

Draft

Lac Value Chain Analysis Study Report:

The lac commodity market represents a high potential value chain for intervention given India's global position and the prevalence of poor producers in the existing supply chain.



LAC VALUE CHAIN ANALYSIS STUDY

SUMMARY OF PRELIMINARY FINDINGS

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EXECUTIVE SUMMARY:

- **The lac commodity market represents a high potential value chain for intervention given India's global position and the prevalence of poor producers in the existing supply chain**
 - Global consumption in spite of global recession is large and stable (*seen steady growth since 1995 bcas of demand for organic resin*), with India producing 70% of worldwide lac, exports 7500MT of shellac, value estimated at 125 crore INR. India also has a competitive advantage against Thailand the second largest producer of lac.
 - Domestic consumption for past one decade is stable and shows slight increase in past 2 years.
 - Poorer communities represent 95% of current volume, with only 10% of the host plant being utilized and high return to labour.
 - Price fluctuation and production instability are key concerns that can be which can be handled by appropriate value chain interventions which would generate value proposition at different levels including better production and prices for poor growers.
- **Preliminary analysis of lac value chain suggest the potential to shore up supply while increasing smallholder incomes by up to 200%**
 - There are clear opportunities to improve productivity to twice by using existing scientific PoP.
 - Supply chain analysis identifies three key major gaps in local market: large intermediaries between processor and farm gate, malpractices and untapped semi-processing options. Producer collectives can get into primary bulking and semi-processing activities leading to 100% increase in price realization to producers.
- **Factors must be considered to ensure successful intervention design**
 - Productivity improvement technology support programs must be coupled with adequate capacity building of producers, easy credit availability, production service delivery provisions and initial start-up infrastructure development subsidies.
 - Need for Break-through Research on factors of production beyond human control.
 - Adequate investment in finding new shellac applications so as to protect producers as production increase is focused.
- **Strategy/Intervention Points**
 - Knowledge partnership amongst producer, lac experts, research institution and promoting agencies to improve lac productivity.
 - Promote improved lac cultivation practices by supporting producers through brood lac, credit, trainings, post harvest management. This will reduce the price fluctuations, reduce speculations, and increase lac derivative application avenues
 - Producer collectives to leverage economies of scale in marketing, input delivery and production services thus better prices to producers.

BACKGROUND OF THE STUDY:

Lac is one of the traditional sources of income for large number of poor and isolated families PRADAN works with, in Jharkhand, Chattisgarh and MP. It accounts to as high as 50% of the income basket to some forest fringe tribal households. PRADAN is working on lac cultivation in Khunti and few other districts since 2002. However, in the recent past, prices of crude lac have plummeted to more than 50% and the production in Jharkhand has fallen by 65% in just last three years. PRADAN is intervening in lac with more than 2500 families in stabilizing production through improved technology and input services. The recent dip in crude lac production is apparently not due to change in demand conditions rather a local and domestic market phenomenon. This is prompting us to undertake a value-chain analysis to understand the scope of intervention in marketing, value-addition, collectivization of producers to shield our producers from recent price risks. A value-chain study is expected to reveal weak nodes in chain and strategies of intervention to help producers realize better prices for their produces.

OBJECTIVES OF THE STUDY:

1. To understand the business scope of production, local marketing, processing and distribution/export of lac commodity with an intention to improve livelihoods for poor lac growers.

2. To understand production fluctuations and reduction.
3. To understand price fluctuation and plummeting.

WHAT IS LAC?

Lac is a resinous secretion produced by the female lac insect *Laccifer lacca*. It is the only known commercial resin of animal origin. The lac resin is eco-friendly, biodegradable, and self-sustaining. The lac insect grows on the branches of host trees, from which it extracts the sap for its nourishment, and excretes a reddish-brown fluid that forms a protective covering over its body. This fluid, in its dried form, is known as lac.

Lac cultivation or production refers to the process of breeding lac insects on host trees to obtain lac resin. There are two main strains of lac insect, *kusmi* and *rangeeni* which grow on different host trees. Each strain produces two crops per year and reaches market mainly three times in a year in the months of May-June, October and Dec-January.

Lac processing refers to the transformation of stick lac harvested from host trees into more refined forms of lac such as seed lac, button lac, and shellac.

The four main forms of processed lac are:

- **Stick Lac:** The raw material harvested from host trees in the form of lac-encrusted twigs.
- **Seed Lac:** A granular material produced after crushing, washing, drying and sieving stick lac to remove various impurities.
- **Shellac:** Thin film-like sheets of pure lac resin produced by heating seed lac to high temperatures and removing wax and other by-products from the molten lac.
- **Button Lac:** Hard, round button-shaped lac produced by heating seed lac to high temperatures, removing various by-products, and manually moulding molten lac into small discs.

When crude forms of lac are processed into shellac or button lac, the following by-products are typically generated:

- **Molamma:** Dust-like powder containing lac resin generated when crushed stick lac is sieved or winnowed to produce seed lac.
- **Kiri:** The residue containing impurities left behind when seed lac is heated and refined to form shellac or button lac.
- **Paswa:** The residue obtained during the production of shellac or button lac by traditional labour-intensive methods.

- **Shellac Wax:** Type of wax that separates itself when seed lac is heated to produce shellac.
- **Lac Dye (*Laccaic Acid*):** An edible, non-toxic dye obtained when washing seed lac.

Various forms and by-products of lac are used in the manufacture of the following products: Bangles varnishes, paints, and glazes, pharmaceutical products such as tablets and capsules, printing ink, shoe polish, cosmetics, electrical products, photographic film hats, gramophone records(before 1995), sealing wax. The markets for these are shown in the next section in the diagram.

VALUE CHAIN DESCRIPTION:

The value chain diagram below shows how raw lac cultivated by lac growers is marketed via *paikars* at village and block level markets to reach processing units, who produce refined forms of lac such as seed lac, button lac, shellac, etc, and sell them via exporters to the international market (80%) and via suppliers to the domestic market (20%).

**Note: The figures in this diagram relate only to the bangle industry, an end-use of lac that accounts for approx. 25% of the domestic market (or 5% of the total lac produced).

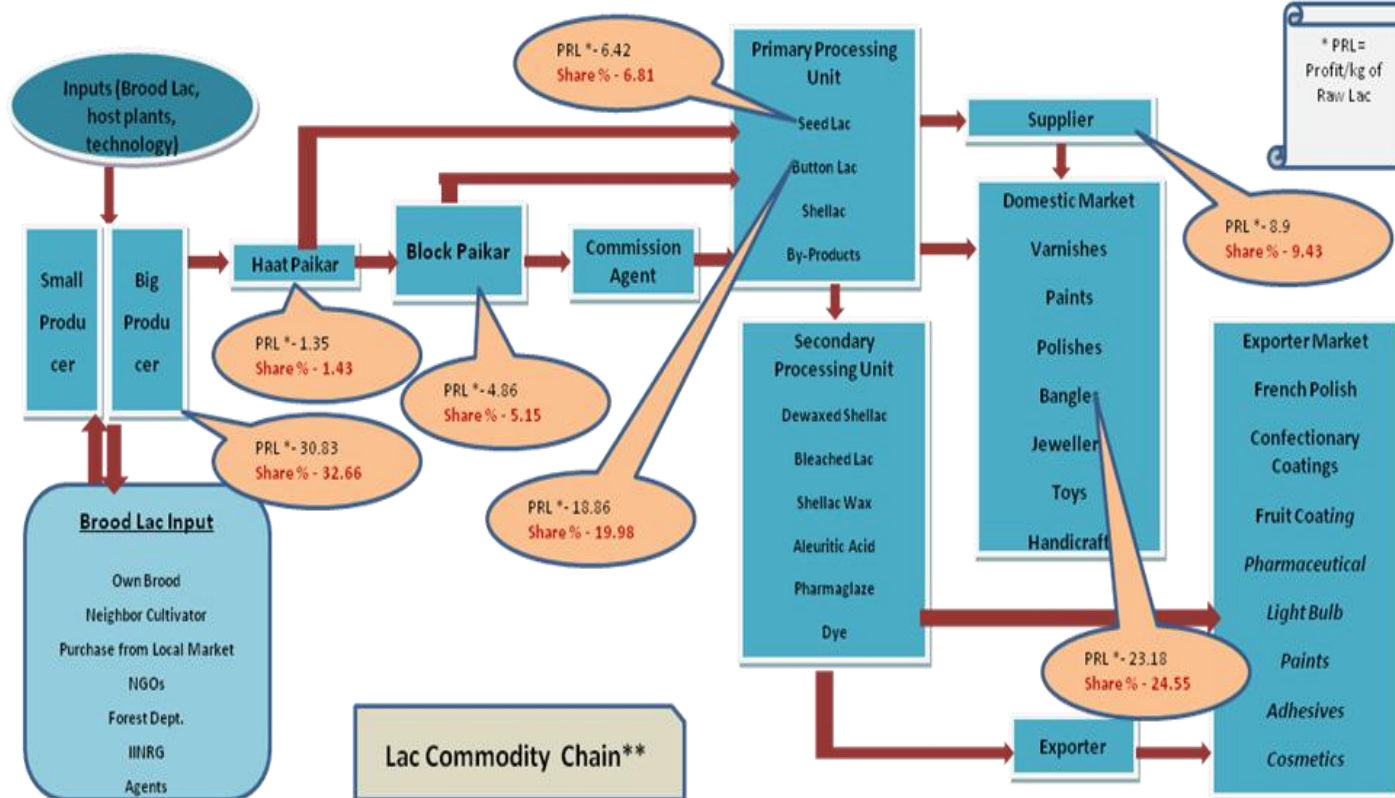


Figure 1: Lac Value Chain Diagram

The table below indicates the annual price spread analysis for bangles, a major domestic end-use of lac in India:

TABLE-A (Price Spread Analysis of lac going to bangle industry)

Actor/Node	No. of Actors	Profit/kg raw lac (Rs.)	Quantity (kg)	Total Profit (Rs. lakhs)	Profit per actor annum	per per
Producers (of raw lac)	400000	30.83	1320655	407.15	101.7	
Haat Paikar	1250	1.35	1188590	16.04	1283.6	
Block Paikar	150	4.86	1069731	51.98	34659.2	
Processing(Seed Lac)	105	6.42	588352	37.79	35996.5	
Processing (Button Lac)	50	18.86	500000	94.29	188580	
Big Supplier	10	8.90	500000	44.49	444943	
Large-Bangle Maker	50	23.18	500000	115.90	231800	

(The price spread analysis for exports is still pending, and will be added shortly to the data collected for the domestic market to obtain the overall price spread for lac.)

From the above price spread analysis even though the profit per kg of raw lac is high at the producer's level, yet, the volumes at his level is really too low. On an average, one grower produces around 50 kgs of raw lac per year. That means his profit from lac is just $30 \times 50 = 1500$ rs. However, other actors higher in the value chain even though has lesser profit/kg of raw lac because they deal with higher volumes they get more returns per year. For example, at the haat paikar¹-block paikar level total profit/kg of raw lac is around Rs.6/- Nationwide according to some estimates we have total of around 1500 paikars who deal with the average supply of 20,000MT. Thus each paikar deals with around 13,000kgs each year. So, one paikar each year earns from lac trading $6 \times 13000 = \text{Rs.}78,000/-$

A similar analysis for just the volume of lac that is consumed by bangle industry is shown in the table-A.

GLOBAL MARKET SCENARIO:

Demand and Supply Conditions

The global market for Indian lac fluctuated considerably over the last decade due to the effects of the global business cycle, particularly in North Atlantic economies. Over this decade, we discern three brief phases of bust, boom, and bust:

1. Between 2001 and 2003, after the technology bubble of the '90s burst in the US, a brief recession set in and demand fell moderately. In response, Indian lac exporters appear to have cut supply in order to prevent prices from falling drastically, and in fact, by the end of this brief recessionary phase, export prices had actually risen appreciably.
2. Between 2003 and 2007, the boom fuelled by international trade and commerce led to a high demand and high export prices in the lac industry. Exporters met the high demand in the international market with lac production figures peaking during this phase.
3. From 2007 onwards, global recessionary trends have reduced the international demand for lac. Exporters have responded by reducing supply by over 25% from peak levels in 2004-05, but export prices have still fallen considerably in the current phase.

The table below summarizes the relationship between the world market for Indian lac and the global business cycle. Demand is proxied here by the average GDP growth rate of the top ten

¹ Local intermediary (middlemen)

destinations of lac exports. Supply is proxied by volumes of raw lac production. Export prices are the average prices of various forms of lac traded in the world market.

Period	2001-2003	2003-2007	2007-
Demand (% GDP growth)	2.10	7.46	< 5
Supply (tons of raw lac)	18,975	18,638	< 15,000
Export Prices (Rs./kg)	170	213	<150

According to a 2006 study by Enterplan, the demand for Indian lac during the boom period, especially in North Atlantic economies, came from large fast-growing industries such as pharmaceuticals, confectionary, electricals, and fruits and medium-sized fast-growing industries such as paints, adhesives, and cosmetics. Growth in these industries was aided undoubtedly by growing consumer preferences in favor of organic rather than synthetic resins. Additionally, wood polish makers continued to be bulk buyers of lac.

The table below summarizes the overall growth trends in the tertiary market for lac during the boom period:

Market Size → Growth ↓	Small	Medium	Large
Growing		Wood Polish	Pharmaceuticals Confectionary Fruit Glazes Electricals
Stable			Paint Adhesives Cosmetics
Declining	Electronics Paper Varnish Hats Sealing Wax	Printing inks Shoe & Automotive Polishes Ayurvedic syrups	Gasket compounds Hair lacquer Jewelry

Currently, due to the global recession, demand for lac may have fallen, but the major industries that purchase lac as an input are still stable. In the case of the major buyers (pharmaceuticals, confectionary, fruit glazes, etc), demand is fairly inelastic since there are no good substitutes for lac. Moreover, once the recession ends, we should expect to see global demand rise in those industries that have currently reduced their purchases of lac recently.

Why India?

A study conducted by the US-based ICON Group showed that India produced 62 % of the world's total lac in 2006. The next highest producer was Thailand, which accounted for only 23% of the world's lac. Due to India's high market share and the lack of close substitutes, Indian exporters have found lac to be a highly lucrative commodity. Over the next decade, there are the two major reasons why India's position in the global lac market will continue to remain strong.

Firstly, as noted earlier, Indian lac exporters respond smartly to a decline in global demand by cutting supply in order to prevent prices and export earnings from falling drastically. During the brief recession in 2002-03, for instance, lac exporters cut supply by 14.43%, which caused prices to rise by 40.6% and total export earnings to rise by 0.63% despite lower demand from abroad. In the current recession too, exporters are practicing similar strategies to cope with lower global demand. Once the recessionary period ends and demand and prices rise, exporters may be expected to increase supply and enhance their export earnings as before.

Secondly, India's two main competitors, Thailand and Indonesia, account for roughly 30% of total lac production. Although it is cheaper in the world market, Southeast Asian lac is of poorer quality, that is, its resin content is lower than Indian lac. Moreover, the lac industry in these competitor countries is highly subsidized by the governments, and their cost structures are widely regarded as unsustainable in the longer run. As such, India's large share in the world market is unlikely to fall due to competition from Southeast Asia.

Why smallholders?

The Indian lac subsector is controlled by a cartel of exporters that determines the final prices paid for the commodity. However, the industry has historically relied on small lac farmers to supply processing units and exporters because:

1. The costs of vertical intervention along the lines of a plantation model seemingly do not justify its expected benefits.
2. Legal issues concerning access rights to lac host trees ensure that lac production remains decentralized in the hands of small farmers in eastern and central India.
3. For small farmers, the revenue from lac cultivation (currently Rs. 82.50 /kg of raw lac) is significantly greater than input costs (currently Rs. 51.67/kg of raw lac) even during the current recession.

4. The returns to labor for lac cultivation (currently Rs. 152.50/day) are substantially higher than the next best possible option under the NREGS (currently Rs. 92.50/day in Jharkhand).
5. In future, it may be possible to organize lac farmers' cooperatives that may result in shared risks and costs of production. Such federation could possibly earn from marketing activity as well.

PRODUCTION ANALYSIS:

OPPORTUNITIES IN PRODUCTION-

1. There are three major states contributing to lac production in the country. These are Jharkhand, Madhya Pradesh and Chhattisgarh. Total production of India on an average is around 20,000MT. A rough estimate would suggest that there are over 4 lakh rural families dependent on lac cultivation as a source of livelihoods from these three states. Most families involved in lac are from BPL category, mainly tribal populace living in forest fringe villages. Income from lac amounts to a significant portion of livelihoods for these families; to the tune of 30% and as high as 55%. Rain-fed agriculture, the main occupation of these communities, is associated with risks and low productivity because of geo-climatic factors. These families however has large host plant stock and today use only 10-15 % of these host resources for lac cultivation. Thus, there is a vast scope of improving livelihoods of such families through lac cultivation.
2. Besides, scope for direct incomes, since returns from lac comes in lean months of May-June; it reduces vulnerabilities associated with debt, mortgaging and distress sale of productive assets for poor families. Economic returns from trees, arrests tree felling and contribute to ecological goals. Further, since return from lac on per labour-day basis is high, under employed rural families find it worth compared to daily wage labour.
3. The current conversions² for Rangeeni crop is around 1:1.25 and for Kusumi 1:2, because of traditional package of practices and recent pestilence seen in Rangeeni crop during Feb-March months. This can be raised to 1:3 for Rangeeni and 1:5 for Kusumi if improved package of practice is followed.

RISKS IN PRODUCTION:

1. Factors of production such as seed material availability, credit availability, production services and technical know-how are under constraint. Patches of Jharkhand and West Bengal have faced severe shortage of brood lac in the past 4-5 years. Besides this, since brood market is not well organized, brood is not traded between surplus zones to deficit zones. Quality brood availability for inoculation is also a concern. Credit facilities for lac

² Conversions are calculated on basis of brood: scrapped lac.

growers in not easy to avail from mainstream banks. Technology and production service extension to lac growers is clearly absent except in few pockets of Chhattisgarh and MP through Forest Department Initiatives.

2. Factors of production beyond human control like rain, heat and temperature extremities makes lac cultivation un-predictable. In fact recent large scale mysterious mortality of Rangeeni crop in the month of Feb-March, in almost all lac growing districts of Jharkhand and WB have raised serious doubts about the 'science of lac' and recommended Package of Practices itself. Unless path-breaking researches pave way, large number of poor growers would continue to abandon Rangeeni crop cycle. Productivity enhance technology is thus one of the chief ruling constraint for stable production.

MARKET ANALYSIS:

OPPORTUNITIES IN MARKETING-

1. Producer's collective could be promoted for primary bulking and semi-processing. Even though there is only around Rs.6/kg margin for direct sale to factory but the volume of scrapped lac at a block level is really high (of the order of 13tonnes). Thus, the revenues from such a cooperative intervention will not be able to make its operating costs but also able to give better prices to growers. Such initiative will ensure fair practices in the market which will provide value to the growers produce as well earn greater seed lac value and quality consistency.

On the other hand producer collectives could also get into value addition of raw lac. This is because the processing of seed lac is pretty labour intensive and the technology is simple. There is a total profit margin of around Rs11 per kg of raw lac at this level.

Producer collectives could also get into brood lac business by organizing brood market as there is a lot of arbitrage trade of brood during the inoculation season.

RISKS IN MARKETING-

1. Lac grower's produce holding capacity is low because of shorter shelf life of scrapped lac (max of two months in village conditions) and cash flow demands within households. This ends up growers with being 'price takers' at any point of calendar.
2. Malpractice in the local market during trade is seen widely across the states. This include adulteration (with a mud similar to lac), cheating in weighing and opportunistic pricing seeing the desperation of the poor seller.
3. There is no objective way to assess the resin content or moisture content of scrapped lac at the interface of grower and the local paikar. This compounds the pricing problem with paikar trying to ensure that he is 'safe'. The processing unit

is least bothered with the moisture percentage in the scrapped lac. This is because when the lac comes to the processing unit, the payments are made on the basis of resin content measured in the lac sample. The processing units pay to paikar for the amount of seed-lac derived from the scrapped lac. Processing Units are not bothered about what price the paikars bought from the farmers. Though technically the profit margins shows Rs6/kg of scrapped lac, they seem to take advantage of the market information available to them about the prevailing seed-lac rate and the expected production this year. Thus, block paikars (*based on information asymmetry both arising out of inherent lack of objective measuring device as well as from non-connectivity of processing units and growers*) seems to be at position in the chain where he can exploit the market situation gainfully.

4. Although lac is predominantly a poor man's crop no support price policy exists for these producers even though there is high price fluctuation seen through out the year and plummeting phenomenon in the past three years.
5. Brood market is highly unorganized. Timely transportation of live insect colony to far off deficit regions needs to be coordinated. No formal agency gives such support input delivery support regularly. Large surplus brood zone farmers sell brood at scrap lac value in the absence of market mechanism and brood deficit farmers
6. In order protect the processing units from supply shock because of low production trends, proprietors of processing units import lac from Indonesia and Thailand. When such imports are unregulated and import quantities and in excess of the supply shock, the prices starts falling.
7. The sector faced heavy competition from the different substitutes of shellac like bakelite, synthetic varnish etc. But recent attraction towards the natural product in Western world especially in the food, pharma and cosmetics sector, in which shellac is used as raw material, has led to positive signs about its revival and intuitively should not be affected by the recession because of its composition in food.

INSTITUTIONAL SUPPORT:

1. SEPC (Shellac Export Promotion Council) has a mandate to help in marketing and also develop new markets in overseas but is struggling for its own existence. Not much of late is being done by the agency and is limited to providing data on exports.
2. IINRG (Indian Institute for Natural Resin and Gums) an IFP (Institute for Forest Productivity) have been involved in lac research and providing training to growers. ILRI is more organized and imparts various trainings for production and processing of lac in

all the four lac growing states. However, in the recent past no new production enhancing technological break through has been found.

3. JASCOLAMF and TRIFED, federations for lac marketing, have been involved in lac and shellac marketing very occasionally but for past few years they are not active. Lac growers are not represented in any of these institutions.

RECOMMENDATIONS

1. Setting up farmers' cooperatives to raise production of raw lac and to provide stable returns to both farmers and processing units
2. Providing lac farmers with technical assistance and access to inputs (host trees, brood lac, inoculation nets, etc), and credit, storage and marketing facilities
3. Diversifying production risks by growing different strains of lac on different hosts in different seasons
4. Installing price-support and insurance mechanisms to protect lac farmers in case of crop failures.
5. Making improvements in production and processing technologies in order to reduce material losses and enhance productivity.
6. Investing in technology imports that cater to secondary markets for button lac and to tertiary markets for bleached lac, de-waxed lac and aleuritic acid
7. Strengthening law-enforcement mechanisms to prevent malpractices by village traders such as adulteration, incorrect weighing, etc
8. Developing systems to obtain and share information along the value chain in order to ensure transparency in trade.
9. Creating a single window to channel imports and exports of lac in order to enhance transparency and prevent restrictive or oligopolistic practices such as price-fixing.
10. Establishing knowledge partnerships between research institutions and promoters to conduct research that helps to increase production and mitigate risks across the value chain

Remaining Aspects of the Study:

1. Value quantification of the propositions
2. Domestic Market detailing
3. Farmer Segment detailing
4. Develop business plan for Lac cooperatives
5. Suggest alternative value chain