shivaji	3	longaon	Majalgaon	Beed
97	Bhagat Navra Kalse	3	longaon	Majalgaon	Beed
98	Raut Rameshwar Balsashi	2	longaon	Majalgaon	Beed
99	Ragunath Raja bhai	3	longaon	Majalgaon	Beed
100	Sanjay Manik	1	longaon	Majalgaon	Beed
101	bala Sahib Datta Kalse	2	longaon	Majalgaon	Beed
102	Rameshwar Gulabrao Nagave	20	Khamkhera	Bhokrdan	Jalna
103	Shivaji Sugdev Nagave	10	Khamkhera	Bhokrdan	Jalna
104	Santosh Utamrao Nagave	15	Khamkhera	Bhokrdan	Jalna
105	Subhash Narayan Nagave	5	Khamkhera	Bhokrdan	Jalna
106	Vithal Gulabrao Nagave	20	Khamkhera	Bhokrdan	Jalna
107	Ramesh Utam Nagave	14	Khamkhera	Bhokrdan	Jalna
108	somnath Kaiba Nagave	4	Khamkhera	Bhokrdan	Jalna
109	Gajanan sajerao Nagave	15	Khamkhera	Bhokrdan	Jalna
110	Narayan Damodar Nagave	5	Khamkhera	Bhokrdan	Jalna
111	Mana Sandu Nagave	7	Khamkhera	Bhokrdan	Jalna
112	Sinheshwar Nanadev Nagave	20	Khamkhera	Bhokrdan	Jalna
113	Sangam Sominath Nagave		Khamkhera	Bhokrdan	Jalna
114	Sominath Kishan Nagave		Khamkhera	Bhokrdan	Jalna

S. No.	Name of Farmer	Land Holding Size of Maize (acres)	Village	Taluka	District
115	Bhavrao Mahtarba Gharekar	4	Akoladev	Bhokrdan	Jalna
116	Laxman Sakharam Sande	4	Akoladev	Bhokrdan	Jalna
117	Bhausaheb Mahadu Sande	5	Akoladev	Bhokrdan	Jalna
118	Vithal Bhavrao Gharekar	5	Akoladev	Bhokrdan	Jalna
119	Laxman Bhavrao	3	Akoladev	Bhokrdan	Jalna
120	Gyaneshwar Bhavrao Ghanekar	3.5	Akoladev	Bhokrdan	Jalna
121	Padmakar Ramrao Sande	8	Akoladev	Bhokrdan	Jalna
122	Bhima Sankar	7	Akoladev	Bhokrdan	Jalna
123	Bhavrao Haribhau	3	Akoladev	Bhokrdan	Jalna
124	Ramrao Haribhau	4	Akoladev	Bhokrdan	Jalna
125	Chanderkant Laxman	3	Akoladev	Bhokrdan	Jalna
126	Ramrao Ghodiba Modekar	7	Akoladev	Bhokrdan	Jalna
127	Bhagwan Kashinath Kapse	15	Devgaon	Bhokardan	Jalna
128	sominath Utamrao Kapse	17	Devgaon	Bhokardan	Jalna
129	Krishna Ramdas Kapse	7	Devgaon	Bhokardan	Jalna
130	Kashinath Rambhau Kapse	15	Devgaon	Bhokardan	Jalna
131	laxman Ramrao Kapse	2	Devgaon	Bhokardan	Jalna
132	Balu Vinayakrao Kapse	10	Devgaon	Bhokardan	Jalna
133	Baburao Manik rao Khegde	18	Devgaon	Bhokardan	Jalna
134	Bhagwan Narayan Kapse	15	Devgaon	Bhokardan	Jalna
135	Anil Rannath Mahale		Devgaon	Bhokardan	Jalna
136	Nilesh Bhagwan Kapse	10	Devgaon	Bhokardan	Jalna
137	HariBhau Kapse	7	Devgaon	Bhokardan	Jalna

List of government officials

	Name	Designation	Area	District
1	Mr C R Deshmane	Taluka agriculture officer	Majalgaon	Beed
2	Mr Raut Sinu	Agriculture officer	Majalgaon	Beed
3	Mr Rathod	CAO	Majalgaon	Beed

List of Officials: Nuziveedu Seeds Pvt Ltd

S.No.	Name	Designation	Area
1	Mr. Vijay Singh Patel	DGM-Special Projects	Aurangabad
2	Dr.S.S.Bainade	Technical –Incharge	Aurangabad
3	Mr Parasnath Jaiswal	DGM	Aurangabad
4	Mr. KundkarKanhoji B	Team Leader	Aurangabad
5	Mr Omprakash D Wankhade	Team Leader	Beed
6	Mr Vishal Wath	Team Leader	Jalna
7	Mr Ravi Rathod	Field Assisstant	Badnapur
8	Mr Eknatha G Sable	Field Assisstant	Bhokardan
9	Mr BharathSonni	Field Assisstant	Bhokardan
10	Mr B R Dhumal	Field Assisstant	Dharur
11	Mr G H Lambud	Field Assisstant	Dharur
12	Mr A N Wamne	Field Assisstant	Dharur
13	Mr MansubBhutekar	Field Assisstant	Gangapur
14	Mr Vijay Pawar	Field Assisstant	Gangapur
15	Mr Vijay Kangane	Field Assisstant	Gangapur
16	Mr Yogesh Ghogle	Field Assisstant	Gangapur
17	Mr DinkarKad	Field Assisstant	Jafrabad
18	Mr Vijay Jadhavl	Field Assisstant	Jafrabad
19	Mr Sunil Patole	Field Assisstant	Jalna
20	Mr Nandkishor Kale	Field Assisstant	Kannad
21	Mr Kiran Kumar Kakade	Field Assisstant	Kannad
22	Mr GhanshyamChawan	Field Assisstant	Khuttabad
23	Mr M MPathan	Field Assisstant	Majalgaon
24	Mr R M Shondiudave	Field Assisstant	Majalgaon
25	Mr A V Naiknaware	Field Assisstant	Majalgaon
26	Mr. TusharGade	Field Assisstant	Vaijapur
27	Mr. RamdasAtole	Field Assisstant	Vaijapur
28	Mr. Arjun Jaybhaye	Field Assisstant	Vaijapur
29	Mr L W Helkute	Field Assisstant	wedwani
30	Mr E V Lambud	Field Assisstant	wedwani

NOTES



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