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CURRENT SCENARIO AND NEW POLICY INTERVENTIONS IN THE LAC SECTOR

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India is the largest producer, processor and exporter of lac in the world. The dynamic complex of lac host plants like *ber (Ziziphus mauritiana)*, *kusum* (*Schleichera oleosa*), *Palas* (*Butea monosperma*) and *semialata (Flemingia semialata)* and lac insect (*Kerria spp.)* are an important means of life support system for tribal communities across the major lac producing states of India. Natural resin secreted by the insect *Kerria lacca* (Kerr) is known as lac and categorized as a Non-Wood Forest Product (NWFP). Jharkhand state alone contributes around 40% of the total national lac production. This study presents an overview of lac production and recent policy interventions in the sector. A paradigm shift of lac growers from *rangeeni* to *kusmi* strain (both *Kerria* species) was observed during recent years due to failure of *rangeeni* crop. *Kusmi* lac fetched a greater price comparatively. Lac and its value added products make a significant contribution to the country's foreign exchange earnings. Policy interventions like Minimum Support Price (MSP) for Non-Wood Forest Products including lac may be helpful to support lac cultivation activities and the strengthening of its marketing system. Thus, the dissemination of lac cultivation technologies and strengthening of value chain and farmer–industry linkages may play a key role to harness the opportunities available for the forest and sub-forest dwellers, lac processors, manufactures, exporters and other stakeholders. Gainful employment can be generated for migrating youths while also providing quality output to the hands of the consumer.

Introduction

Lac is mainly produced in India, Thailand, Indonesia, and parts of China, Myanmar, Philippines, Vietnam and Cambodia. India is the largest producer, processor and exporter of lac in the world. A dynamic complex of lac host plant like *ber (Ziziphus mauritiana)*, *kusum* (*Schleichera oleosa*), *Palas* (*Butea monosperma*), *Flemingia semialata, Ficus spp.,* and the lac insect (*Kerria spp.)* are one major source of life support system in the tribal areas of Jharkhand, Chhattisgarh, Madhya Pradesh, West Bengal, Maharashtra, Odisha and parts of Uttar Pradesh, Andhra Pradesh, Gujarat and the North Eastern Hilly (NEH) region. Lac is a natural resin secreted by the insect *K. lacca* (Kerr), which thrives on the tender twigs

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of specific host trees. Insect originated resin is categorized as a Non Wood Forest Product (NWFP) and is either produced or collected by forest dwellers. The forest and sub-forest dwellers mainly depend on agriculture and forest produce for their livelihood and lac is an important source of income. Thus lac shows high potential as an employment generator for both men and women in the forest and sub-forest areas of India.

In India, Jharkhand state registered the highest average annual production (6306 tonnes), comprising 38.82% of the total lac produced in the country (ICAR-IINRG, 2014). About 76% of the total population in Jharkhand resides in rural areas, where more than 75% of the population depends on subsistence farming (Government of India, 2014a). About 72% of farmers, covering about 90% of the total cultivable area in the state, are categorised as small or marginal farmers (Government of India, 2014b). Of these, marginal farmers are more inclined towards lac cultivation (Yogi, Jaiswal, & Singh, 2014). Farmers imparted training under capacity building programmes have been found to utilise a higher percentage of host trees as compared to non-beneficiaries (Yogi & Jaiswal, 2014). The weaker sections of the society collect, consume, and sell various NWFPs in order to survive (Sharma & Butola, 2008).

In this context, introduction of lac production technologies may play a key role to harness the available opportunities in the field of lac cultivation. Lac is a highly remunerative crop, paying high economic returns to farmers and also foreign exchange to the country through its export. Dissimilation of the improved/scientific technologies becomes vital to improve the livelihood security of lac growers. It could enable both forward and backward linkages of the whole sector through minimizing the communication gap among stakeholders. The present study aims to explain the current scenario of lac production, processing and export of lac. It also includes a review of new policy interventions by the central government for the welfare of lac growers.

Methodology

Sampling Design

This study draws on data collected from Jharkhand, Chhattisgarh, Madhya Pradesh, West Bengal, Maharashtra, Odisha and parts of Uttar Pradesh, Andhra Pradesh, Gujarat and North Eastern Hilly (NEH) region, as all are important areas of lac production in India.

Data Collection

Primary data on lac production during 2011-12 were collected through survey method by using pre-tested questionnaires. The surveys were conducted in over 30 lac producing districts of different states covering 300 respondents, including lac traders, lac manufacturers, and other key informants. For updating the information and data, regular contacts were made through telephonic conversation with the respondents.

Secondary data, including time series and cross-sectional data on production since 1974, was obtained from the Natural Resins and Gums Information Cell, Indian Council of Agricultural Research-Indian Institute of Natural Resins and Gums, Ranchi. Online Export-Import data on lac has been downloaded from the website of the Director General of Commercial Intelligence and Statistics, Kolkata. Detailed information about the Minimum Support Price was collected from the various proceedings and reports of The Tribal Cooperative Marketing Development Federation of India Limited (TRIFED), Ministry of Tribal Affairs, Government of India.

Data Analysis

Diagrams and graphs are extremely useful to bring out hidden facts and relationships. Diagrammatic representation stimulates and aids analytical thinking and investigation. Hence, the analysis of time series data uses tabular analysis, statistical tools like measures of central tendency, bar diagram, line diagram (one dimensional) and pie charts (two dimensional).

Results and Discussion

Lac Production Scenario

Lac production in India mainly comes from the two strains of *K. lacca* namely *kusmi* and *rangeeni.* The major host trees *kusum, palas* and *ber* are used in four seasons of crop production across the lac producing states of the country. In this ecosystem, the lac insect survives on the lac host plants and completes its life cycle. Humans are an integral part of this system as during the lac production process, humans play a role as lac growers as well as service providers for various inputs. According to the Census of India 2011, there are 248.4 million households with an average family size of 4.8 in India (Government of India, 2015). Out of these households, less than one percent is involved in lac production and processing activities, but

almost every household and each government department of the country has a regular demand for lac-based products. The environment including living (parasites and predators) and non-living factors plays a major role in lac cultivation. Climate resilient practices have become an important researchable issue and their adoption by lac growers at the field level is a necessity due to the changing climate.

In the second stage of lac production, the major activities are transportation and processing of the harvested crop (sticklac). The role of the host plant and machinery come into the value chain. At this stage, policy issues, infrastructure, applied research and market factors become major factors influencing lac processing. As soon as the final product comes out of the machinery, lac reaches the market where applied research, price, demand, supply, trade agreements, and policies become major factors influencing lac consumption. Thus, the value chain extends from the lac insect and ecosystem that produces sticklac (natural resin) to the finished/value added products that reach consumers. In this process host plants, machinery and the market play a key role. Trophic level and lac value chain is presented in Figure 1.

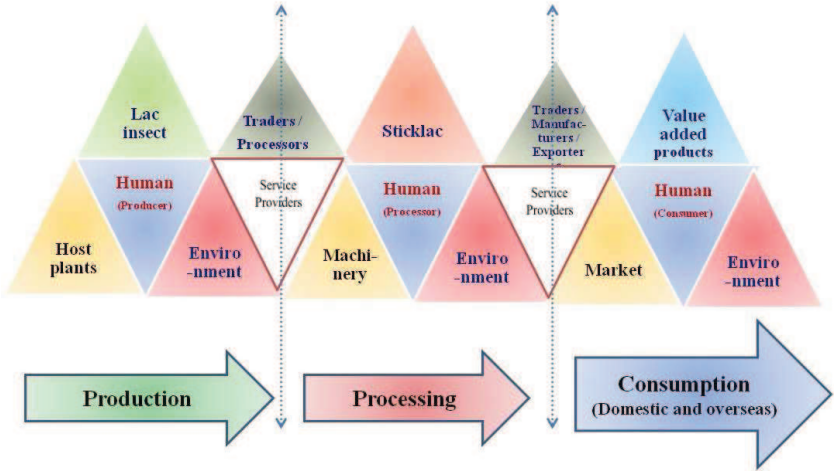


Figure 1. Trophic level and lac value chain

Strain-wise Analysis of Time Series Data

Jharkhand state alone contributes around 40% of the total lac production of the country. About 40 years back Jharkhand's share was 65% with a record high (about 70%) during the sixth five year plan (1980-85); in which the major share was from *baisakhi* and *katki* crop of *rangeeni* strain (Table 1). Throughout 1974-97, the *rangeeni* strain contributed about 80% of the country's total lac

Table - 1. Quinquennial average lac production in the state of Jharkhand and India

Plan	Plan Period	*Rangeeni*		*Kusmi*		Total (*Rangeeni* + *Kusmi*)	
		Jharkhand	India	Jharkhand	India	Jharkhand	India
V Plan	**(1974-79)**	11215(71)	15904	1143(37)	3111	12358(65)	19015
Annual plan	**(1979-80)**	9164(65)	14154	801(31)	2584	9965(60)	16738
VI Plan	**(1980-85)**	9976(72)	13777	985(45)	2208	10961(69)	15985
VII Plan	**(1985-90)**	8507(63)	13607	1731(50)	3485	10238(60)	17092
Annual plan	**(1991-92)**	7440(68)	10864	880(46)	1934	8320(65)	12798
VIII Plan	**(1992-97)**	10116(64)	15872	1286(42)	3045	11402(60)	18917
IX Plan	**(1997-02)**	6148(53)	11507	2313(53)	4334	8461(53)	15841
X Plan	**(2002-07)**	6232(43)	14366	2065(37)	5650	8297(41)	20016
XI Plan	**(2007-12)**	1570(18)	8562	4758(62)	7709	6328(39)	16271

Figure in parentheses are the percentage share of the state in national lac production

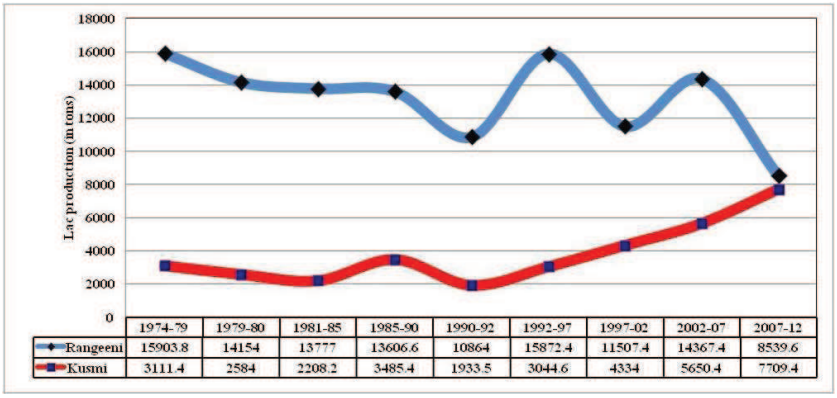


Figure 2. Strain-wise lac production in India

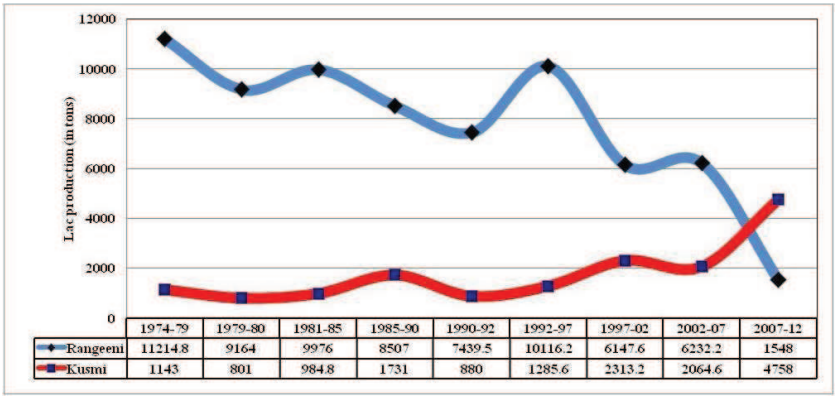


Figure 3. Strain-wise lac production in Jharkhand

production (Figure 2). Similar trends over this period were observed in the state of Jharkhand (Figure 3), and it is interesting to note that Jharkhand had been contributing more than 60% of the lac produced in the country.

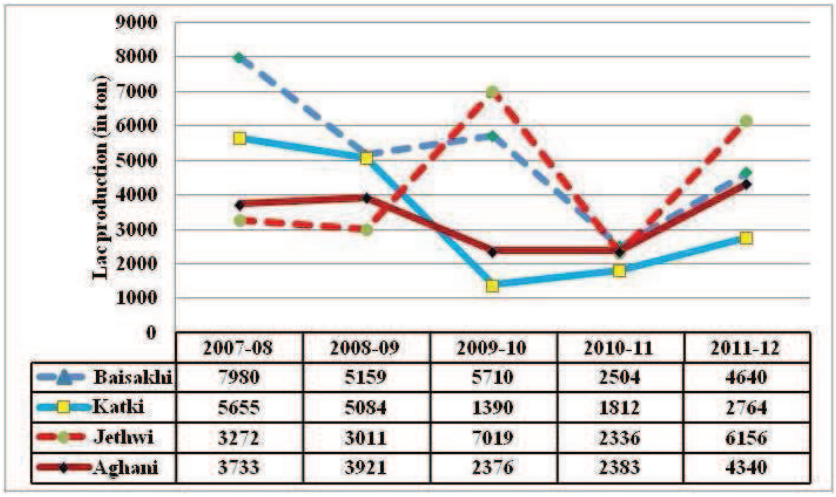
The production level of *jethwi* and *aghani* crop of *kusmi* strain was doubled from 1997 onward while the production of *rangeeni* strain was observed to be in a declining trend both at the national and state level. The transition period of the paradigm shift in lac cultivation pattern was observed from 1997 to 2007. During this period, production curve of *kusmi* strain touched the level of average annual lac production of 2000 and 4000 tonnes in Jharkhand and India, respectively. During the sixth five year plan period, an '*overlapping stage'* was observed after which *kusmi* strain has contributed the major share of lac production. Since last few years, Jharkhand state has witnessed failure of *rangeeni* strain in several districts and simultaneously has been compensated by *kusmi* strain. Consequently, the production level of *rangeeni* strain inclined downwards at the state level. The scenario was not similar at the national level, as production belts for *rangeeni* strain in the states of Madhya Pradesh, Maharashtra and West Bengal were the major contributors in lac production. Utilization pattern of lac host trees in Jharkhand showed that only 51%, 70% and 62% of the *palas, ber* and *kusum* trees respectively, are exploited (Jaiswal, Kumar, & Pal, 2006).

Kusmi lac in terms of quality and quantity is superior to *rangeeni* lac. Lac growers fetch a greater price for *kusmi* lac in comparison to *rangeeni* lac. Moreover, both of the crops of the *kusmi* strain, namely *aghani* and *jethwi,* mature in six months and the lac growers get their income at a half yearly interval. On the other hand, the major crop of *rangeeni* strain, i.e. *baisakhi,* matures in eight months (Jaiswal, Sharma, & Ramani, 2011) so lac growers have to wait for eight to nine months for income (Table 2). Among lac growers, the level of awareness through various training programmes has also increased, providing more profitable options for them. Consequently, a paradigm shift of lac growers from *rangeeni* to *kusmi* lac production in Jharkhand state as well as at the national level is observed.

Production of lac from *jethwi* crop of *kusmi* strain shows the highest instability comparatively to all the other crops of *kusmi* as well as *rangeeni* strain. As seen in the pictorial illustration (Figure 4 and Figure 5), the other crop of *kusmi* strain seems to be a relatively more stable crop. During the five year period, a lac production level of about 4000 tonnes was achieved thrice. Thus, it can be inferred

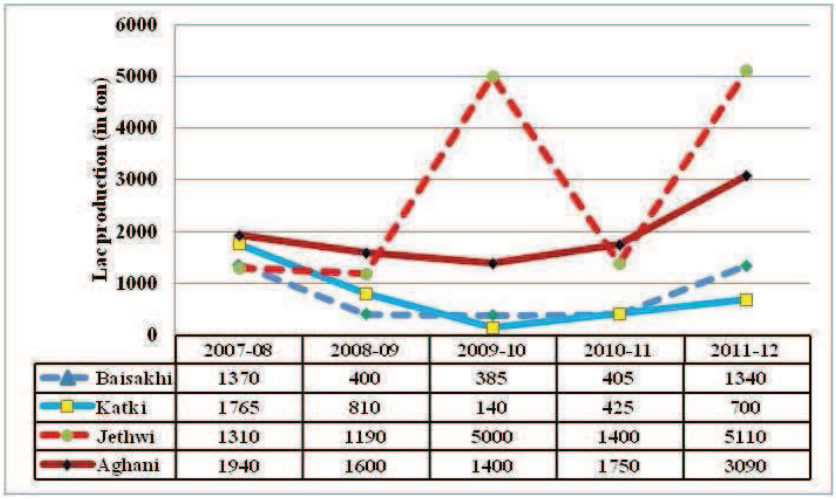
Table 2. Major strain/crop types and their life period

Sl. No.	Strain/Biotype (% share)	Crop (% share)	Season	Period		Duration (in days)
				Inoculation	Harvesting	
1.	*Rangeeni* (44%)	*Katki* (16%)	Rainy	June-July	October-November	120-125
		Baisakhi (28%)	Summer	October-November	June-July	240-250
2.	*Kusmi* (56%)	*Aghani* (24%)	Winter	June-July	January-February	180-185
		Jethwi (32%)	Summer	January-February	June-July	180-185



	2007-08	2008-09	2009-10	2010-11	2011-12
Baisakhi	7980	5159	5710	2504	4640
Katki	5655	5084	1390	1812	2764
Jethwi	3272	3011	7019	2336	6156
Aghani	3733	3921	2376	2383	4340

Figure 4. Crop-wise share in total lac production in India



	2007-08	2008-09	2009-10	2010-11	2011-12
Baisakhi	1370	400	385	405	1340
Katki	1765	810	140	425	700
Jethwi	1310	1190	5000	1400	5110
Aghani	1940	1600	1400	1750	3090

Figure 5. Crop-wise share in total lac production in Jharkhand

that the winter and rainy season crops of both the strains show stable production over the specified period. On the other hand, summer crops of both the strains were relatively less stable in production due to mortality of the lac insect. Mortality of the lac insect may occur due to several factors including high temperature, traditional method of lac cultivation, water scarcity, and pest attack. Negative growth trends in the production of rainy and summer season crop of *rangeeni* strain have been reported (Yogi, Bhattacharya, Jaiswal, & Kumar, 2015). Over the past five years, insect mortality of the rainy season crop of *rangeeni* strain was the major cause of decline in production. Subsequently, a shift in utilization of the *ber* host trees for *kusmi* strain has taken place and the relative contribution of *kusmi* lac has gained a momentum of positive growth in the state (ICAR-IINRG, 2014).

Current Status and Trends in Lac Processing

India is not only the largest lac producer but also has the world's largest lac processing infrastructure. On the basis of surveys conducted at different lac processing centres in the country, the total quantity of sticklac processed during 2012-13 was 14,594 tonnes including that of imported lac. A total 150 lac processing units were functional in West Bengal (102 units), Chhattisgarh (24), Jharkhand (16), Maharashtra (6) and Madhya Pradesh (2) during the year 2012-13. The number of units declined in comparison to 2010-11, but the scale of production per unit increased. In processing of lac, Chhattisgarh ranked first (38.6%), followed by West Bengal (30.2%), Jharkhand (24.5%), Maharashtra (6.2%) and Madhya Pradesh (0.6%). The information on lac processing centres in India and share of different states in lac processing in the country during the last five years is presented in Table-3 and Figure 6, respectively (Yogi, Bhattacharya, Jaiswal, & Kumar, 2015).

Seedlac, button lac, shellac, dewaxed shellac, bleached lac, aleuritic acid, and lac dye amongst others are the value added products that have good demand in domestic as well as international markets. The amount of sticklac processed in India during the last five years is presented in Figure 7. According to Pal, Jaiswal, Bhattacharya, and Yogi (2013), out of the 195 market points across the country, four primary and six secondary markets at the national level have received an excess of 500 tonnes of sticklac. The Tribal Cooperative Marketing Development Federation of India (TRIFED) has taken initiatives to upload the daily market price data for stakeholders. This initiative may increase the accessibility of online market information.

Table 3. Lac processing centres in India

States	Districts /Centres	No. of units	Value added products
Chhattisgarh	Bilaspur (Pendra)	2	Seedlac, Button lac
	Dhamtari	12	Seedlac, Button lac, Bleached lac
	Janjgir-Champa (Sakti)	3	Seedlac, Shellac, Bleached lac, Dewaxed Shellac, Lac dye
	Kanker	2	Seedlac
	Korba (Kathgora)	6	Seedlac, Shellac, Bleached lac
	Rajnandgaon	1	Seedlac, Shellac
	Raipur	2	Bleached lac, Aleuritic acid
Jharkhand	Daltonganj	2	Seedlac
	Ranchi (Khunti, Bundu, Murhu)	10	Seedlac, Button lac, Shellac, Lac dye, Bleached lac
	Simdega	2	Seedlac
	Saraikela-Kharsawan (Chandil)	1	Bleached lac
	W. Singhbhum (Chakradharpur)	1	Shellac
Madhya Pradesh	Indore	1	Seedlac, Bleached lac
	Hoshangabad (Bankhedi)	1	Seedlac
Maharashtra	Gondia	6	Seedlac, Shellac, Gasket Shellac Compound, Bleached lac
West Bengal	Purulia (Balarampur)	110	Seedlac, Shellac, Button lac, Bleached lac, Aleuritic acid, lac wax, Dewaxed Decolourised lac
	Purulia (Jhalda)	3	Seedlac, Shellac, Button lac
	Purulia (Tulin)	30	Seedlac, Button lac
	TOTAL	**195**	

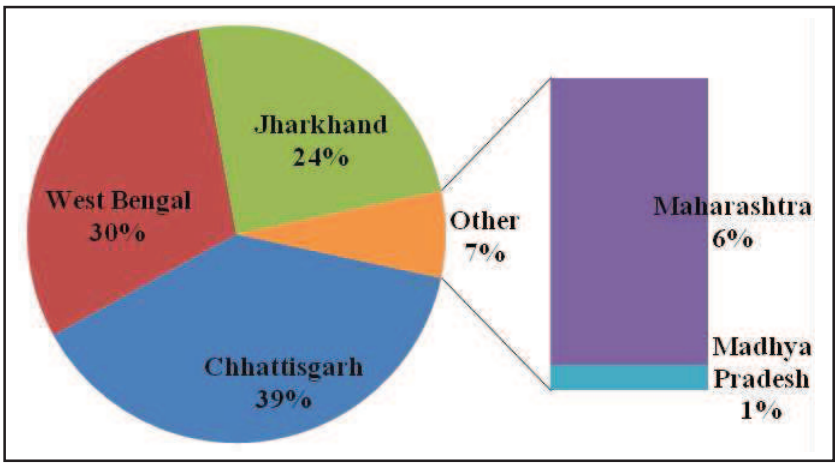


Figure 6. State-wise share in lac processing

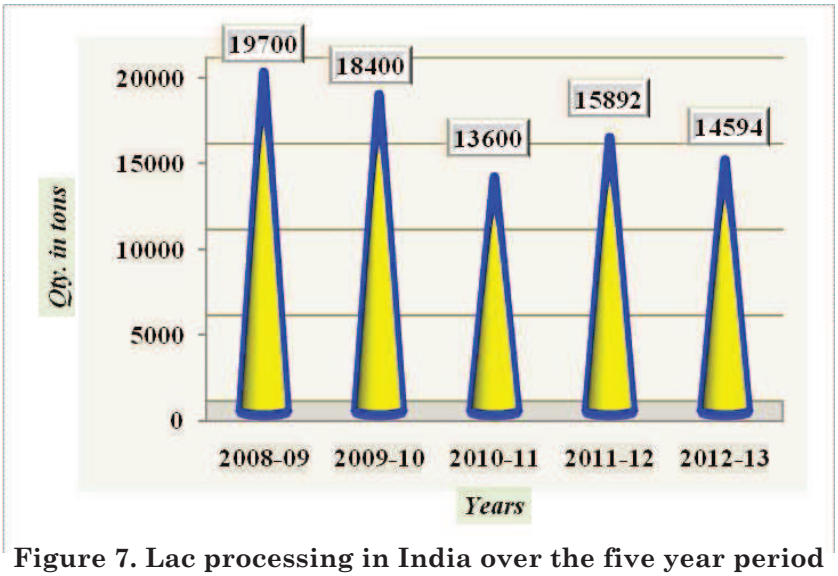


Figure 7. Lac processing in India over the five year period 2008-2013

Composition and Direction of Lac Export

Lac and its value added products significantly contribute to the country's foreign exchange earnings. The total export of lac and its value added products during 2010-11 was 6339 tonnes valued at 211.13 crore Rupees while the total export of lac and its value added products during 2012-13 was 4361 tonnes valued at 480.27 crore

Table 4. Export of lac and its value added products from India during 2011-12 and 2012-13

Sl. No.	Name of product	Export in 2011-12		Export in 2012-13	
		Quantity (t)	Value (lakh Rupees)	Quantity (t)	Value (lakh Rupees)
1.	Shellac	4479.31	21565.5	2865.4	23744.4
2.	Aleuritic acid	64	1118.13	162.4	10068.1
3.	Seedlac	1657.09	7737.2	769.39	8422.49
4.	Dewaxed shellac	293.64	2031.08	227.77	3066.53
5.	Bleached lac	310.06	2454.52	164.22	2082.03
6.	Shellac wax	47.86	290.35	43.17	557.53
7.	*Kiri* lac	-	-	44.9	51.96
8.	Hydrolysed lac	-	-	78.9	25.17
9.	Gasket lac	5.18	7.43	5.18	9.2
10.	Lac dye	0.002	0.06	0.01	0.2
	Total	**6858.21**	**36461.30**	**4361.30**	**48027.58**

Source: DGCIS, Kolkata.

Rupees (Government of India, 2012). During the previous two years, due to regular demand in domestic as well as international markets, a price hike in both domestic as well as international markets was observed. Consequently, foreign exchange earnings from lac and its value added products had doubled (Table 4).

During 2011-12, major destinations for international trade of lac were Germany (16%), Egypt (16%), Pakistan (9%), Indonesia (9%), Bangladesh (8%), USA (8%), Jordan (6%), Canada (6%), UK (4%) and Italy (3%). These destinations imported about 85% of the value added lac products from India. The remainder of the 15% of exports were directed to Kenya, New Zealand, Japan, Netherlands, France and several other countries (Government of India, 2012).

Policy Interventions for the Welfare of Tribal Communities

The people who depend on Non-Wood Forest Products (NWFPs) are beset with a number of problems such as the perishable nature of their produce, lack of storage capacity, lack of marketing infrastructure, exploitation by middlemen, lack of government intervention at the required time and scale, and the volatile nature of markets. Consequently, the NWFP gatherers who are mostly poor are unable to bargain for fair prices. Ensuring fair returns to nearly 100 million people is the duty of the government.

In this context, the Government of India has decided to introduce the scheme of "Mechanism for marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP) and development of value chain". The scheme is designed as a social safety net for improvement of livelihood of NWFPs gatherers by providing them with a fair price for the NWFPs they collect. The scheme has been started to enhance their income level; to ensure sustainable harvesting; and for development of NWFPs trade including its value chain and necessary infrastructure at local level. The MSP scheme seeks to establish a framework to ensure fair returns for the produce collected by tribes/forest dwellers, assurance of buying at a particular price, primary processing, storage, and transportation, while ensuring sustainability of the resource base. The Ministry of Tribal Affairs, which is the central nodal agency for implementation of the scheme through state level implementing agencies, shall announce a Minimum Support Price (MSP) for the selected NWFPs with the technical support of TRIFED (Table 5).

Table 5.Coverage of states and NWFPs under MSP Scheme

SN	Particulars	States/Commodities	Criteria
1.	States covered	Odisha, Jharkhand, Chhattisgarh, Maharashtra, Madhya Pradesh, Gujarat, Andhra Pradesh and Rajasthan.	States having Scheduled Areas and Scheduled Tribes in the Fifth Schedule of the Constitution of India (Except Himachal Pradesh).
2.	Commodities covered	*Mahua* Seed, Lac, Myrobalan, Gums (Gum *Karaya*), *Sal* Leaf, *Chironjee*, Tamarind, *Karanj* Seed, *Sal* Seed and Wild Honey.	Covers all non-nationalized / non-monopolized NWFPs from the 12 main identified NWFPs.

Source: TRIFED, Ministry of Tribal Affairs, GOI, New Delhi

i. ***Price Fixation:*** Presently Indian states fix the price for different NWFPs on the basis of market prices by reducing all the overheads. The second methodology for arriving at a procurement price is to follow cost plus method in which cost of collection is calculated for NWFPs in different states. The Ministry of Tribal Affairs isthe nodal ministry for implementation and monitoring of the scheme. The scheme's basic component includes declaration of MSP for notified NWFPs by the Central Government based on the recommendation of the Pricing Cell set up within TRIFED. To determine a fair and remunerative MSP for lac during 2014-15 and 2015-16, the Pricing Cell deliberated with State Procurement Agencies (SPAs) and federations. ICAR-Indian Institute of Natural Resins and Gums, Ranchi (ICAR-IINRG) furnished the computation of cost of production of lac for MSP.

ii. ***Price Announcement:*** The two lac varieties, *rangeeni* variety (harvesting season is May-June and October-November) and *kusumi* variety (harvesting season is January-February and July-August), are cultivated in India. Accordingly, based on the inputs provided by ICAR-IINRG, the Pricing Cell recommended a Minimum Support Price (MSP) of 210 and 290 Rupees/kg for *rangeeni* and *kusumi* lac, respectively, for the 2014 crop (applicable up to November 2014 as the cost of the production may vary depending upon the cost of broodlac during the next season). The Pricing Cell recommended enhancing the current MSP by 10%. It had recommended a Minimum Support Price (MSP) of 230 and 320 Rupees/kg for *rangeeni* and *kusumi* lac, respectively, for the 2015 crop (Government of India, 2016).

iii. ***Procurement:*** State designated agencies have procured lac from NWFP gatherers (individual or collectives) at local markets/pre-notified procurement centres at a prefixed

Minimum Support Price. To ensure full and timely payment to NWFP gatherers across the country, states need to set up an adequate number of Procurement Centres with necessary manpower and storage facility, to thereby minimize exploitation by middle men. But still, appropriate guidelines for efficient and transparent procurement, supervision and monitoring of the operations are needed.

iv. ***Revolving Fund and Subsidy Requirement:*** A revolving fund shall be provided to each designated state for procurement of NWFPs from the gatherers at the prefixed MSP. The revolving fund requirement for each state shall be assessed based on an annual Procurement Plan. Subsidy is required for the states to compensate for losses that may be incurred during the MSP operation. This is essentially an anti poverty measure, as it addresses the livelihood of some of the poorest communities in the country.

v. ***Capacity Building:*** The Scheme shall provide training on sustainable harvesting and value addition activities including facilitation for the marketing of the produces to one hundred thousand tribal MFP gatherers.

vi. ***Market Information System:*** The existence and dissemination of complete and accurate market information is the key to achieve both operational and pricing efficiency. Therefore, a nationwide information network/a portal MFPNET dedicated to NWFPs is being established to implement Information and Communication Technology (ICT) based schemes for speedy collection and dissemination of market information and data for its efficient and timely utilization. In many states, purchase and sale of NWFPs in local weekly markets is done in the open and thus buyers and sellers have to face a lot of problems during the rainy and hot summer seasons. In order to improve the condition of these places, formal structures where trading can take place in a systematic manner need to be established.

vii. ***Creation of Storage Facilities at Aggregation Points:*** The stocks procured by the state designated agencies in each weekly market may be too small and therefore, would need to be transported to the aggregation centres from where bulk quantity can be transported to the centrally located warehouse/ cold storage. Therefore, it is essential to establish a warehouse of 50 metric tonnes at the block level to aggregate the stocks procured at each local market.

viii. ***Multi Purpose Centre:*** To facilitate capacity building, training for value addition, storage, and marketing of NWFPs, TRIFED will establish five multipurpose centres in the first phase (twelfth five year plan) for training, and primary processing. Value addition in NWFPs and warehousing and cold storage facilities will be required.

Conclusions and Recommendations

The number of lac host trees under lac cultivation should be increased to sustain lac production in the country. Crop protection measures and other technical guidance regarding lac production may be supported by ICAR-IINRG, Ranchi through research, regular training programmes, and provision of extension activities and linkages. The lac processing industry has also witnessed several interventions like aleuritic acid, bleached lac, and fruit coating. The major challenges from the production side have been climate change, inadequate broodlac supply, and damage of crop by pests. Increasing wages and fluctuation in the price of basic raw material (sticklac) at various levels of the market have been identified as major constraints for both lac production and processing. Poor lac marketing facilities adversely affect the execution of lac promotion schemes implemented by the government. Strengthening of infrastructure and other support facilities will be effective for monitoring of locations, situations and system based technologies. Market linkages and savings may be strengthened through ICT interventions. This will lead to the betterment of the socio-economic condition of India's lac farmers. Strengthening of value chain through policy interventions like MSP, and farmer–industry linkages through Farmer Interest Groups (FIGs) and Commodity Interest Groups (CIGs) will be helpful to harness the full potential of available resources. This should generate gainful employment on the one hand while also providing quality output to the hands of the consumer.

Acknowledgement

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