

COMMERCIAL EXPLOITATION OF RUBBER HONEY IN INDIA REPORT OF A SAMPLE SURVEY

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Introduction

The three important by-products and ancillary sources of income of rubber plantations are rubber wood, rubber honey and rubber seed. Among the three by-products, the extent of commercial exploitation of rubber wood is relatively higher compared to the other two across the major natural rubber (NR) producing countries mainly due to the potential value addition and size of the world market for the rubber wood based finished products¹. However, significant differences exist among the major NR producing countries in terms of the extent of commercial exploitation of the ancillary sources of income arising from observed disparities in the objective conditions encompassing the produc-

tion sector, natural resource endowments, level of technology, the extent of institutional and R & D support, wages and market conditions. The present study is a pioneering attempt to analyse the operational level constraints and potential of rubber honey production in India though an earlier study had reported the production potential in the country (Haridasan *et al*; 1987).

The two main sources of honey production in India are wild honey gathered from forests and apiary honey collected from beehives maintained for commercial exploitation. Reliable estimates on the total production of honey in the country are not available mainly due to paucity of information on the production of wild honey. However, available estimates on

the production of apiary honey underline the importance of rubber plantations as a source of honey. The rubber tree is a prolific source of honey which is obtained from the extra floral nectaries at the tip of the petiole where the leaflets join and the honey flow period is between the months of January and March. According to the Bureau of Indian Standards (BIS) specifications, rubber honey belongs to medium grade (Grade A) with an average moisture content of 22 per cent². The major commercial applications of honey are in ayurveda and unani systems of medicine, pharmaceutical preparations, confectioneries, bakeries and other food products manufacturing industries. Beeswax, a by-product of bee-keeping industry is used in the manufactur-

¹The major products manufactured from processed rubber wood are furniture, panel products and household articles. The current estimated size of rubber wood based products is more than US \$ 1 billion.

²According to BIS specifications, honey is classified into three grades based on the moisture content. It prescribes less than 20 per cent moisture for 'special grade', 20-22 per cent for 'grade A' and 22-25 per cent for 'standard grade'.

ing of artificial comb foundation, drum coating and is an essential ingredient in industries such as cosmetics, perfumes, confectioneries and pharmaceuticals.

The evolution of bee-keeping in rubber plantations on a commercial scale can be traced back to the 1920's under the initiative of European missionaries based in South Kerala and Kanyakumari district of Tamil Nadu. The introduction of commercial bee-keeping by Dr. Spencer Hatch of Marthandom YMCA prompted many of the local households to take up bee-keeping as a means of livelihood at various regions of Kanyakumari district. In course of time, this new endeavour was supported by various voluntary agencies and co-operative societies. However, the direct government intervention in terms of institutional support to the industry was available only with the establishment of Khadi and Village Industries Commission (KVIC) and since 1956 this autonomous organisation has played a crucial role in propagation, R & D work and marketing.

Though there are four main species of honey bees, viz., *Apis mellifera*, *Apis cerana indica*, *Apis dorsata* and *Apis florea*, only the first two are used in apicul-

ture as there are operational level problems in domesticating the remaining two species of wild bees. *Apis mellifera* is the most common species in the world while *Apis cerana indica* is an indigenous variety which is the most common species in the rubber plantations in Kerala and Tamil Nadu. *Apis mellifera* was introduced in India in the 1960's and it was successfully reared in the states of Himachal Pradesh, Haryana and Punjab. In the rubber plantations, this species was introduced as a rehabilitation measure by the KVIC after the outbreak of Thai sacbrood disease in 1992-93 which almost completely destroyed the hives of *Apis cerana indica*. Though the current trends are indicative of a recovery, the possibilities of rubber honey production retaining its previous share in the total apiary honey production in the country appear to be bleak owing to a variety of factors affecting the production and marketing sectors. The present study was undertaken in the backdrop of the efforts to revive rubber honey production, with the following objectives:

Objectives

1. to analyse the prevailing production conditions and operational level constraints,
2. to examine region-wise differences and the contributing factors,
3. to identify the channels of primary marketing and organisation of the retail marketing and
4. to estimate the production potential, net income and to suggest modifications on the policies based on the emerging conclusions.

Methodology

The relevant data for the study were collected through a field survey, covering 29 major bee-keeping societies and collection centres operating in Kerala and Tamil Nadu during 1993-94. The units covered were classified under four regions viz., 1. Kanyakumari district in Tamil Nadu (K. K.) 2. South Kerala covering Trivandrum, Quilon and Pathanamthitta districts (S. K.) 3. Central Kerala covering Kottayam and Ernakulam districts (C. K.) and 4. North Kerala covering Trichur and Kannur districts (N. K.). Secondary information were collected from the offices of Khadi Board and Central Bee Research and Training Institute (CBRTI), Pune.

Results and Discussion

Table 1 shows the trends in the production of apiary honey in India and the rela-

Table 1. Trends in apiary honey production and the relative share of rubber honey.

Year	Apiary honey production in India (MT)	Production of rubber honey (MT)	Share of rubber honey (%)
1981-82	5600	2300	41
1985-86	6200	2600	42
1990-91	6100	2750	45
1993-94	5529	550	10

Source : Khadi and Village Industries Commission, Bombay and Rubber Research Institute of India, Kottayam.

tive share of rubber honey since 1981-82.

It is seen that honey from the rubber plantations of Kerala and Tamil Nadu achieved the peak level production during 1990-91 and its estimated relative share was 45 per cent of the total apiary honey production in the country. However, the outbreak of Thai Sacbrood disease since 1992 had adversely affected the production base of the industry and the major honey processing units in Kerala had to depend on imports of raw honey from Punjab and Haryana. The sample

survey conducted during 1993-94 revealed the main characteristics and operational level problems of the industry.

A profile of the units covered in the survey is given in Table 2.

Among the 29 units covered, six were functioning as exclusive collection centres of honey and 23 were engaged in bee-keeping and promotional activities with around 7000 bee keepers as members. The average membership per society was 306. Only 30 per cent of members had rubber cultivation and the average size

of holding was 3.73 acres. The percentage of members who employed hired labour for bee-keeping was only 15 per cent, highlighting a very high degree of dependence on family labour. The region-wise data showed wide variations in terms of the important features. The average membership per society varied from 85 in South Kerala to 713 in Central Kerala. The relative intensity of rubber growers in the membership also varied from 68 per cent in North Kerala to seven per cent in Kanyakumari district in Tamil Nadu. A relatively lower intensity of non-rubber growers in the Kanyakumari district is historically rooted as the region had an early beginning in commercial bee-keeping and over time the individual bee keepers from this region institutionalised contractual bee-keeping in the rubber plantations of Kerala on a rental basis. The rent was very often given in kind to the rubber growers.

Table 2. Salient features of the sample units

Region	Number of collection centres	Number of societies	Average members/society	Members with rubber cultivation (%)	Average size of holdings (acres)	Members with hired labour (%)
K. K.	4	2	185	7	4.00	10
S. K.	1	4	85	33	2.88	16
C. K.	1	4	713	11	4.50	14
N. K.	-	13	239	68	3.54	32
Total	6	23	306	30	3.73	15

Table 3. Source-wise and region-wise yield of raw honey

Region	Number of societies	Average number of hives/society		Reported average yield of honey (kg/hive)	
		Indica	Mellifera	Indica	Mellifera
K. K.	2	1220	158	12.80	N. A.
S. K.	4	648	18	12.63	N. A.
C. K.	4	1919	758	11.66	61.00
N. K.	13	3155	26	12.00	51.00
Average	-	2336	163	12.10	60.60

The region-wise production and productivity of honey from *Indica* and *Mellifera* bee hives is given in Table 3.

The average number of *Indica* hives per society was 2336 compared to 163 *Mellifera* bee hives as the latter were introduced in rubber plantations only after the outbreak of the disease in 1992-93. The relative share of *Mellifera* hives was the highest in Central Kerala (28%) in relation to all the other regions (4%). This was mainly due to the pioneering efforts by

Malanadu Development Society, based at Kanjirappally, in bringing *Mellifera* colonies from North Indian states, especially from Punjab and popularising them in the rubber plantations.

The reported average yield of *Indica* honey per hive is 7 kg (Haridasan *et al.*, 1987) and that of the *Mellifera* bees ranged from 45 to 60 kg per hive (M. D. S., 1994). The results of the present survey showed an average yield of 12.1 kg per hive for *Indica* bee and 60.6

kg per hive for *Mellifera*. Among the individual units the highest reported yield for the indigenous and *Mellifera* varieties were 30 kg and 80 kg per hive respectively. However, the region-wise difference in the average yield of *Indica* honey was not much significant.

The total collection of honey by the sample units from 1983-84 to 1993-94 is given in Table 4.

The average collection of honey per unit increased from 31.7 MT during 1983-84 to 108.4 MT during 1991-92 showing a rise of around 242 per cent. But the average quantity plummeted to 7.3 MT per unit during 1993-94 due to the drastic reduction in the number of hives arising from the outbreak of the disease. The average number of hives per member declined from 50 in 1990-91 to 7 in 1993-94.

Table 4. Collection of raw honey (MT)

Year	No. of units	Kanyakumari	South Kerala	Central Kerala	North Kerala	Total
1983-84	9	197.50	2.00	17.90	68.60	286.00
1984-85	14	202.20	3.00	69.70	74.60	349.50
1985-86	15	203.70	2.50	58.00	96.00	360.20
1986-87	18	505.50	2.50	105.30	214.30	827.60
1987-88	19	555.00	2.50	102.00	65.90	725.40
1988-89	20	632.00	1.00	96.30	81.60	810.90
1989-90	21	667.50	9.00	162.80	97.10	936.40
1990-91	20	2311.50	7.50	191.00	103.20	2613.20
1991-92	20	1942.50	6.20	136.80	83.00	2168.50
1992-93	17	1690.00	5.40	26.50	43.70	1765.60
1993-94	15	85.00	5.70	9.60	9.60	109.90

The Kanyakumari district of Tamil Nadu has been dominating the collection and sale of honey and in 1983-84 the region accounted for 69 per cent of the total collection. Though in 1990-91 its share has increased to 88 per cent, it declined to 77 per cent in 1993-94. It was reported that the collection units in the region even imported honey from North Indian states in 1993-94 for sale.

Beeswax is a commercially important by-product of the industry. It contains many economically important chemicals and vitamin A. Compared to honey, the yield of beeswax is much lower as evident from Table 5.

Table 5 shows the region-wise and source-wise yield of wax reported by the honey producing units. The average production of wax is 12.11 kg per 100 *Indica* hives and 25 kg for 100 *Mellifera* hives. The results obtained on the comparative yield of the wax from the two varieties are more or less in conformity with the differences in the yield levels of raw honey.

Primary marketing of honey and wax

Table 6 shows region-wise and channel-wise sales realisation of honey and wax. The average farmgate price of rubber honey has increased from Rs. 18.00 per kg in 1988 to Rs. 44.81 per kg in 1993-94 though there

Table 5. Region-wise yield of beeswax

Region	Reported average yield of wax per 100 hives (kg)	
	<i>Indica</i>	<i>Mellifera</i>
K. K.	5.33	N. A.
S. K.	12.50	N. A.
C. K.	10.00	25.00
N. K.	20.62	N. A.
Average	12.11	25.00

Table 6. Region-wise and agency-wise farmgate price of raw honey and wax (1993-94) (Rs/kg)

Region	Societies		Collection centres	
	Honey	Wax	Honey	Wax
K. K.	47.50	60.00	42.50	N. A.
S. K.	51.00	60.00	40.00	45.00
C. K.	41.13	78.00	44.00	N. A.
N. K.	50.18	59.00	Nil	Nil
Average	47.45	64.25	42.17	45.00

existed differences between the average prices paid by the societies and collection centres. The steep rise on the price was mainly due to shortage of honey production since 1992. Consequently, the farmgate price realised by the bee keepers both from the societies and the collection centres was higher than the rate fixed by the KVIC. Technically, the procurement prices paid by the societies and the collection centres was higher than the rate fixed by the KVIC. Technically, the procurement prices paid by the societies and the collection centres varied between 81 to 72 per cent of the bulk sale price and 65 to 57 per cent of retail sale price respectively. Though the production of beeswax as a percentage of honey ranged between 0.4 per cent to 10 per cent, the unit value realisation was higher as evident from Table 6.

Processing

Processing of honey involves indirect heating mainly to prevent fermenta-

tation and granulation. Normally the processing of honey involves filtering and heating of raw honey in containers at around 63°C under controlled conditions. However it is reported that conventional processing method of heating honey in containers would spoil its natural properties by over heating. The new technology developed by CBRTI is found to be capable of preventing fermentation, delaying granulation and maintaining quality of Indian honey. None of the sample processing units has this facility and all the units were depending on the conventional system.

The estimated average processing cost of honey by the KVIC is Rs. 16.50 per kg including the loss in weight, bottling, packing costs and Agmark fee. The summary of the estimated processing cost is furnished in Table 7.

Marketing of processed honey

The analysis of the pat-

tern of marketing by the sample units showed differences across regions and in terms of unit prices.

The pattern of marketing was dominated by direct retail sales (58.75%), with a higher unit value

Table 7. Processing cost (1993-94)

Particulars	Cost (Rs/kg)
1. Loss in weight, labour cost, bottling & packing	6.00
2. Interest on capital	2.25
3. Rent and depreciation	8.25
Total	16.50

Source : Khadi and Village Industries Commission, 1994.

realisation of Rs. 73.45/kg compared to Rs. 58.51/kg for bulk sale. As evident from Table 8, direct retail sale was very popular in South Kerala (81%) and Central Kerala (80%) whereas in Kanyakumari region and North Kerala bulk sale was the dominant pattern of marketing. The major sources of bulk purchase were ayurvedic and pharmaceutical firms, confectioneries and various forms of food processing units. The processing units marketed the honey through various channels in 1 kg, 500, 200, 100 and 50 g bottles. It was reported that around 80 per cent of the bottled honey was sold through various agencies and only 20 per cent was

Table 8. Selling price of processed honey (1993-94)

Region	Bulk sale		Direct retail sale	
	% share	Price (Rs/kg)	% share	Price (Rs/kg)
K. K.	62.00	58.75	38.00	70.00
S. K.	19.00	58.00	81.00	78.00
C. K.	20.00	59.00	80.00	73.00
N. K.	64.00	58.30	36.00	72.78
Average	41.25	58.51	58.75	73.45

sold directly.

The details on the composition of the market in terms of the relative shares of different sectors in the market for rubber honey are shown in Table 9. The results are indicative of the dominant role of the Khadi shops (39%) as the major sales outlet of the processing units compared to other three channels. Region-wise analysis of the sales showed that ayurvedic drugs manufacturing sector was the major channel of sales for the Kanyakumari region (44%) whereas Khadi shops formed the dominant channel for the other three regions. In Central Kerala, direct retail sale to house-

holds was equally important and it had the highest share (38%) compared to other three regions.

Potential production and income

Although the extent of commercial exploitation of rubber honey in India is insignificant, a few observations on the potential production and returns from the farmers' angle are in order. Results of the experimental trials conducted in RRII indicated that on an average 15 to 20 hives of *Apis Cerana Indica* can be maintained in a hectare of rubber plantation. With a potential production of 182 kg per ha as evident from the survey results, the mature rubber plantations in

Table 9. Composition of the market for processed honey (% share) in 1993-94

Region	Khadi shops	House-holds	Ayurveda firms	Others
K. K.	20	30	44	6
S. K.	55	22	17	6
C. K.	38	38	8	16
N. K.	43	15	35	7
Average	39	26	26	9

India extending to 3.65 lakh hectares has the potential to produce 66430 MT of rubber honey annually and the current extent of exploitation amounts to only less than two per cent of the potential. The estimated gross income from bee-keeping in rubber plantations is Rs. 8190 per ha based on the current prices. The net income from the rubber growers' angle after giving due allowance to various components of costs is estimated to be around Rs. 5000 per ha.

Conclusion

Despite the attractive net returns, the commercial exploitation of rubber honey in India is at its infancy. The lukewarm response of the small rubber growers in Kerala to bee-keeping appears to be based on a host of factors ranging from the growing trend of part-time farming in rubber plantations, labour shortage and inadequate institutional support.

Off-seasonal management of bee hives is another important factor contributing to the lower level of exploitation of rubber honey. Though the forage plants suitable for off-seasonal management were identified by the Rubber Research Institute of India³, so far the adoption of the same was insignificant among the

farmers. Another major issue for consideration is the relative priorities given to the domestic and export markets. Per capita consumption of honey in India is only 2-3 gm. India's share in world exports of honey is less than one per cent. Therefore the policy prescriptions required for the maximum commercial exploitation of this valuable by-product have to focus on measures to increase productivity by popularising the rearing of the *Mellifera* variety so as to enhance the farmers' net income per unit area. Co-ordination of the extension activities of Rubber Board, KVIC, CBRTI

and Indian Council of Agricultural Research (ICAR) is one of the primary requisites for exploiting the commercial potential from a long term perspective. A well laid out strategy of providing institutional support for upgrading the processing and marketing operations is also crucial for achieving the desired goals within a prescribed time frame.

References

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Appendix 1

Region-wise world production of honey ('000 MT)

Region	1979-81	1992	1993	1994
Asia	235 (25)	329 (28)	326 (27)	338 (30)
N. C. America	211 (23)	217 (19)	220 (19)	207 (19)
Europe	134 (14)	171 (15)	177 (15)	175 (16)
Africa	87 (9)	113 (10)	117 (10)	119 (11)
Others	270 (29)	339 (28)	346 (29)	276 (24)
Total	937	1169	1186	1115

Note : Figures in parentheses denote percentage share

Source : FAO Quarterly Bulletin of Statistics, 1995

Appendix 2

World export and import of honey (million US \$)

	1989	1990	1991	1992
Export	78	532	115	1081
Import	164	1678	65	184

Source : UNCTAD Commodity Year Book and International Trade Statistics Year Book 1993, Vol.3.

³The forage plants identified by the Rubber Research Institute of India are - 1. *Antigonon leptopus* polygenic 2. *Callistemon lanceolatus* Mordecai 3. *Manihot glaziovii* Euphorbiaceae and 4. *Pongamia glabra* Leguminous.