

AYURVEDIC MANUFACTURING INDUSTRY IN KERALA

- A STUDY OF ITS ORGANISED SECTOR

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*Dissertation submitted in the partial fulfilment of the requirements for the degree of Master
of Philosophy in Applied Economics of the Jawaharlal Nehru University*

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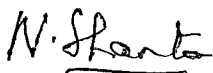
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I hereby affirm that the work for this dissertation, 'Ayurvedic manufacturing Industry in Kerala- a study of its organised sector', being submitted as a part of the requirements of the M.Phil. Programme in Applied Economics of the Jawaharlal Nehru University, was carried out entirely by myself and has not formed part of any other Programme and not submitted to any other institution/University for the award of any Degree or Programme of Study.

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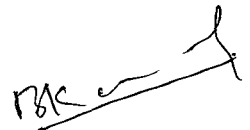
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Certified that this study is the bona fide work of Harilal.M.S, carried out under our supervision at the Centre for Development Studies.



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To my parents

ACKNOWLEDGEMENTS

Perhaps, a task, which is harder for me than writing a dissertation, is to put my love and concern through words. Words hardly enough to catch the intensity of emotions. If put it too emotionally, then it becomes mechanical. But as Kamala Das said "Prakadamakatha sneham nirarthamanu" (unexpressed love is meaningless), for the same simple reason, I am putting my concern on paper.

My association with Shanta madam and Ravi Raman sir was not of a kind of 'teacher-student'. Shanta madam, with her affectionate smile, kept my tensions away. I was also quite surprised in many occasions by her speedy feed back and logical handling of the matter. It is wrong from my part if I would say just thanks for all these.....

Ravi Raman sir...the freedom and friendship I enjoyed with him, the encouraging words, timely advises and the detail correction of the draft gave a relation of more than just a supervisor.

Professor K.K.Subrahmanian –'the iron man' of my mind, as his great ideas and encouragement with a smashing hit on the shoulder will keep all my CDS memories behind....I remember the long hours he spent with me to correct the whole draft criticising my 'horrible English'.

Dr. K.P.Kanman...introduced me to this area....the initial discussions on the topic and his occasional enquiries regarding the progress of the study ...all...kept me going with more confidence.

Soman Nair's help in collecting the data and the concern he showed in my study helped me to bring out the thesis within the time limit.

Kabir sir, with his informal way of dealing the formal things and small tips on the aspects relating to this area and occasional invitation to his home provided me the charm of informality in CDS life.

Dr. Vijaya Mohanan Pillaifor taking the trouble of making me understand the statistical part, Harilal sir.....for his nice interference in thoughts – both intellectual and 'personal', Achin sir....for bringing the beauty into the art of teaching, Pushpangadan sir.....for understanding the feelings of the students and timely advisesmy indebtedness is lifelong.

Panda sir, Chandan sir, Mridul madam, Santhakumar sir, John Kurien sir, Mohanan Pillai sir, Irudaya Rajan sir, Indrani madam, Suresh sir all helped in giving valuable suggestions at some point of time ...

I am deeply indebted to Binoy sir who encouraged me to apply in CDS telling that I need only one seat.

Among the seniors, Rathi Kantaji has been a great support throughout my life at CDS. Tea outside with him is very difficult to put back of my memories. His careful examination of my draft and valuable suggestions helped me to strengthen my arguments.

K.S. Hari's and Shujan's help in collecting the data, company of Prabhakaran, Ikka, dada, Achan, Sunny, Paramettan, Ranjan, Azeez, Komathi, K.P.Rajesh, Rudra, Varindar, Sandeep.....all are invaluable. In my first year, Varman was always there for me, never keeping his personal feelings away from me. I cherish his friendship and it will be continuing.....

Subbu, Anil, George, Puliyara, Suresh, Saji, Sanal, all were very helpful and always there for me with great concern. I owe special thanks to George, who took the trouble in formatting and taking print out of the thesis.

There are situations where one will be left with no words to express the gratitude. Dhanya chechi, though she has been with me as my senior for the last four years, the warmth in relation I shared with her in the last two years stand out...with her intellectual and financial help along with the sisterly concern. Let me say no more words about that.....

I cherish the friendship of Lakshmi, Rakhe, Sajitha, Indu, Soya, Vaidegi, Timothy, Aparajita, Ashita, Simon and ever pleasant Surabhi.

My juniors, who gave a lot of memories in the CDS life – Syam with his nice interference in the room with Cricket scores and politics were great relief for me. Nadhanael- with an ever-loving company started three years back, Joseph- with his emotional brainwashing songs, Arvi with non-mimic warm of love, Ashish with his whole lot of questions, Sejuti with the precious friendship, Alice with her enquiries on the progress of the study and Remya with her passing smile..... all that I can really keep as my own.

And my family in CDS (my batch mates).....this unique relation was so enchanting with a very different set of 'badmashis'.....Frenchie with contracted ideas in Oasis, only one and only Zakaria, with his everready coffee company without any money input, Ashutosh's insecure Aajki ladke., Aathira's 'junks', Nandana's so-called Assamese song, Gowri's and Vijesh's ever lasting concerns were unique of our group. Our one and half hour lunch and dinner, one hour tea sessions are always a big head ache for canteen chechis. Our outings, cinema and functions are something incomparable.

I remember Biju, Saritha, Balu, Sajitha, Joe, and Ancy for their unequal love and friendship and they cannot be just relinquished from my heart until my bye from the world. I remember the company of Girish, Shine, Seema, Rekha and Binoj.

I am grateful to the staff at the library-especially Sobhachechi and Joseph Kurien, Anil Kumar at the data section, the administrative block- Sreekumari and Geethamadam, Syamalachechi, Philroy, the staff in the Computer Centre, Canteen chechis and security persons for their help.

I extend my deep gratitude to all those helped me in the collection of data including the medicinal plant collectors, traders and the officials of different companies, doctors ...etc.

I thank CDS authority for giving me chance to undergo this course.

The poetic silence and the nice epilipil trees, which always took part in my thoughts.....all

Above all, my parents, brothers, sister, Kathukkutty all encouraged me during the study. How can I thank these great idols in my mind, who, I know always therefore me in my ups and downs...

Harilal. M.S

ABSTRACT OF THE DISSERTATION
**AYURVEDIC MANUFACTURING INDUSTRY IN KERALA-
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The present study is an effort to understand the growth and linkages of one of the traditional, resource based industries in India. Ayurvedic manufacturing industry is the one, which prima facie shows a high growth in the recent decade. Though India has only 2-3% share in the global herbal market, the potential left with her due to herbal wealth and growing demand for the 'green' as well as the natural products, needs much concern. Kerala, a Southern state of India, stands as a major contributor in this sector, has a rich heritage in the ayurvedic health care system with lot of indigenous knowledge, which can exploit the huge resource. Hence the study attempts to identify the growth of organised sector of this industry in a regional growth perspective of Kerala. The study sets on the background of the sustainability of the celebrated 'Kerala model' through industrialisation.

Specifically, it starts with an objective of understanding the process and nature of commercialisation of ayurvedic health care system in Kerala, then goes on analysing the status of the ayurvedic industry in the state's manufacturing sector, in terms of some of the selected industrial variables and the growth of the same in the last decade (1993-2002). Profitability and efficiency of the industry and the performance in the export front also were analysed. As the third objective study tries to examine the backward and forward linkage to explore the reason for the urgent promotion of the industry. Study ends with case studies of the growth of two major firms in the sector.

Study made use of both secondary and primary level information. For Primary level information personal interviews were conducted with the medicinal plant collectors and traders and the manufacturers of different firms. Nine out of twelve leading firms (constitutes 73% in terms of sales value) were selected for the analysis. Data collection was a difficult task since the existing database of the industry was very scanty and further, discouragement from the part of firms.

Major findings of the study are, in Kerala, unlike the other states of India, ayurvedic health care system overcome the marginalising effort of the colonial government mainly because of the deeper roots in the cultural values, which mixed with the textual ayurveda, mixing with the existed indigenous knowledge, deeper and wider base on different castes and the state support at the peak time of colonial suppression. But in the recent period, a kind of commercialisation is visible, which completely undergoing the basic tradition of ayurveda, though there are some efforts of maintaining it from the part of some firms. In Kerala, though modernisation efforts were started with Arya Vaidya Sala in the first decade of 20th century, commercialisation efforts are visible in the recent years only.

In terms of the growth of major variables viz. deflated sales value, net fixed assets and net value addition, the industry is growing at a higher rate (more than 10 % during 1993-2002), while profitability ratios like profit to sales ratio, return on net worth are not showing an impressive trend mainly because of the relatively less growth rate in the profit. This low growth rate is the reflection of the loss incurred by some firms like Kerala Ayurvedic

Pharmaceutical Limited and Santhigiri Oushadha Sala in the recent years on the whole industry. The present share of ayurvedic manufacturing in the manufacturing sector of Kerala is relatively low in terms of the indicators like net value addition, fixed capital, output value (2.5%, 0.4%, 0.8% respectively). But the rate of growth of major variables of ayurvedic industry relative to the overall manufacturing is promising with a much higher growth rate in the last decade, which is more or less an expected result. In the R&D front, most of the firms are spending less than 1 % of their total expenditure, which is low as far as concerned to the nature of the industry. But a large number of R&D initiatives are coming up from the government, which need a proper back up from enterprises. The product pattern of the industry is undergoing a considerable change in favour of ayurvedic cosmetics, which can be noted from the change in the demand shift for the products of Pankaja Kasturi. In the case of the major expenditures most of the firms are showing a similar trend, spending more than 50 % of their expenditure on the medicinal plants. This raise a huge concern on its exploitation and at the same time need for preservation. Advertisement expenditure is very high in the case of cosmeceutical firms like Pankaja Kasturi, spending around 25% of the expenditure. The export from Kerala is relatively less ranging from 1% to 13 % in the case of firms. This low export is mainly because of the leading firms like AVS are not entered into the product exports even now. In terms of efficiency in utilising assets AVS, Kottakkal stands at an exceptionally higher rate (with an asset turnover ratio of 56 % in 2001). The industry is largely depends on the internal funds, while the external dependence is mainly on secured loans. The study could not obtain the industry level employment since data is not available, considered to be a major limitation of the study.

The analysis on the linkage shows that ayurvedic-manufacturing industry has backward linkage with the medicinal plant industry and forward linkage with the tourism industry. The analysis shows that 37 % of the income of this manufacturing industry is generated in the field of medicinal plant sector. An in-depth analysis is made with the help of the supply chain analysis, reveals that the agents at the lower edge of the chain earns very little share of the final price of the plant. In our analysis, in most of the cases, it is even less than 50 %. A lack of linkage with the tribal co-operatives and the firms need a serious concern since it affects the cost of the firms and the final price of the product. The large level of employment that this sector creates through collection, grinding, transportation of plants creates high employment linkages in the sector. In the forward linkage front also (ayurvedic tourism), the supply chain channelisations holds, while for some semi finished goods, these resorts depends manufacturing firms. In this sense, the health tourism sector has more linkage with the medicinal plant sector than the ayurvedic manufacturing units.

Lastly, in the case study, AVS Kottakkal is emerged as a 'leader' in terms of the growth rate of the variables and efficiency in utilising assets, while the external market possibilities are remains to be untouched by the firm. Oushadhi is an example for a successful public sector unit with higher profit earnings, and contribute a significant share to the state exchequer.

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Chapter 1

INTRODUCTION

1.1 The Background

In the theory of structural transformation, industrialisation has a leading role in mediating the growth stages of primary and secondary sectors in the path of economic growth and development. Some economists (eg. Kuznet, 1959 and Kaldor, 1967) even considered industrialization as an 'engine of growth' and a prerequisite for economic development. It is also generally accepted that industrialization is critical to the economic development of the regions within a national economy. The development experience of Kerala State in India, however, does not fully vouch for the above conventional development pattern inasmuch as the state has made remarkable achievements in terms of human development despite its low level of industrialisation and per capita income growth. The literature has even conceptualised the "Kerala model of development" to emphasise the feasibility of a society with low levels of income growth to attain high level of development through progressive state policies. But of late, some social scientists (eg. George, 1993, Tharamangalam, 2002, Govindan Parayil, 2000) have raised serious questions about the sustainability of such a model and has emphasized in the context of Kerala the importance of development strategies for accelerated growth of industry and other productive sectors of the economy.

The literature on Kerala economy has highlighted the industrial backwardness and hence the inability of the state to generate adequate employment opportunities to absorb the growing educated labour force for over a long period. According to Subrahmanian (2003), even today Kerala ranked 10th among the Indian states on the basis of the composite index of industrial development¹ though there has been a marginal improvement from the initial position of 70s and the 80s. It is also shown that the secular growth rate of net domestic product by manufacture of Kerala is lower than the all India level (1981-98 it was 4.9 % while in India it was 5.38 %). As compared to the neighboring states too, Kerala's performance is less impressive. Similarly, with respect to other key variables like fixed capital, net value added and employment in the manufacturing sector too, Kerala has remained stagnant over time and comparatively backward, and hence occupies a low position in the industrial map of India.

¹ K.K.Subrahmanian estimated this on the basis of seven indicators like, per capita value added in the state, per capita output of the state, percentage of domestic production from manufacturing etc.etc.

Many economists (eg. Isaac and Tharakan (1984); Mahadevan (1988); Ram Mohan (1988), Pillai (1986)) have pointed out various historical, political and economic reasons for the industrial backwardness of Kerala and have offered various suggestions to improve the industrial performance of the state. These include aggressive promotion of private investment, elimination of restrictive labor practices, filling up the infrastructure gap etc. Along with these measures, it is important to identify the potential industries, which could play a major role in accelerating the pace of industrialization of Kerala. Obviously, the inter-sectoral linkages merit serious consideration in deciding the priority industries. In this context, along with the promotion of new generation industries (e.g. electronics, ICT and genetics) and repositioning the traditional industries (coir and handloom), it is strategically important to promote industrial activities like ayurvedic manufacturing and tourism based on traditional knowledge and natural resources in which Kerala has comparative advantage.

Interestingly, some of the above types of industries have been studied, though not in an extensive way, to identify their potential. However, there has not been any serious attempt to trace the growth and to assess the potential of ayurvedic industry in Kerala and its contribution to the state's manufacturing sector. The present study is a small beginning in the direction of filling up the gap in the literature by attempting a study of the organised sector of the ayurvedic manufacturing industry of Kerala. More specifically, the study attempts to assess the growth and linkages of the ayurvedic manufacturing in the context of the region's industrial growth.

1.2 The Rationale

During the past decade there has been an ever-increasing demand especially from developed countries for more and more drugs from plant sources.² This revival of interest in plant-derived drugs is mainly due to the growing belief that green medicine is safe and more dependable than the synthetic drug, many of which have adverse side effects.

World demand for herbal products including natural products of medicinal value, pharmaceuticals, food supplements and cosmetics has been growing steadily at the rate of 10% to 15% per annum in the last decade. This may be due to the '*back to nature*' attitude of consumerism. According to World Health Organisation, about 80% of the world population

² Cited in WHO Strategy on traditional medicine.

depends on one or another form of indigenous medicine. Currently, the global market for herbal products, which includes medicines, food supplements, herbal beauty and toiletry products is estimated at around US\$ 62 billion. Out of this, the market for herbal medicine alone is estimated at US\$5 billion and is expected to reach US\$16 billion by 2005 (EXIM Bank, 2002). In the total market for the herbal products, India's share is less than 2% i.e., about Rs.1000-1500 crores. Out of this, Kerala provides more than 200 crores. It follows that Kerala has a huge potential for developing this industry if properly nurtured. This provides the rationale for selecting the subject for study in the context of Kerala's industrial development.

It may be reiterated that ayurveda holds a special place in the context of Kerala. Some features that make Kerala an ideal place for the growth of the ayurvedic system are the following.

1. 70% of the herbal plants used in the formulation of ayurvedic remedies are native to Kerala. More importantly, Kerala has been identified as a bio-diversity hotspot imbued with a rich source of medicinal plants. It is the only state that practices the '*Ashtanga Pradhan*' (all eight divisions of ayurveda) in its most comprehensive form.
2. Kerala has the largest pool of qualified and committed ayurveda doctors and experienced therapists.
3. The state has the distinction of making independent treatment contributions in the form of the very popular *Navarakkizhi* and *Thakradhara*. It has exceptional efficiency in the *Panchakarma* treatment.
4. Most manufacturers and practitioners of ayurveda in the state follow the traditional form of the system strictly adhering to the dietary regimens prescribed in the classical texts.

Unfortunately Kerala has not been able to capitalise fully on its herbal wealth. So considering the necessity for boosting industrial growth in Kerala, and the comparative advantage in the manufacture and trade in ayurvedic products due to the ready availability of natural resources and skill – locational advantage – an assessment of the problem and prospects of this industry in Kerala seems important.

1.3 Review of Literature on Ayurvedic Industry

At the outset, the literature on the subject is rather scanty. Madhulika Banerjee (2001) has given a brief description about the public policy on ayurveda and pointed out the commercialising behaviour of ayurvedic industry in the new era, which has a characteristic of

'pharmaceutical episteme'. This, anthropological as well as political economy study concentrates on civil society's role in the development of the ancient health care system. There is some literature on the demand for medicinal plants by the ayurvedic industry and the bio diversity aspects (Sankaranarayan, 1995 and Suneetha, 1998, Sasidharan and Muraleedharan, 2000). Meerabai (2001) explains the advantages and problems of cooperative and non-cooperative channelisation of medicinal plants to the ayurvedic firms. Joby (2000) has analysed the consumption pattern of the major seven ayurvedic drug-manufacturing units in Kerala accounting for 68% of the market share. Chandrakanth and Suneetha (1998) have made evaluation of the demand for medicinal plants of the Western Ghats. This study also did a comparative cost analysis of ayurvedic medicine and allopathic medicine for some particular diseases and shows that even with the transaction costs being included ayurvedic medicine is less costly. The curative aspects of ayurveda have also been taken up for various enquiries. EXIM bank study (2001) gives a broad picture of the export potential of herbal products to different countries, developed as well as developing. This study gives a broad idea about the national policies existing in different countries and the major export destinations of ayurvedic products from India.

Thus there have been attempts from anthropologists, botanists and economists to understand the various dimensions of medicinal plant cultivation, conservation and economic valuation, which have a direct connection with the industry. But what seems to be lacking is an attempt towards the assessment of the growth and performance. The findings of such a study would have policy implications as they help revealing many complex problems about which the government has so far not shown a concern. Given this background, an enquiry in to the growth, problems and prospects of the ayurvedic industry and its major manufacturing units in Kerala seem pertinent.

1. 4 Scope and Objectives

Generally, the ayurvedic drug-manufacturing industry in Kerala comprises registered and unregistered pharmacies, local *vaidyas* and households. According to the latest data available from the Drug Controller's Office there are 962 registered ayurvedic pharmacies in the state. This is a highly concentrated market. It has been claimed that two percent of the total manufacturing units in the industry account for 81% of the turnover of the organised sector (Sarkar, 1996). The market has expanded with the emergence of nutraceuticals and

cosmeceuticals. In this study the focus is on the organised ayurvedic-manufacturing units. The unorganised sector is excluded from the purview of the study for the simple reason that the data about them are not available from the secondary sources and the collection of the data with the help of a primary survey of the large number of scattered units is beyond the means of the present study.

The major objectives of the study are to:

- 1. trace the transition of ayurvedic manufacturing industry from household system of production to a more modernized and commercialised form;*
- 2. analyse the growth, performance and contribution of organised ayurvedic manufacturing industry in the manufacturing sector;*
- 3. examine the backward and forward linkages of the industry with special emphasis on the supply chain in the raw material channelisation; and*
- 4. understand the complexity of the growth process of the industry through some case studies.*

1.5 Data Source and Methodology

a) Data source: The study is largely based on primary data collected from various institutions and through personal interviews. Secondary data from various sources has also been used. Macro information about the ayurvedic industry like the number of ayurvedic manufacturing units and their district-wise distribution are collected from the Drug Controller's Office, Thiruvananthapuram. The state-wise distribution of the number of pharmacies has been obtained from the Indian System of Medicine web site. Firm-wise addresses are collected from Confederation of Indian Industries (CII) office, Kochi. Those ayurvedic manufacturing units, which have taken loans from Kerala State Industrial Development Corporation (KSIDC) are required to submit their annual reports. Hence their balance sheets are available at the KSIDC library. The Department of Company Affairs (Government of India) keeps all the records of the companies registered in India. But in Kerala there are manufacturing units registered as trusts, whose information are not available from the above source. An effort was therefore made to collect primary data from the manufacturing units registered as the trusts.

Data on infrastructure of the ayurvedic health care system of the state (i.e., number of ayurvedic hospitals and beds and the trend in the number of ayurvedic practitioners in the state

etc) are available from the various economic reviews published by the state planning board. The Indian System of Medicine and Homeopathy (ISM&H) also provides information on the same. For a comparison with the manufacturing sector of Kerala, industrial data has taken from the Annual Survey of Indian Industries (ASI).

For the information about the ayurvedic beach resorts or rejuvenation centres, some firms were visited by the researcher and information collected particularly from Somatheeram beach resorts and Manaltheeram (situated in Kovalam) beach resorts. Personal interviews with the ayurvedic experts and doctors have given a clearer idea about the industry. The ayurveda Research Council and some of the tribal co-operatives have also become a part of the information source. A primary survey was done among some of the manufacturing units. Personal interviews with the medicinal plant collectors also added to the information source.

b) The sample: In Kerala there are 12 firms in the organised sector of the ayurvedic industry. According to the information provided by the ayurvedic Manufacturing Association, these firms account for more than 84% of the industry turnover. Of these, one is organised as a charitable trust, i.e. Arya Vaidya Sala Kottakkal, two are public limited companies, i.e. Kerala ayurvedic Pharmaceutical Limited (KAPL) and Pharmaceutical Corporation of Kerala (Oushadhi), and the rest are private limited companies. Out of these 12 firms, the analysis covers only 9 firms, as the information on the other three was not forthcoming despite repeated efforts. Thus, the study is based on the data of 9 sample firms. Its importance however cannot be devalued as these firms account for 73 % of the total turnover of ayurvedic manufacturing industry in Kerala.

The nine firms covered in the study are Kottakkal Arya Vaidya Sala, Vaidya Ratnam Oushadha Sala, Pankaja Kasturi Herbal India Limited, KAPL, Nagarjuna Herbal Concentrates, Oushadhi, SD pharmacy, Sitaram Pharmacy and Santhigiri. Pankaja Kasturi mainly concentrates on ayurvedic nutraceuticals and cosmeceuticals and the others on pharmaceuticals. Primary data needed for the study are obtained by interviewing the sample-manufacturing units through a well-designed questionnaire and the information about the supply chain is obtained from the medicinal plant collectors (six people) from Kottur, Nagarcoil and traders mainly concentrated in the southern manufacturing units and other middlemen involved in the supply chain. Over and above the aggregate analysis based on the nine sample firms, there are two detailed case studies (Kottakkal Arya Vaidya Sala and

Oushadhi) to understand the complexities of the growth process of the ayurvedic industry in Kerala.

c) Methodology: To understand the growth process, the simple method of compound growth rate has been used. For the financial analysis, profitability ratios like, gross profit margin, net profit margin, activity ratios like asset turn over ratio, net fixed capital turnover and other profitability ratios, return on capital employed, return on net worth are used. For finding the major determinants of sales turn over, a simple production function with dummy variables and the ordinary least square regression method is used. To trace the backward linkage of the industry simple ratio method is used. To understand the major players involved in the channelisation of raw material of the industry and to evaluate the share of each agent involved at each tier or at different nodes in the market price, supply chain analysis has been used. Detailed descriptions of the methodology used are given at the beginning of each chapter.

1.6 Limitations

Admittedly the study has limitations primarily arising from the nature of data collected from the sample of nine firms and hence the recourse to the use of proxy variables and extrapolation to capture the aggregate picture of the ayurvedic industry in Kerala. The insights on the qualitative dimensions of the growth process, operational problems and prospects gained from the intensive interviews with the leading manufacturers and detailed case studies of two major manufacturing units (one in the public sector and other in the private sector) hopefully stand to compensate for the limitations of the aggregate analysis.

1.7 Chapter Scheme

The study is organised in six chapters. The present chapter one has introduced the subject matter and explained the analytical methodology. The second chapter gives a historical analysis of the process by which ayurveda has grown from a household health care system to a more commercialized and modernized system. The third attempts to understand the current status of the ayurvedic industry in the total manufacturing sector of Kerala. It also focuses on the trend in the growth of major variables in the industry and identifies the major determinants of production. The fourth chapter gives a broad analysis of the backward and forward linkages

of the industry. In this chapter, the industry's links with the medicinal plant industry and the tourism are established. The fifth chapter deals with two case studies, Kottakkal Arya Vaidya Sala and Pharmaceutical Corporation of Kerala (Oushadhi). In both the cases, the growth experience has been analysed. The final chapter summarises the major findings of the study and put forward some issues for further research.

Chapter 2

PRESENT HISTORY OF AYURVEDIC INDUSTRY IN KERALA

Introduction

Indigenous knowledge¹ is the consequence of practical engagement in every day life and is constantly reinforced by experience of trial and error. This experience is characteristically the product of many generations of intelligent reasoning, and since its failure has immediate consequences for the lives, its success is very often a good measure of Darwinian fitness. It is; as Hunn (1993:13)² neatly puts it, 'tested in the rigorous laboratory of survival'. Thus, these traditions have more coherence with society than economy in the earlier period.

Ayurveda (see end note) emerged in the Indian culture as an indigenous medical system of our own like the other great civilisations have (e.g. Chinese, Tibetan, Babylonian, Arabic). But in the present period, a shift has taken place from what generally has been considered as ayurveda. The present form of this herbal medical system holds two possibilities in the global market: 1) it either becomes a multi billion industry by accepting the now ongoing global consumer green demand, which will be a shift from the very nature of its basics, or 2) it continues in the local market, in which alternative systems have not fully lost their legitimacy. In the first form, global acknowledgement is possible by 'modifying' or 'commodifying' ancient knowledge. The traditional heritage of India, by selecting the first option has moved from a position of more of social concern to one of economic concern in the new era of globalisation. A quick look back on history will enable us to understand the relations and the processes undergone both in India and Kerala in this transition during pre and post independence. This chapter is an attempt in this direction.

The extent to which this age-old indigenous medical system forms an important category within the framework of production and consumption and the extent to which the development of professional science and technology have undermined and obscured it along

¹ In this context it is important to stress that by Indigenous Knowledge we have in mind local *environmental* knowledge (knowledge of plants, animals, soils and other natural components) with *practical* applications, rather than the more encompassing sense of IK associated with environmental philosophies or world-views, or even ITK (indigenous technical knowledge) in its wider sense.

² Hunn, E. (1993) "What is traditional ecological knowledge?" *Traditional ecological knowledge: wisdom for sustainable development*. N. Williams and G. Baines (eds.) Canberra: Centre for Resource and Environmental Studies, ANU, pp. 13-15.

with the way in which this knowledge systems are constantly changing, being produced as well as reproduced, discovered as well as lost, will be a part of the analysis of this chapter. The above mentioned analysis is more focused on Kerala.

Section 1 Development of Ayurveda in India

2.1 Understanding the Production Relations

Pre-modern ayurveda was marked by various multiplicities- multiplicity of texts, diversity of practice, social multiplicity, differentiated political patronage etc. It is to be noted that whatever change happened in the form and approach of this system has been initiated by the incentive from the market, external or internal along with direct or indirect political pressures. This is evident from the colonial period. In India, the biological trade was the beginning of a larger level of inquiry into the possibilities of the herbal medicinal market. Even at that time the expeditions conducted were mainly considered as a part of plans for later exploitation. The main character of the traditional industries is that the agents and the materials at the initial nodes of the commodity chain are in the developing countries, without which nothing is possible, while most of the western empires hold the means of later nodes. Hence an understanding and hiring of these agents of first nodes is very important for the exploitation of market. This can be the main agenda of the earlier expeditions in the pre-independence periods.

2.2. Biological Trade and Knowledge Spread

The arrival of Vasco-da-Gama on the Malabar Coast in 1498 is considered to be a landmark in the biological trade initiatives in the country. This accelerated the exchange of biological information and biological material particularly among Asia, Europe and the Caribbean. Such enlarged horizons were perhaps the most significant stimuli and accompaniment to the explosion of the mental energy which characterised the renaissance, which had an intellectual counter part; a scholarly exploration of time and texts as a consequence of the re-evaluation of the Greeko- Roman and Arabic thought that laid a special emphasis on the later studies on nature as well as indigenous medicine (Grove, 1998).

Further the establishment of Dutch power in Cochin on the decline of Portuguese power in Malabar was marked in Botanical terms by the preparation of the *Hortus Indicus Malabaricus*, a personal project of Hendrik Van Reede tot Drakenstein with the help of Itti

Achutan³, a Malabar Vaidyar of that age. The close association between Reed and the Dutch botanical establishment ensured that the diffusion of Botanical knowledge between Southwest India and the Leiden botanical garden became central to the whole relationship between European and Asian constructions of that nature. Otherwise, a remarkable chain came into existence linking Indian medical ethno-botany, compilations of Middle Eastern and South Asian knowledge, Portuguese and Dutch political interests, and modern scientific botany and pharmacology. The existence of botanical gardens, global network of information and materia medica transfer, and the increasing professionalisation of natural history seems actually to have facilitated the diffusion of an Ayurvedic epistemological hegemony alongside the erosion of the older European and Arabic systems. Almost all-subsequent texts on South Asian botany retain the essential indigenous structure of the *coloquias*⁴ and the *Hortus Malabaricus*.

There are many areas of medicine where the Indians were well advanced. It would be noted that the localisation and the societal relations this system had were very high at that time. It is quite clear that ayurveda was very efficient in tackling the small pox. It would not be wrong to speculate then, that the high incidence of small pox epidemics in all parts of India during the 19th and early 20th centuries could be attributed to the Government's ban on indigenous inoculation in 1804 (Voluntary Health Association of India, 1992). The Indians possessed many surgical talents including plastic surgery. Dr. H. Scott, in a communication to Sir. Joseph Banks, President of the Royal Society, London, wrote,

'the effects of surgical operation are more obvious, more easily much to praise. They practice with great success the operation of depressing the crystalline lens, when it becomes opaque (sic) and from time immemorial they have cut for the stone at the same place, which they now do in Europe. These are curious facts and I believe unknown to us....'

(See Dharmapal, 'History of Science and Technology in 18th Century in India')

³ Itti achuthan was a renowned physician of that time, born at Carrapurram; of the Ezhava caste, a low caste and of the name Kolladan and helped in the preparation of the ethno- botany of Malabar separately in Malayalam and Portuguese language.

⁴ Published in English as Colloquies on the samples and drugs of India by Garcia da Orta, trans: Sir Clements Markham (London: Henry Southern, 1913).

Similar ways, the efficiency of the traditional ayurvedic system was well acknowledged. This has a double implication for the western interests. A desire to understand and acquire the biological wealth and to spread the own medicine.

2.3 Sidelining the System by Colonial as well as Domestic Authority

If, in the context of European colonial scientific field work in Asia, traditional knowledge was evident but mute, with the inexorable rise of modernity, it faced a kind of ignorance (Hunn; 1993). And, given the continuing domination of the West, non-Western societies are left with no option but to accept modern science and technology as the universal well-established system and to derive legitimacy for their own traditional system by demonstrating how well the latter conforms to the methodology, theory and practice of the former. The western mindset was such that tradition was believed to be overcome rather than encouraged, and several generations of 'top-down' development experts, and organizations engaged in resource extraction and management in the underdeveloped world, have either deliberately avoided ayurveda on the grounds that their own models were superior, or have simply never realised that it might be a resource worth tapping (Ellen and Harris, 1996)⁵

When the Mughals set up their empire and brought it to its high point in the 15th and 16th centuries, for the traditional medical science of ayurveda this meant a period of stagnation and repression and the Muslims introduced their own system of healing Unani (Bala, 1991). Looking now at the changing relationships between the Mediterranean world and the Indian cultures, it is interesting to see how these relationships turned full circle. Unani medical science was an importation not of alien knowledge but of cognate knowledge. In the India of today, ayurveda, Unani, and Western medicine are practiced side by side, and in the India of the day before yesterday ruled by the Mughals there was no fruitful exchange of ideas and enrichment of the two old healing systems.

⁵ In both the *Coloquias* and *Hortus* contemporary Hippocratic emphases on accuracy and efficiency tended to privilege strongly local medical and biological knowledge, and to lead to effective discrimination against older Arabic, Brahmanical and European classical texts and systems of cognition in natural history. Because Van Rheede in particular, was unable to rely on any pro-existing European template for South Asian plant knowledge, he was largely responsible for elevating Ezhava knowledge above that of the dominant Ayurvedic schemes, with the aim of acquiring the highest quality indigenous expertise. According to Richard Grove, the Ezhava physicians written in the *Kolezhuthu* script of lower castes and were prevented from using the more sanskritised *Aryazhuthu* script. As Brahmins were forced to rely on their lower caste servants for detailed local knowledge of plants, it made sense for Van Rheede to by-pass 'academic' Brahmin knowledge.

In the first quarter of the 19th century, the imperial government (British) occupied itself with two major pursuits: a) an inquiry into the detailed survey of the biotic resources of the various colonies of the empire and b) to establish means by which these resources could become accessible to the European capitalists for further capital accumulation (Ravi Raman, 1997).

It is evident from a perusal of historical records that European attitude to indigenous science can be divided into two phases. The earlier phase is evident in records, which are relatively more objective, recording the state of indigenous science as it was. These accounts are part of the European quest for useful knowledge from non-European world during 17th and early 18th centuries, a period corresponding to the time when the European's interest was in trade alone. The second phase began towards the end of the 18th century, during which India was depicted as 'backward and barbaric'. The accounts from this period, corresponding to the firm establishment of colonial domination, highlight the deliberate attempt to suppress the indigenous medical systems especially ayurveda. In the beginning of the 1800's, they closed the schools and destroyed the books until ayurveda vanished into the corners of society. After European penetration, they tried to impose Western Knowledge. In 1833 the East India Company, having seen fit to give India the benefit of Western Science closed and banned all ayurvedic schools and opened in Calcutta a school for occidental science. By the late 19th century, the colonial state was quite hostile to ayurveda and sought to remove it from state ambit – cantonments, government hospitals and medical colleges. The cultural arrogance on the part of the colonists was apparently encouraged by the revolutionary changes that had taken place in Western medicine in the 18th century. The denigration of traditional wisdom reached its zenith in 1835 when Lord Macaulay settled the controversy over whether government should support indigenous or Western knowledge by ordering that European knowledge should be exclusively encouraged in all areas governed by East India Company.

To quote his words:

'It will hardly be disputed, I suppose, that the department of literature in which the eastern writers stand highest is poetry. And I certainly never met any orientalist who ventured to maintain that the Arabic and Sanskrit poetry could be compared to that of the great European nations. But when we pass from the works of imagination to works in which facts are recorded and general principles investigated the superiority of the Europeans become absolutely immeasurable. It is, I believe, no exaggeration to say that all the historical information which has been collected from all the books written in the Sanskrit language is less valuable than what may be found in the most paltry abridgement at preparatory schools in England'.

In colonial days, ayurveda sank in India to the status of poor man's medicine. Only those who could not afford the western treatments slipped quietly in to the hut of an ayurveda doctor, who might have been a complete charlatan. The knowledge survived but its prestige was lost. Thus in the process of empire building, India was added as a laboratory to the edifice of modern science (Kochhar 1992, p. 694). Whereas Allopathy (mainly) and Homeopathy (partly), the two alien systems kept striking deeper roots in the Indian soil, the indigenous medical systems, like ayurveda correspondingly kept losing ground steadily and inexorably. Ayurveda and Unani had no answer to the new diagnostics and novel vaccines. Finding themselves badly mauled and let down, the indigenous systems went in to a sulky withdrawal. The myth of there being one universal science—the modern western science – dominates the thinking of a large section of the scientific society. In fact, this view has served to block a healthy dialogue in India among those trained in the indigenous sciences.

With respect to the preservation of resources needed for indigenous medicine it is important to note that while the British were interested in commercial exploitation, moulding rules which suit themselves, the respective state governments were interested in the exploitation of certain royal species alone, which almost become the private property of the state. In a way, it has restricted the actual rights of the communities who are considered to possess a rich biodiversity (Ravi Raman, 1997). This unethical exploitation led to the extinction of many medicinal plants such as *Rauwolfia serpentina*, popularly known as *Sarpagandhi*, an under shrub that grows wild on the Himalayas and in the Western Ghats. In a way, this hit ayurveda as a double blow from the colonial government as well as the post colonial state authorities.

But the response from victims was also passive. It is amazing to note that despite the continual decline, the Vaid and Hakims⁶ made no attempt to change their familial mode of medical education throughout the nineteenth century. Their lack of enthusiasm for the institutional promotion of their knowledge appears more glaring when contrasted with the fledging homeopathy, which despite numerous odds and allopathic rivals could boast of a handful of medical schools and colleges by 1880s.

Though no social or institutional efforts to stem the crisis of confidence that engulfed and hampered the indigenous medical sciences were forthcoming, some notable personal efforts were made to synthesize the better of the two conflicting systems (Kumar, 1998). The new

⁶ Persons practicing Unani medicine.

quest underscored that European theory and Indian experience, if amalgamated, would yield fruitful results beneficial and gratifying to both the contenders equally. The most prominent protagonist of the syncretism was Raja Serfoji, the last Maratha ruler of Tanjore. He opened a research institution called 'Dhanwanthari Mahal where ayurveda, Siddha, Unani, and Western medicine intellectuals came together. As a result of the interaction and investigation, the best among the tried and effective remedies were collected in a series of works named '*Sarabendra Vaidya Muraigal*' (in the Tamil language) (ibid.).

2.4 Efforts for Revitalisation and Seeds of Commercialisation

As western education progressed in India, a section of the intelligentsia sought the revival and simplification of indigenous knowledge. Two very popular Vaidas of Calcutta, Ganga prasad Sen and Neelamber Sen started the process of Ayurvedic rejuvenation by publishing the sacred texts in Bengali (Gupta, 1977). Observing the increasing importance of European drugs, Gangadhar Ray, a Kaviraja proposed that Ayurvedic medicines also are prepared for sale in other countries and he seems to have been the first person, who has exported ayurvedic medicines to Europe and America. In the pattern of European physicians, he introduced fixed fee for consultation, which equated or surpassed the fee of the European physicians and he sold the Ayurvedic medicines at a fixed price and advertised for them. By these means he elevated ayurvedic medicines to the same rank as the allopathic drugs and drew public attention to that. Gupta (1977) informs us that the drug business thrived so well that of the Kavirajas; Chandrakishore Sen (another Kaviraja) was soon counted among the richest then in the country. In 1890, he shifted his dispensary to Calcutta for large-scale production and set up a manufacturing unit in 1884 called NN Sen and Company Private Limited; Calcutta. By 1900, Ayurvedic drugs had created a good demand and a firm share in the drug market of India. Its success lured others to follow and soon Sakthi Ausadhalaya of Dacca, Sadhana Ausadhalaya and Kalpatharu Ayurvedic works were competing with one another in the market by the first decade of the 20th Century (ibid.).

The revivalist movement developed two ideological streams. *The first* held that indigenous medicine should be taught and practiced in its classical or *suddh* form, while *the second*, who were directly influenced by western ideas, held that allopathic elements needed to be integrated into the indigenous theory, principles and practice in order to make it more complete. Liberal social circles saw the first position as orthodox. These circles (second) as also the experimental methods, technology and surgical skills impressed indigenous

practitioners trained in the new integrated institutions associated with Western medical Science, above all, with its superior value in the job market. They naturally found the second position attractive.

In the last decades of the 19th century, the organisation of indigenous medicine itself underwent change, once again taking its cue from the West. This was the birth of a new social culture, aptly described by the term '*professionalisation*', but largely depend on the western style. This character change resulted in some changes in the functioning of the indigenous medical system also. They are:

- Formal colleges of Indian medicine were created replacing the traditional family based *guru-shishya* relationship.
- Dispensaries and hospitals similar in design to allopathic OPDs were established in order to provide curative services.
- Pharmacies were set up for the large-scale production and marketing of medicines.
- Professional associations, a board for the registration of medical practitioners, and medical journals were also initiated.

Thus, the traditional physician too gradually moved into a clinic to prescribe commercially manufactured drugs, confining traditional medicines to disease-oriented clinics and hospital-centred care. All aspects of this new 'professional' culture imbibed from Western influence were thus accepted uncritically and without debate (Voluntary Health Association of India, 1992).

By 1900, though professionalisation of Ayurvedic practice and commercialisation of Ayurvedic drugs in the line of Western model were zealously achieved, it drew a blank on the educational front (Kumar, 1998). On the nationalist agenda too, the indigenous medical men had to face discrimination. Being basically a party of urban elite in the beginning, the International Congress first raised its voice in favour of the Indian Practitioner's of Western medicine. Revival, preservation and reinvigoration of the traditional medical systems became the cultural symbols of the nationalist struggles only after the Swadeshi Movement picked up the people's fancy and got turned in to the most potent anti-colonial weapon. At the height of the Home Rule Movement, Jamini Ray opened the first Ayurveda College at Calcutta in 1916 out of the funds collected from its ardent admirers.

The British on the other hand, were decidedly uniform in their outright rejection of the indigenous systems as the viable alternative to Western medicine. They never considered them to be a part of scientific disciplines, even though evidence to the contrary abounded in existing indigenous medical literatures. Claims of the therapeutic efficiency and contribution to the modern medicine were always rejected. In 1926, with the acceptance of the Swadeshi movement, it gained some prospects of revival aided by the sympathetic consideration of a liberalised provincial administrative structure. This revivalist movement was taking place alongside the wider movement for independence from colonial rule. In 1920 itself, the INC passed its resolution in Nagpur, whereby indigenous medicine received political support for the first time in 200 years. Following this, representative provincial governments set up special committees to define the necessary steps to be taken for the revitalisation of ayurveda.

2.5 Domestic Recognition of its Importance through Committee Reports

The Bengal committee report (1928) ended with a note on the need for the revitalization of the system, but insisted that the following questions be kept in mind;

- Whether any particular advantage is to be derived by the public from the renewal of the same and
- Whether there are sufficient grounds to justify state aid and encouragement and the expenditure of public funds.

Both these questions are well answered by the importance that the people of West Bengal themselves gave to indigenous medicine at a later period.

But in South India, a new era started in the late 1830s. Ayurveda education in its present form started in Banarus Hindu University and in Haridwar Asram. In Kerala and other southern states and states like Gujarat and Maharashtra ayurveda education gained popularity in late 19th century. Many kings like Krishnadevarayar of Vijayanagara kingdom encouraged and contributed to the indigenous medical knowledge. Later with the entry of Sanskrit most of the regional texts were translated into Sanskrit. This widened the knowledge coverage.

The first committee of British India (Bhore committee, 1943) was formed to assess the health status of India took a hostile attitude towards the indigenous medicine while it revealed its over consideration for biomedicine. It invited wide criticism all over India. As a consequence of this, the Health Ministers' Conference held in October 1946 at Delhi resolved to make provisions "for research in and the application of scientific method for the investigation of the

indigenous systems... for starting colleges and schools for training for diploma and degree courses in indigenous systems of medicine and for postgraduate courses in Indian Medicine for graduates in Western Medicine" (quoted in Government of India 1948:6-7).

The Chopra Committee (On Indigenous Systems of Medicine) was set up following this and it submitted its report in 1948, which showed a departure from colonial policy, while continuing much of the spirit of the approach of the state and, remained a point of reference for many subsequent investigations. In its report, it argued for: (1) integration in teaching/education of traditional medical systems; (2) standardisation and rationalisation of research and production parameters, primarily to serve modern needs of commercial production and (3) hastening specialisation in the traditional medical systems, with an emphasis on learning the techniques involved in that, from the biomedical system. Each of these clearly illustrate the overall position of the committee and also of the parameters that were set and followed for ayurveda and all Indian systems of medicine for a long time to come.

But this committee appointed by the government as also the others that came later have emphasised the need for mass scale production. Alternative production structures were never articulated as an issue even when the government subsequently established its own pharmacies for providing medicines to the health centres. By assuming however, that they would have to be necessarily mass-produced, this report reflected the ideology of production and distribution dominant at the time. Thus, the fact that ancient texts provide methods for the making of medicines in small amounts is cited as a problem. It could well have been to its strength, if the production decision to make medicines at a decentralised level by well-trained Vaidyas, in numbers sufficient for small, local communities all over the country were taken. However, it has affected the very significant, fundamental issue of the production of ayurvedic medicines in an overall sense, because even when the government set up its own pharmacies to supply to the dispensaries, it worked with the typical sense of constraints that small production units have. That context of production was never utilised to explore the larger possibilities of linking technological/production decisions with health decisions, which any far-sighted health economics policy could well have done (Banerjee, 1995).

2.6 Ayurveda in a Globalised World

As the theoretical basis of ayurveda is known to be metaphysical, scientists are justified in pointing out that it has all along been severely restricted by tradition and isolation from other

sciences. This was no restriction in terms of efficacy of the system as has been amply borne out by centuries of successful practice of ayurveda by at least some schools of ayurveda in different parts of India. It was a matter of doubt as to how far ayurveda was reliable since it is more based on traditional success stories than on scientific proof. These doubts gain more validity since trial and error is not possible in the case of treatment. But the current resurgence of ayurveda is more emphatic, because most of the ayurvedic medicines are being scientifically tested and proved. The blind superstitious beliefs of the past have promoted extensive testing of several ancient medicines. Out of the known 1500 medicines, well over a hundred medicines have qualified for entry in India/British pharmaceutical codex and the US dispensary. Thus in a way, the ayurvedic products are satisfying the western conditions also.

The Unique Selling Proposition (USP) of traditional medicines was that they were inexpensive as they were made of locally available natural materials. Besides they were familiar, as people had relied on them for long. Ayurveda could thus claim greater legitimacy despite the advances reported by biomedicine, in turn leading to mass production of ayurvedic and other medicines. The outcome was companies like Dabur and Arya Vaidya Sala Kottakkal. The results of modern mass production were manifold. In the modern context what is significant is that it helped structure the identity of both the medicines and the systems of which they were a part.

In the early phase of modernisation the distinct contribution of the market was in terms of two features of modern mass production – standardisation and commercialisation of medicines. Standardisation involved making medicines of uniform quality. While some standards were legal requirements laid down by governments, in the main they were based on the companies' perceptions of what would increase their credibility in the market. Commercialisation involved three processes: packaging, positioning and advertising, just like for any other commodity in the modern market (for a detailed discussion, see Banerjee 1995: 158-180). In visible terms this meant that indigenous medicines were available in chemist shops that sold *angrezi* medicines, even in cities far away from the point of production. Also, that they were advertised in the media through wall writing, newspapers, pamphlets, even banners on elephants! (Banerjee, 2001)

The most important benefit of mass production was, however, that of economies of scale. The expectation was that over time indigenous medicines would cost less, making them accessible to ordinary people. But the last 100 years of mass production has seen more powerful and

subtler developments. The institutional consolidation of the indigenous systems has, however, been fraught with controversy, resulting in a decline of the value of the systems *qua* systems. Though a larger numbers of people today use these medicines, fewer people now look for treatment in the Indian systems of medicine. Though apparently improbable, this is a result of both transformations of the medicines in themselves and their subsequent appropriation by allopaths. Companies began to produce medicines based on traditional formulations, but in the contemporary form of tablets, capsules and syrups. In a way, now the westernisation has rendered these medicines inaccessible to its original owners!

What is less realised is that the postcolonial Indian State too systematically marginalised the indigenous medicine (in the sense, as a health care system) for the better part of the 50 years. All that is new today is rediscovery of the possibilities of going herbal but on different set of parameters. These parameters are being defined by the momentum and direction of the dominant economies of the world, which countries with old herbal traditions have now to follow. So if government and industry have suddenly woken up to the glories of herbalism it is not out of loyalty to indigenous culture or tradition, but a level headed recognition of its increased marketability particularly in the international economy as pointed out by Madhulika Banerjee (2001). In the globalised era though the commercialisation was internally driven, the incentive structure has been created by the external economies only.

The poor hardly stand to gain from these developments. A primary achievement of the growth of the market is an extension of choice. But, by definition, this choice can be exercised only by those who are part of the market in the first place. The idea behind encouraging manufacturing companies to get into traditional medicines was to make them available at a low price to those who could not afford expensive modern medicines. But the point of contribution of the industry to the national economy and manufacturing sector will be best served here, whatever ways these companies adopt to commercialise their products since it fetches more and more consumers. But it is a matter of relief that some institutions like Kottakkal Arya Vaidya Sala still preserve the traditional original line of production and treatment (*suddh* form).

Section -2 Development of Ayurveda in Kerala

Though in India the colonial period led to modernisation and the global market led to commercialisation, in Kerala, these two processes are very difficult to delineate, because

commodification of ayurveda is a recent phenomenon here. Though in the early 20th century (1901), Kottakkal started large-scale production it never represented the true sense of the term, because, advertisement and the positioning of a target group were not intended in their production. Even in the modern days, Kottakkal is not in the production for the global market. In short, though modernisation has occurred, in the Kerala ayurvedic sector, commercialisation was unknown for a long time (Varier, 1980).

2.7 Kerala Tradition: Mixture of Indigenous System with Text Based Ayurveda

Kerala has a unique tradition in ayurvedic health care. Though it is very difficult to trace the history of ancient healing, available evidence shows that the influence of ayurveda started in Kerala during or after the spread of Sanskrit education. But the typical Kerala ayurvedic tradition shows some what distinct characteristics compared to what existed in India generally. Mr. N.V Krishnankutty Varier divides Kerala Ayurvedic history in to three periods in his book '*ayurveda charithram*' (1980). That is *Pre Sanskrit Period, Sanskrit period and Post Sanskrit period.*

It is difficult to say in which century the Sanskrit language had influenced Kerala. But it is supposed to be in the 5th, 6th and 7th centuries. There were parallel streams in the health care systems in Kerala and obviously, not all of them insisted on a thorough knowledge of Sanskrit. Clearly many special features of the use of certain drugs and herbs native to the region and of methods of treatment used only in Kerala must have been known much before the arrival of Sanskrit. The indigenous system which existed, was reasonably well developed and influenced the 'texts based ayurveda' so that Kerala got her own Ayurveda with all its cultural richness. Many forestry herbs used for the healing, visha chikitsa (treatment for snake poison), marma chikitsa and the Yoga were prevalent in Kerala, while the great Ayurvedic texts make no mention of these (Varier, 1980). Kerala has its own textual form of this system known as '*Sahasra Yogam*'. Most of the documents in this text constitute indigenously developed knowledge of healing practices. The yogas of Bala chikitsa (healing for the children), Dhara, Navarakkizhi, Pizhichil, Thalam etc are unique to Kerala tradition.

2.8 Treatment sans Caste Borders

One important thing to be noted in Kerala is that practice of ayurveda is not confined to any particular caste or tribe. There are many Ezhava families (considered to be of lower caste) who have carefully gone through all the Vedic texts just like the Brahmins (who were well



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versed in the Sanskrit texts). Even before the influence of Sanskrit there were some tribes and castes that had practiced the healing activities following it as a traditional job (Velan, Kanyan, Karuppan etc.) So there existed a wide social base for healing practices in Kerala. Medicinal plants were used in religious practices (*Pala, parijata* etc). There are many herbs associated with the divinity. Lord Ayyappa and the Pala tree are an example of this. Pala is a herb that is used for Raktamoksha (It refers to the removal of doshas from blood).

Among many of the so-called lower castes of Kerala, secret knowledge about certain methods of treatment, about the properties and powers of certain drugs were handed down from parents to children. The women of the washerman community, for instance, were traditionally skilled in midwifery, while the men were excellent pediatricians. *Kurups*, another caste, were excellent in different types of massage used in *Pizhichil* and *Uzhichil* methods of treatment. Similarly there were families who specialized in the use of particular drugs or herbs for wounds. As in all ancient civilizations, the practice of Vaidyam in Kerala was associated with craft and sorcery. The ancient Sangha text '*Tholkappium*' is silent on the healing activities of Brahmin's while it depicts their practice in many other backward communities. The influence of the Aryan and Dravidian culture changed the form and face of the healing system. So free from the clutches of brahmanical supremacy the Kerala ayurvedic healthcare system developed more freely among different castes with its own indigenous background. That may be one of the reasons by the colonial suppression over passed Kerala to a larger extent. Later we have accepted most of the aspects of the Sanskrit texts (Menon, 1934). It is obvious that the culture of Kerala has accepted and parted with many foreign cultures.

Around the 16th century, the Namboodiri Brahmins began to dominate Kerala society. The power they wielded was based on their priestly right to conduct rituals. They also acquired lands near temples. As this upper caste society grew stronger, wealthy and influential Namboodiri families began to feel a need for physicians from their own caste. They began to have at least one member in each family trained in Vaidyam. Once established, these Namboodiri Vaidyans began to treat nobles, which meant they could amass more wealth and power.

The Namboodiri ayurvedic physicians in Kerala were always open to different trends in Vaidyam (healing) and Vagbhatan's works was acknowledged as a fundamental part of the study of ayurveda in Kerala, although he was a Buddhist. However, those Namboodiris, who were scholars of Vedas, always considered Vaidyam a slightly inferior profession. Since the

texts the Namboodiri teachers taught were originally written in Sanskrit, a mastery over the language became imperative for students who wanted to learn Vaidyam from them. But their supremacy could not be established since other castes were also well trained in the system.

Healing practices were mainly concentrated near religious places. Temples, churches, mosques were functioning as centres of ancient healing. So it is inferred that not only Hindus but other religions as well have contributed to develop ayurveda in Kerala. This is evident in the present commercialised era also (there exists manufacturing units owned by Christians). With the spread of Sanskrit language and the Ayurvedic texts the form and appearance of the existing ayurvedic system changed but its essence remained the same since the new form imbibed the old one. Generally it helped the growth of ayurveda as a health care system. Ayurvedic texts like *Ashtanga Hridayam* influenced traditional healers in different communities. It is said that the describer of *Ashtanga Hridaya* is a Keralite. *Ashtanga Hridayam* is the principal text taught in the Kerala system of ayurveda and the tradition is several centuries old. One of the reasons for the widespread use of *Hridayam* is that Vakhata spent a considerable portion of his life teaching ayurveda in Kerala and is believed to have died in central Kerala. The congregation of ayurvedic families in this part of Kerala may have something to do with this.

2.9 Ashta Vaidyas and ayurveda

Healing activities were connected with the temples since most of the artistic forms and royal activities were conducted through the temples. The people who were connected with the temples needed health care and this was provided by well-experienced Namboothiri families. A physician who was well versed in all eight branches was called 'Ashtavaidyas' because they are experts in ayurvedic healing. Ayurveda has eight branches called *Ashtangas*. They are Kaya (general medicine), baala (pediatrics), graha (astrological), urdwanga (above neck), shalya (surgery), dhamshtra (toxicology), jara (longevity) and vrusha (infertility). There are eighteen families of Ashtavaidyas in Kerala who are believed to be the torchbearers of the Vahata tradition. Kerala's ayurvedic history is very much related to the Ashtavaidyas.

Ashta Vaidyans practiced the home-centred or temple centred healing and prepared medicine for immediate needs only. The well-known Ashta Vaidyans of today are Poolamanthol, Aalathiyoor, Kuttancherry, Thrissur, Thycaud, Ilayidathu, Chirattaman, Vayaskara, Vellod etc. In this the Aalathiyoor family is known as Nambis and others Moose. There are many

families other than Namboothiries who practiced ayurveda (Varier, 1980). Sri Narayana Guru was born in one Vaidya family and had enough knowledge in Vedas, Yogas and Vaidyam.

In addition to the traditional Ashtavaidyas, certain families in Kerala practiced ayurveda and established a name and fame in this profession. The intellectual aristocracy who practiced ayurveda were not only experts in their line, but they were responsible for doing intensive research in various branches such as ophthalmology, pediatrics etc. Their research was directed towards finding out remedies and radical cure for diseases such as snakebites and infectious diseases etc. (Expert committee on Ayurveda, Kerala, 1963). Many books have been published relating to the ayurvedic treatment and the importance of medicinal plants in which Van Reed's '*Horthoos malabaricus*' is very famous. There are criticisms that this book contains only the medicinal plants, which are known to the Ezhava community since Itti Achutan and other Vaidyas, who helped Van Reed in the writing of the book belonged to the Ezhava community. (Grove, 1998). Actually ayurveda developed as an art. This shows that Kerala has been preserving and practising it in its *Sudh* form.

2.10 Spread and shift from the Household Structure

The patronage of the major emperors can be considered as one of the reasons for the late commercialisation of ayurvedic system in Kerala. The enlightened rulers at that age understood the meaning and significance of the great system of medicine. The eminent physicians who adorned this profession were therefore provided with all necessities and amenities, so that they were not compelled to commercialise their knowledge to earn their livelihood. Many of these eminent physicians were not only given lands free of tax but other amenities of life as well, so that they could devote their whole time to the profession (Expert committee on Ayurveda, 1963).

It is no wonder therefore that free medical aid was the rule rather than the exception in those days. The convention with regard to the snakebite cure is that if the person who administers the cure receives any remuneration its efficacy will be nullified. The commercialisation of the different professions that is the order of the day did not affect ayurveda for a long time. It may however be stated that today the old practice of giving prescriptions and the preparation of the medicines being under taken in the house has almost ceased to exist. The craze for ready-made things has invaded this realm also. This compelled even the eminent physicians who

practiced ayurveda to commercialise the practice; with out which it would be impossible for them to conduct even normal practice.

It should be noted that the influence of these eminent physicians was personal and no attempt was made at that time to give an institutional shape and form to this system of medicine. As in other things if a system or practice depends merely on personality, its development and growth are likely to be retarded when the influence of the dominating personality ceases.

The new period in ayurveda starts from the period from which the united or associated work for the healing activities and education started. Like any other place of India, reformation has given a new life to the healing activities. There were efforts to form associations to encourage government to start education centres and spread ayurveda all over India. An institution for ayurvedic education was first started in Travancore (Thiruvananthapuram) by Kaviyoor Parameswaran Moothathu in 1886. In 1890 government took the institution. Subsequently, it rose to the power of an ayurveda college. Later, many institutions came up like Arya Vaidya Samajam, Keraleeya ayurveda Samajam, Madhava Memorial Ayurveda College etc.

Though colonial attempts were made to de-legitimise the development of indigenous medicine, the Travancore state had taken measures to promote the same even before the end of the 19th century (Kumar, 1998; Panikkar, 1995). Even though there were continued resistance from the British government, the Travancore government stuck to its policies and included the ayurvedic practitioners in the grants-in-aid system in 1896. (Which later extended to all practitioners whom a board of examiners certified as possessing *a fair knowledge on the native system of medicine*).

But certainly there were encouraging attempts from the part of government too through expert committees for the revival of the indigenous system of medicine and to give a place in the health services sponsored by the state. (Mohammed Usman Committee (1923), Health Survey Planning Committee (1961)). This is the main reason for the continuous improvement of ayurveda in Kerala, unlike the rest of India despite the colonial efforts to suppress it.

2.11 Modernisation and Large Scale Manufacturing in Kerala

It was during the medieval period (early 19th century), that the manufacture of medicines began. When ayurveda started gaining popularity, small manufacturers came in to picture. During these periods, production was undertaken mainly to meet the immediate needs of the

people i.e. medicines required for treating a small number of people at a time. Mass production actually started with the establishment of Kottakkal Arya Vaidya Sala (KAV) in October 1902 by Dr. P.S. Varier. This was initiated the manufacturing and supply of ayurvedic medicines for the patients in the hospital strictly in accordance with the authentic ayurvedic texts.

Marketing was also started by KAV for the first time. As the scope and variety of the medicines and treatments increased, it set up branches in other parts of the country under qualified and experienced physicians. From 1905 to 1923 the number of grants-in-aid Vaidyasala increased from 64 to 82. (Government of Travancore, TAR, 1905-06,1923-24). Easy accessibility, traditionally proven curing efficiency all led to an increase in the demand for the indigenous medicine more than the supply. Government enhanced the ayurvedic facilities by introducing more schools and colleges under the grants-in-aid system. Though the number of vaidyasalas were increased (127 in 1932-33 to 189 in 1946), their number was not sufficient to absorb all who were passing out from the institutions. Those who could not find any berth in the governmental system established practice in the rural areas on their own. In the face of these developments, many traditional self trained physicians turned themselves in to workers (or as suppliers of herbs) in the organised private ayurvedic dispensaries, or in to manufacturers and sellers of medicines and medicated oils (Kabir, 2002)

Other pharmaceuticals that came up during this time were Vaidya Ratnam Vaidyasala, Dhanwanthari and Arya Vaidya Pharmacy. In course of time, many other pharmacies like Oushadhi, Nagarjuna, Jayabharatham, S.D pharmacy, Vasudeva Vilasam and the like too were established. Along with this, self-production also existed side by side, which contributed to about 25 percent of the total production.

This alternative system of medicine has to follow certain good manufacturing practices in relation to raw material collection, storage, processing, standardisation etc. according to the *Drugs and Cosmetics Act, 1942*. Many innovations came in due course, first by KAV followed by other pharmacies in terms of Electro Mechanical Machinery for large scale grinding, filtering and filling and steam plants etc. Taking in to account, the changing tastes of the consumers, many of the products were converted in to the form of tablets, capsules, syrups etc.

But in Malabar area lack of political support, proper training facilities and the impoverishment of the masses, who had sustained it led to a gradual decadence of the indigenous medical system. At no stage was the government ready to consider the indigenous system on a par with western medicine (Kabeer, 2002). However, the government permitted local boards, consequent on the retrenchment scheme and the withdrawal of the government allopathic doctors from the hospitals in 1929, to appoint practitioners of indigenous medicine for filling the gap. The local fund board was also given permission to open rural ayurvedic dispensaries on their own. These apparent changes in the government attitude didn't have much of an impact on the medical facilities in Malabar. Because of severe financial crisis in 1932 the boards were compelled to suspend most of the health programs in Malabar. In short, while in Malabar, the state's policy was hostile to the development of the indigenous system of medicine, in Travancore; the state gave active support both in terms of quality and quantity.

2.12 Modern Mechanisation and the expansion of Branches- a sign of Commercialisation

In the earlier days, the production of ayurvedic medicine was confined to smaller areas, because of lack of transport facilities, unsophisticated communication facilities etc. The obstacles to large-scale production were pulling down institutional growth (Raghava Varier, 2003). An internal contradiction was faced when there was more demand for medicines. As mentioned earlier, the Arya Vaidya Sala led the mechanisation efforts by the mid 20th century itself, as a solution to this difficulty. This is evident from the gradual mechanisation of the Vaidya Sala. In 1949 itself, they have used AC generator for electricity (Presently they have three 250 KVA electricity generating capacity and in Kanjikkod, one 360 KVA generator.). A counterline grinding system with twelve grinders was adopted in 1952. Mechanisation of the processing activities like drying, pulverising, sifting, grinding, mixing, homogenising, evaporating,, filling, capping with Electro mechanical equipment, automatic filling lines, mechanised tableting section, mechanisation of lehyam production through semi mechanizes lehyam plant and employment of modern quality assurance mechanisms etc. stand testimony to the complete mechanisation of the industry which occurred , initially in Kottakkal but later in many other plants.

Almost, all leading ayurveda firms have their outlets all over Kerala especially, KAPL, Oushadhi, Sitaram, Kottakkal, SD pharmacy, AVP etc. Kottakkal has 11 branches all over Kerala. In the national and international level also they have expanded their influence. Generally the different pharmacies in Kerala have created a brand loyalty. That means the

different pharmacies have made their name in different regions. To cite a few examples in Northern Kerala (Malappuram, Kasargode, Palakkad)- it is Kottakkal Arya Vaidya Sala; in Thrissur-Ernakulam belt it is Sitaram of Thrissur, Arya Vaidya Pharmacy of Coimbatore and Vaidya Ratnam of Thrissur, in the South (Ernakulam and southward) Nagarjuna Herbal concentrates of Thodupuzha, SD Pharmacy of Aleppey, dominate Oushadhi caters to the all regions of Kerala. Though this natural oligopolistic situation, they have a built a brand loyalty for Kerala ayurveda medicines.

Another important factor regarding the manufacturing system is the improvement in the education system along with the development of the firms. Along with major pharmacies, there are ayurveda colleges and related educational institutions. Kottakkal, Vaidya Ratnam, Pankaja Kasturi all have made their own efforts in spreading ayurveda knowledge through ayurveda colleges and research centres along with the production units.

Kottakkal AVS has a charitable hospital, which started in 1924. About 30 percent of the patients of the Arya Vaidya Sala are foreigners. This shows its international acclaim. The number of the patients both in-patient and outpatients are increasing both in the paid section and charitable section. The below table gives a better picture.

Table 2.1: Number of patients who visited Arya Vaidya Sala, Kottakkal.

Year	Out Patients (Lakhs)		In patients	
	AHRC+ Branches	Charitable	AHRC (paid)	Charitable hospital
1976-77	1.2	2.9	346	759
1979-80	1.4	1.9	728	1066
1984-85	1.7	2.2	822	1521
1989-90	1.9	2.6	985	2043
1994-95	2	2.9	1372	2151
1999-00	2.5	3.7	2279	2847

Source: compiled from annual reports.

The increasing expenditure on advertisement and packaging of some firms is also a sign of modern commercialisation of ayurveda. Pankaja Kasturi, a major ayurveda firm is spending around 25 percent of its sales income on advertisement. Advertisement –sales ratio of some other important firms are given below.

Table 2.2: Advertisement –sales ratio of some firms

KAPL	Year	1994-95	1997-98	2000-01	2001-02	2002-03
	Ratio	5.37	2.35	2.25	2.16	2.48
Oushadhi	Year	1990-91	1994-95	1995-96	1996-97	1997-98
	Ratio	0.75	0.76	2.02	2.06	1.76
Nagarjuna	Year	1992-93	1994-95	1997-98	1998-99	2001-02
	Ratio	13.32	8.60	11.03	8.35	11.73

Source: compiled from annual reports.

The huge advertisement expenditure shows that modern techniques of Commercialisation are increasingly being adopted in ayurvedic industry also.

Concluding Remarks

The contemporary status of indigenous systems of medicine is a culmination of the events over the last 200 years of colonial rule, pre-independence policies of the Indian National Congress, and the post-independence policies of the government of India. A brief review of the history of ayurveda is necessary to arrive at the contemporary state of the same. In brief, the stages like,

- More than a century of colonial oppression
- The distortions imposed on the psyche of the indigenous medical community due to the insistence of Indians and Europeans trained in modern medicine that ayurveda be integrated with modern allopathic and scientific terms without understanding the fuller implications of an exercise comparing two distinct scientific cultures.
- The biases in the health policies of the GOI in terms of various medical systems in the national health plans etc.

are points to be taken account of important while considering the resilience of ayurveda. The politics of nationalism in the pre and post Independence periods, however, has ensured a permanent place for indigenous systems of medicine in Indian society, thus rescuing them from ignominy and restoring a certain measure of the state patronage, which was completely absent during colonial rule. Despite this, ISMs have not flourished in Independent India. This is possibly because of two reasons: first, the Indian allopathic community has played a major role in discrediting ISMs, and second, the ISM community itself has remained inert, not rising to the contemporary challenges of health care, despite a favourable political climate.

The often contradictory and changing scientific and moral attitudes towards the knowledge systems like ayurveda is linked to a history in which Western science has by turns absorbed local knowledge (both non western and folk European) in to its own, and rejected it as inferior only to rediscover its practical benefits. The importance that the Dutch and Portuguese governments of the 16th century gave to these systems and later their reduced attention shows this. While considering the addition to the global biological knowledge, the contribution of the knowledge systems remains on top. And it is to be noted that at that time, as a part of the exploitation of traditional knowledge, western government popularised the system. But in the course of time it was left unrecognised though in some parts of the third world region, like Kerala it got attention. It is to be doubted that whether the present boom in the world market completely depends on the western recognition. The popularity in the recent centuries has strictly been confined to the locations in and around the regions in which the tradition existed. The resurgence of this system in the present has to be viewed as the resurgence of the same in the west, especially in the modern era with the glamour of globalisation and modernization. The story to be read between the lines of the new market strategies and the market extension ideologies of the west. The conclusion comes with the strategies of encroachment of these traditional systems through patent laws.

The point, which is to be noted, is that the unethical exploitation of bio diversity in the pre-colonisation and colonised period, even in the post- colonisation period has some thing to do with the decline of ayurveda as a system. In both India and Kerala the development of ayurveda was eventful with the efforts for the promotion and demotion of the system by different rulers. Kerala had a typical indigenous medical system, which went along with text based ayurveda unlike the other areas. It faced challenges in Kerala during the British period as they followed a policy of promotion of biomedicine alone. But the resurgence was fast, though it was not in a way it was perceived. The new development, which can be called as market oriented, is efficient enough to meet economic purposes, though it completely ignores the traditional values of the ayurvedic medical system. The development and modernisation of ayurveda has typically been in a way such that it satisfies the huge demand of the east and west. But it is significant that there are some efforts from the part of a few companies to conserve its purity and tradition. The growth of ayurveda in Kerala is difficult to alienate from the growth of Kottakkal Arya Vaidya Sala. The new development (whether market oriented or heritage driven) is also important in a sense since it gives the same importance to the regional

economy, as it contributes to the regional industrial growth (though a traditional friendly market driven growth is far more important, if it may be called so).

Another serious concern is that, ayurveda, as a system of medicine should be differentiated with ayurvedic products. While the market for ayurvedic products are increasing as a result of the wider belief and trust in nature- oriented nutraceuticals and cosmeceuticals, ayurvedic health care system is completely opposed in most of the foreign countries because of the lack of 'therapeutical evidence', which is set by the present allopathic world. So, the present era of globalisation does not give much hope for ayurveda as a system, as long as effort on the part of the 'herbal axis' are not successful in making an impression on WHO. In a sense, while globalisation opens door to a higher demand and hence profitability in the herbal food supplement side, it totally ignores the traditional charm of ayurveda and the words 'herbal' and 'ayurveda' become simply the caption words for capturing the world wide capitalists promoted beauty market. This is better seen in the CAM (Complementary and Alternative Medicine) policies followed by most of the developed world. Given the size and attraction of these markets, the policies of these governments have the power to reshape the internal structure of the ayurvedic pharmaceutical industry in India.

As Madhulika (2004) pointed out, China's success in the herbal industry shows that the more you adapt to the dictates of the dominant scientific and market trends, the more likely that you are to succeed. But the arguments made by the neo-traditionalists cannot be ignored. The only way to save tradition is to make it conform to specific modern requirements of legitimacy. It is better to move on with the times rather than killing oneself for the pristine purity of the heritage. But what has to be noted here is that the balance has to be kept by maintaining more and more tradition in preparation and pharmacology while embracing the so-called modernisation or commercialisation through appearance in the product and marketing.

APPENDIX

Epistemology of Ayurveda

The term ayurveda is derived from two words i.e. 'Ayur', meaning Life and 'Veda' signifying knowledge or 'knowledge of life'. Ayurveda is therefore called science of life. According to ayurveda, all living things including human beings are composed of three fundamental elements called doshas, dhatus and malas. Doshas govern the physio-chemical activities of body, while dhatus enter in to the formation of the basic structure of the body cell, there by performing some specific activities. The Malas are substances partly utilised in the body, and partly excreted in a modified form after performing their physiological functions.

According to ayurveda, each person has a constitution created at conception that determines basic physiology and personality. This constitution is the inherent balance of these doshas or subtle biological forces. There are infinite combinations and permutations of these three basic energies, and each person's constitution is a unique expression. Constitution determines what a person is naturally attracted to and what is experienced as repulsive, what is in harmony with his or her nature, and what will cause imbalance and susceptibility to illness. Because no two people are alike and no two presentations of a disease are alike, ayurveda does not approach the cure of a disease as much as it approaches the cure of the person who has the disease.

These three doshas are said to be in a state of dynamic equilibrium with each other for the maintenance of health. Any imbalance on their relative preponderance in the body results in diseases and decay. The Equilibrium State is called 'Kriya Samyam'. It is a pleasant state of indefinable happiness. This is the individual happiness or joy of the soul. In this state the mind, the body and all sensory organs perform their functions very well. Naturally it leads to absolute happiness or sound health.

To help individuals to create an optimal environment for health, ayurveda offers a group of treatments often referred to as "five sense therapies." Through its detailed science of diet and herbalism, aroma therapy, color therapy, sound therapy, and touch therapy (massage and marma therapy), ayurveda recommends how to use the senses to interact with the environment to create balance. These recommendations are based on a person's constitution, current health imbalances, and the time of the year.

Since diseases are caused either directly or indirectly by dosha imbalance, the treatment is based fundamentally on the treatment of doshas. The doshas are fundamentally excreted from the body by five purification (Panchakarma): emesis (therapeutic vomiting), purgation, enema, nasal medication, and bloodletting. There are various prescriptions based on plant medicine.

Emergence and Early Development of Ayurveda

Ayurvedic knowledge originated in India more than 5,000 years ago and is often called the "Mother of All Healing", even older than the Chinese medicine, and all the existing indigenous medical knowledge in the world. It stemmed from the ancient Vedic culture and was taught for many thousands of years in an oral tradition from accomplished masters to their disciples. Some of this knowledge was set to print a few thousand years ago, but much of it is inaccessible. The principles of many, if not all, natural healing systems now familiar in the West, such as Homeopathy and Polarity Therapy, have their roots in ayurveda.

In the Indian System of Medicine and Homeopathy (ISM&H), ayurveda is considered to be the oldest indigenous medical system of India while Unani and homeopathy are of recent origin. Even by BC 1500 its fundamentals were clear. Ayurveda developed from the youngest of the Vedas, the Atharva Veda, which can be understood

from the residual harappan knowledge. Atharva Veda lists the eight divisions of ayurveda: Internal Medicine, Surgery of Head and Neck, Ophthalmology and Otorinolaryngology, Toxicology, Psychiatry, Pediatrics, Gerontology or Science of Rejuvenation, and the Science of Fertility. Not only Atharva Veda but Rigveda and Yajur Veda also give the hints that Vedas proclaimed the divine origin of ayurveda. The Rik Veda (also known as Rig-Veda) refers to the cosmology known as Sankhya, which lies at the base of both ayurveda and Yoga, contains verses on the nature of health and disease, pathogenesis and principles of treatment. Among the Rik Veda are found discussions of the three doshas, Vata, Pitta and Kapha and the use of herbs to heal the diseases of the mind and body and to foster longevity.

According to Hindu mythology ayurveda originated from Brahma. It was transferred from Brahma to prajapati/Daksha and then to Asvin. Indra got the knowledge from Asvin and later transferred to the Rishis. It has developed and improved largely in Arsha period (period of Rishis). It is considered that among Rishis Dhanwanthari/ Bharadwaja received the knowledge from the Indra. Even in Ramayana there are citations about the herb, '*Mrita sanjeevani*'.

What is fascinating is ayurveda's use of herbs, foods, aromas, gems, colors, yoga, mantras, lifestyle and surgery. Consequently ayurveda grew into a respected and widely used system of healing in India. Around 1500 B.C, ayurveda was delineated into eight specific branches of medicine. There were two main schools of ayurveda at that time. *Atreya*- the school of physicians, and *Dhanvantari* - the school of surgeons. They developed the surgical knowledge in 9th century BC. During that period, it was unwritten. These two schools made ayurveda a more scientifically verifiable and classifiable medical system. People from numerous countries came to Indian ayurvedic schools to learn about this world medicine and the religious scriptures it sprang from (Trawick; 1993). Learned men from China, Tibet, the Greeks, Romans, Egyptians, Afghanistanis, Persians, and more travelled to learn the complete wisdom and bring it back to their own countries. Some of the students of Dhanwanthari recorded the preaching.

Among the disciples of Atreya, Bhela and Agnivesha are famous and their writings as well. Bhela Samhita in its original form is retained from South India. Among the disciples of Atreya, who developed the school of medicine, '*Agnivesha Samhita*' is the best among the recorded knowledge and it was well accepted and propagated as the backbone of Ayurvedic Samhita (compendia).

Though the Greeks were probably aware about the Indian culture and their medical systems, the invasion of Northern India by Alexander the Great in 326 B.C was likely to have been responsible for the spread of ayurveda in Europe. Alexander believed this system to be effective. At that time in North, Asoka was also trying to spread it. A book on diagnostics appeared in the Eighth Century B.C and the Buddhist movement set up universities to teach Buddhism including medicine. During 6th century BC, Thakshasila (university near Rawalpindi in Pakistan) was built and gave much emphasis to the health education (Kutumbabai; 1962). One of the Thakshasila products Jivaka supervised health of Buddha and his followers. This indigenous system of Knowledge developed a good extent during Buddha times. Under the rule of Asoka (follower of Buddha) many charitable hospitals were founded, doctors and nurses were trained, herb gardens were planted, and medical knowledge became the most formidable weapon in the hands of Buddhist monks as they proselytised through out Asia. The medical system spread with Buddhism, and ayurveda or one of the offshoots is still being practised today in Tibet in Central Asia, Srilanka, in parts of China and Japan and in Indonesia. (Heyn, Birgit.1987). Later Charaka revised Atreya Samhita known as '*Charaka Samhita*' and Susruta developed the surgical knowledge called '*Susrutha Samhita*'. Charaka was Kanishka's '*darbar Vaidya*' in AD 2nd century.

During 4th century AD itself the University of Nalanda importance to gave medical teachings. Almost during this period, Ayurvedic works were translated into Chinese; by 700 AD, Chinese scholars were studying medicine at Nalanda University. As Indian thoughts influenced Chinese spirituality and philosophy through Buddhism, ayurveda greatly influenced Chinese medicine and herbology. In 800 AD, Ayurvedic works were translated into Arabic. (D. P. Agrawal & Lalit Tiwari).

During the period of the Guptas and Mauryas state-employed as well as private practising. Village physicians maintained by the government through gifts of land and payment of salary. The state has also planted medicinal herb gardens, established hospitals and maternity homes. In AD 6th century Vakhbada wrote the *Ashtanga Hridayam*. Ashtanga Hridaya is a concise version of the works of Charak and Sushrut. In 16th Century Europe, Paracelsus, who is known as the father of modern Western medicine, practised and propagated a system of medicine, which borrowed heavily from ayurveda.

But the Golden Age ended with the invasions of Muslim in 10th and 12th century. They went on anti-Hindu crusades and destroyed many of the ancient books and the knowledge of ayurveda began to slip away. It is considered to be a major set back in the Asian medical knowledge. Those who escaped fled to Nepal and Tibet. That may be the reason why ayurveda has reached Tibet also. Muslim conquerors influenced and impacted the indigenous medicine with their own medicine Unani. So the present Unani knowledge is a combined package of Greek medicine and ayurveda.

Chapter 3

STATUS, PERFORMANCE AND GROWTH OF AYURVEDIC INDUSTRY IN KERALA.

In the preceding chapter, we have seen the process and nature of commercialisation of ayurvedic health care system both in India and in Kerala. In this chapter, an assessment of that commercialised structure (i.e. the present status of the ayurvedic industry) in Kerala is attempted. The performance of the industry in terms of some important variables, its contribution to the state-manufacturing sector, the determinants of production from expenditure side and the status of the industry on the major factors, which exercise an influence on future prospects have been analysed. This chapter is organised in two sections the first gives a brief overview of the Indian ayurvedic industry, while the second gives a detailed picture of the industry in Kerala.

Section 1: Ayurvedic Industry in India

India's share in the global herbal market is less than 2 percent with around Rs 1000 -1500 crores. In India there is inadequate information about the medicinal plant and Ayurvedic drug market. It is often argued that the market is as big as Rs.4500 crores considering the formulations, beauty and toiletry products made by the emerging companies like Zandu, Dabur, Himalaya etc (Dharmananda, 2003). The public perception of ayurveda has also undergone a sea change. Official reference to ayurveda as a 'system of production' started from 1920, when the All India National Congress Movement felt the need to inspire people and inform them that the only effective medical science during that time was ayurveda (Export Import Bank, 2002). Thereafter the demand for ayurveda has been sustained. This growth is the biggest proof of its efficacy. In this era of rapid environmental degradation, ayurveda provides the comfort of being in total harmony with nature. Yet, India has not been able to capitalize fully on its herbal wealth so far.

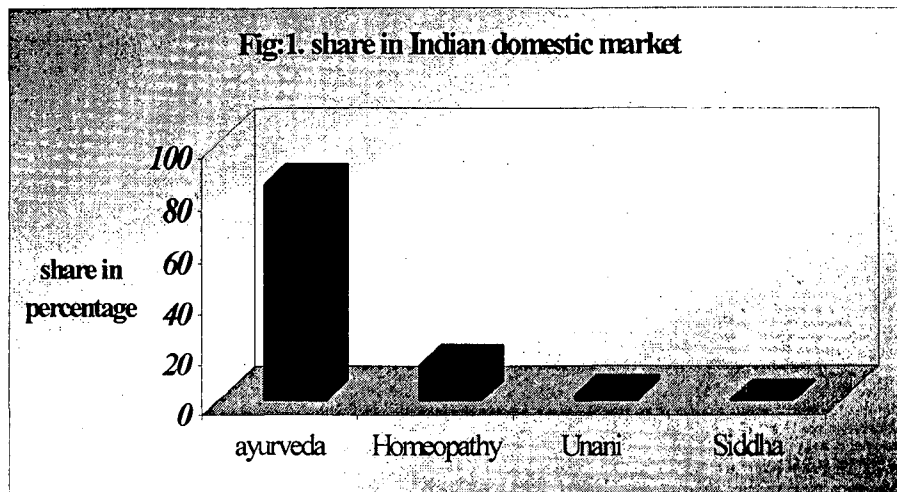
This opinion is valid because over the years, the expenditure on the traditional medicines¹ like ayurveda is increasing as the population, which makes use of this system also rises. India like

¹ The term traditional medicine refers to ways of protecting and restoring the health that existed before the arrival of modern medicine. According to WHO traditional medicine is "the sum total of the knowledge, skills, and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses".

Malaysia, China, Pakistan, and UAE is increasingly making use of the help of the traditional system in a larger way. This system has the ability to satisfy the conventional medicine demand and the modern beauty care demand. This opens more possibilities for ayurvedic market.

Figure: 3.1 illustrates the importance of different alternative systems with respect to the total indigenous medicine's market within India.

Figure: 3.1



Source: EXIM bank, 2003

It shows that about 84 percent of the market for indigenous drug market is occupied by the ayurveda system, while homeopathy holds about 14 percent and others negligible shares of the market, which clearly proves the prominence of the Ayurvedic system in the indigenous health care market of India.

3.1.1 Ayurvedic Manufacturing Units: The all India picture shows that the manufacturing units show its regional concentration. The three states viz. Uttar Pradesh, Kerala and Gujarat have more than one half of the units (Table 3.1). According to the Indian Systems of Medicine and Homeopathy (ISM&H web site, 2000) there are 8405 licensed manufacturing units and a large number of small scale processing houses to meet the requirement of 4.6 Lakh registered practitioners of ISM&H and other users in the country. These pharmacies range from large Indian drug houses like Baidyanath, Dabur, Zandu, Himalaya Drugs, Arya Vaidya Sala etc., employing modern/sophisticated equipment and methods of production of drugs on mass scale, to small ones which manufacture drugs in the traditional manner following the prescriptions of ancient medical texts that specifically deal with plants and products.

Table: 3.1 State wise licensed Ayurveda Manufacturing Units, 2003

Sl.No.	States/ UTs	Number of licensed Manufacturing units	percentage to the total
1	Andhra Pradesh	556	6.6
2	Assam	39	0.5
3	Bihar	228	2.7
4	Delhi	78	0.9
5	Gujarat	892	10.6
6	Haryana	210	2.5
7	Himachal Pradesh	54	0.6
8	Karnataka	241	2.9
9	Kerala	962	11.4
10	Madhya Pradesh	225	2.7
11	Maharashtra	757*	9
12	Orissa	160	1.9
13	Punjab	149	1.8
14	Rajasthan	388	4.6
15	Tamil Nadu	218	2.6
16	Uttar Pradesh	2575	30.6
17	West Bengal	620	7.3
	TOTAL	8405	100

Source: Indian System of Medicine & Homeopathy.

* 2000 data

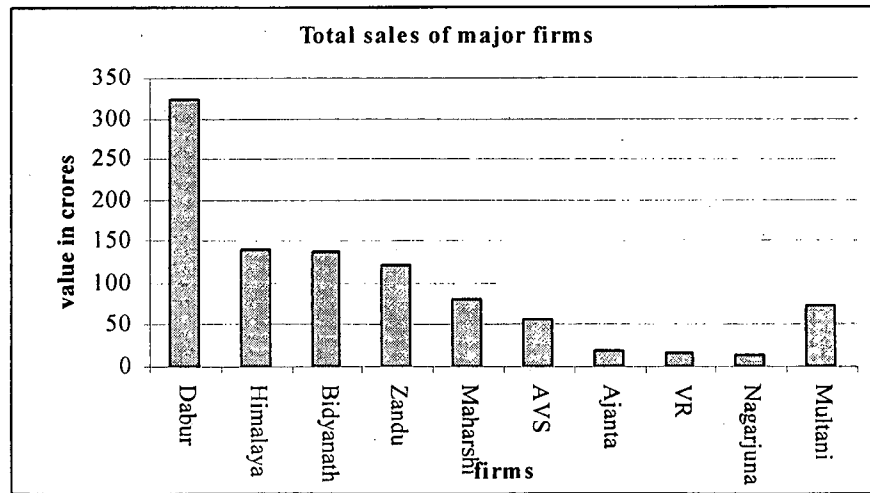
Many pharmacies are attached to Ayurvedic institutes and hospitals, and many village-Vaidyas produce drugs for their own consumption. Unfortunately, the break-up of licensed pharmacies in terms of large and small companies across the states is unknown. It is believed that there are an equal number of unregistered manufacturing units functioning in the Ayurveda sector².

India's share in the world herbal market is around 2% of the total market. The high potential left with her if fully utilised will pay good dividends in the future. In 2002, the sales value of the Drugs and Pharmaceutical products in India accounted for more than Rs.15780 crores. Of this, ayurveda's share was seven percent. Of the total 8405 ayurvedic manufacturing units around 10 have annual turnover of more than 50 crores and 25 companies have a turnover of above 5 crores and the remaining have less than Rs. 5 crores. The internal market for Ayurvedic medicines is dominated by Chyawanprash- a herbal honey comprising of about 3 dozen ingredients, with amla (emblic myrobalans) as the key ingredient. The leader in this field is Dabur, whose share in the market was 69% at the end of 2002; followed by Baidyanath, with nearly 11%, and Zandu and Himani (Emami Group) with about 7.5% each

² Based on the information from Ayurvedic Manufacturing Association of India, 2003.

(IDRC-MAPPA, 1999). A variety of individual herbs, traditional formulations, and proprietary medicines make up the rest of the health products section involving internal remedies, while the remainder of the market is taken up by tooth -pastes and powders, skin creams, massage oils, shampoos, and other preparations. Some of the major Indian Ayurvedic firms' sales values are shown below.

Figure: 3.2



Source: IDRC MAPPA study

It is important to note that value obtained from ayurvedic medicines is very low in the case of firms like Dabur. But they are generally known as ayurveda firms since it is one of the major items in their product structure.

3.1.2 Export of Ayurvedic Medicine from India: According to an estimate of DGCIS (2002), the export from India has increased from \$126 million to \$128 million in the last year over the previous year. About 60% of this is crude herbs (to be manufactured into products outside India), about 30% is finished product shipped abroad for direct sales to consumers, and the remaining 10% is partially prepared products to be finished in the foreign countries. In 2001-02, though the quantity exported has increased by nearly 3% the value has increased by only 1.23% (see table 3.2). It is to be noted that while the export to countries like America, and Africa has tremendously increased, there is a large decrease in the export to EU and Oceania (20.42 percent and 52.37 percent respectively). The decrease in the export to European union is to be taken seriously, because the largest share of India's Ayurveda export is to EU. .

Table: 3.2 India's major export destinations of Ayurveda products

Importing region	Value (US \$ million)		Growth (in percentage)	Quantity (tonnes)		Growth (in percentage)
	2000-01	2001-02	2001-02	2000-01	2001-02	2001-02
World	126.94	128.50	1.23	54,811,144	56,357,133	2.82
America	40.41	48.90	21.01	19,280,174	21,639,823	12.24
Asia	33.17	30.64	-7.63	18,595,995	18,530,193	-0.35
EU	26.50	21.09	-20.42	10,493,139	9,033,009	-13.92
Other Euro countries	10.30	10.38	0.78	2,735,354	2,255,039	-17.56
Africa	6.41	8.76	36.66	1,468,559	1,683,323	14.62
Middle East	6.97	7.18	3.01	1,630,461	2,692,391	65.13
Oceania	3.17	1.51	-52.37	605,662	518,845	-14.33

Source: DGCIS, Ministry of Commerce and industry (as compiled by CMIE India Trade database), 2002.

Another estimate of the export of ayurvedic medicines gives a different picture³.

Table: 3.3 India' export of medicinal plants and herbal products (in Rs. crores)

Code	Items	1998-99	1999-00	2000-01	2001-02	Major destinations
1211	Plants and parts of plants of a kind primarily used in perfumery, in pharmacy or for insecticidal or for similar purposes, fresh or dried	268.74	191.44	357.45	370.94	USA, Japan
1302	Vegetables saps and extracts; pectic substances, pectinates and pectates; whether not modified, derived from vegetable products	826.79	921.53	698.99	593.18	USA
Preparations						
30039001	Ayurvedic and Unani medicines	34.76	36.23	96.53	92.26	USA (9.1), Nepal (7.2), Russia (5.7)
30049001	Ayurvedic and Unani medicines for retail sales	98.84	108.79	124.97	147.52	USA (20.6), Russia (17.8), Nepal (13.1)
	Total Herbal export (including homeopathy)	1230.8	1261.9	1289.1	1209.7	
Growth			2.5%	2.2	-6.2%	

Source: DGCIS data, Ministry of Commerce.

India, at present, exports herbal material and medicines to the tune of Rs. 1210 crores annually (2001-02), comprising Rs. 593 crores from saps and extracts, Rs. 370 crores from plants and plant parts, and Rs. 235 crores from Ayurvedic and Unani medicines. USA is the single

³ Study done for the inquiry of feasibility of an Agri-export zone for Kerala. They have given these estimates in the final report submitted to the government.

largest export destination for Indian medicinal plants/products, accounting for almost 50% of total exports. The table shows a decline in the growth of herbal exports mainly because of the decrease in the export of herbal products other than ayurveda. Ayurvedic medicines and sales are on an increase as shown in the table.

The study says that there was a 52 percentage increase in the total pharmaceutical exports in the year 2000-01, mainly due to the increase in the export of the ayurvedic and Unani products, for which the export has increased to Rs. 220 crores. This growth was sustained in the following year too (see table 3.4).

Table 3.4: Export of ayurveda and Unani preparations (medicines) from India (Rs. Crores)

Year	total	To Russia	To Germany	To USA	To Australia
1998-99	130	9	2.7	14.6	.85
1999-00	145	16	2.7	15	3.5
2000-01	220	26	21.7	21.2	8.2
2001-02	240	23.5		29.7	

Source: Report on feasibility of an Agri- export zone

Table (3.4) relates to ayurveda/unani formulations alone. But India is getting more than Rs. 500 crores through the export of raw medicinal plants. The report says that the export to Nepal is increasing while there has been a decline in the export to Germany and Australia in 2001-02. United States of America (USA) emerges as the single largest destination for the Indian herbal formulations. Though export to the individual countries of EU is very small, as a region it forms a major buyer.

Another significant development has been the capturing of US market by Indian export. Though India's earnings from the herbal market as compared to Chinese earnings is considered to be meagre, the earnings from pharmaceutical preparation, mainly ayurveda, is on par with China. In a short period, India has caught up with China in the share of US pharma preparation import. While India's export income increased from US\$ million 59 to US\$ million 330.73, China's income increased from US\$ million 305.57 to a mere US\$ million 331.81. The remarkable performance of India is mainly because of the increase in the export of ayurvedic preparations. The following table shows the trend:

Table 3.5: United State's import of Pharmaceutical preparations (US \$ million)

Year	Total	From India	From China ⁴
1997-98	16980	59.69	305.57
1998-99	22510	78.27	376.21
1999-2000	27810	95.55	386.62
2001-02	32700	214.43	295.69
2002-03	40550	330.73	331.81

Source: Report on conservation and development of medicinal plants, 2003.

The global demand scenario provides a sizable market potential for the Indian Ayurvedic industry. The crude drug accounts for a major part of the ayurveda exports even now. Herbal medicines can be sold in the processed form only if the formulation is registered. But this is very difficult and involves much cost and hence most of the exports are taking place in the form of paramedicine and food supplements. A recent Planning Commission estimate shows that the export of ayurvedic raw drugs and other formulation export can go up to Rs. 100 billion in 2010 with the kind of advantage India has.

Entrepreneurs in India, who are seeking to break into the market for natural products have determined, rightly, that the demand for traditional style Ayurvedic medicines both inside and outside the region is limited, despite growth trends as high as 20% annually encountered in the late 1990s. They have aimed to bolster confidence in ayurveda through scientific research into promising herbs and formulas but not necessarily reflecting traditional practices. Of necessity, such research eventually focuses on finding of active ingredients, and this has led to the development of isolates from plants that are sold as "nuetraceuticals" (substances not registered as drugs, but used like nutritional and dietary supplements, sold over the counter in various formulations with specific health benefits portrayed for them). For these, there is a growing worldwide demand. The main suppliers of neutraceuticals are Japan, China, and the U.S., but India has the potential to become a significant contributor. Against the background of the portrayal for this industry in India, we analyse the Kerala scenario.

Section 2- Ayurvedic Industry in Kerala

In Kerala there are a large number of ayurvedic medicine manufacturers, both registered and unregistered. Ayurvedic industry in Kerala can be broadly categorized under the following three types:

1. Truly traditional, in terms of systems, practices and products. These are largely self-regulated entities, growing on the basis of the track record and credibility and

⁴ For china it is their indigenous medicine, which is also based on the herbal formulations.

do not consider it necessary to scientifically validate their products and systems. They can grow, still quicker, if they move to modern methods of manufacture, distribution and R&D.

2. Companies adapted to meet modern life styles, manufacturing and marketing methods. These companies draw upon traditional knowledge without fully following or using them and have the ability to grow, partly by accepting modern technology. Nonetheless, their products are neither wholly traditional nor are entirely modern and need scientific rationale.
3. Companies that use traditional systems as leads to new drugs either as standardized extracts or as pure isolated active moieties scientifically validated. These companies do achieve a global presence in this manner. However, they face regulatory problems, have relatively longer gestation and are more expensive. They also face the constraints in terms of having to validate traditional system based products by modern methods.

Generally the licensed category falls mainly in the second and third category. Within the third category, three types of manufacturing units can be seen. They are: a) household small manufacturing centers mostly indigenous Vaidyas selling medicines, necessary to serve the village needs, b) Large scale manufacturing units strictly following the ayurveda texts solely manufacturing ayurvedic medicines and c) firms which are mainly concentrating on the nutraceuticals⁵ and cosmetics along with the ayurveda medicines. The unregistered units are believed to be large number in Kerala and the estimation of its contribution relative to the factory sectors is impossible. This is mainly because the household *Vaidyas* still forms a major part of the ayurvedic sector, and generally they are not officially registered. There are Namboodiri and Ezhava families still engaged in household production. Our analysis is confined to the organized licensed manufacturing units of Kerala. Here the study is based on the sample drawn from the last two categories since the efforts to collect the data regarding the first category turned futile.

While considering the organized large manufacturers of second category, that is the firms which produce ayurvedic medicines, the market structure is basically one of monopolistic competition because each firm produce products which are almost similar except for some

⁵ Nutraceuticals are the ayurvedic extracts or products, which are used as food and considered to be nutritious for body.

difference in the formulation or the combination. There exists some kind of homogeneity in the nature of ayurvedic products at least in the medicine category. The price system is also very competitive. But the price revision largely depends on the leading role played by Arya Vaidya Sala, Kottakkal. Another character of the industry in Kerala is that technological innovation has also been led by the Kottakkal Arya Vaidya Sala. The history of mechanization in Kottakkal gives the evidence.

In this section, we attempt to quantify the growth of the ayurvedic industry in Kerala. The recent report of Swaminathan Commission and the EXIM bank argue that Kerala has a bright future in industrial development, if only she nurtures her traditional heritage based industries especially industries like ayurveda. However, there is hardly any attempt to quantify the status, growth and performance of the ayurvedic industry in Kerala. An assessment of the present status and its contribution to the industrial development of the state would help to plan future growth.

Investment, which can create a dynamic impact on the economy through backward and forward linkages, should be an ideal strategy for economic development. (Hrischman, 1958). In that sense, the ayurvedic industry seems to be a viable option for investment considering the backward linkage it provides through the collection and cultivation of the medicinal plants and the forward linkages it has through its increasing utilization in the tourism industry and related health care services. This forward linkage has been further strengthened by the rocketing growth of the herbal beauty business and nutraceutical industry. But the necessary condition to conform the working of the linkages is to understand how the ayurvedic-manufacturing sector performs, since it is the sector where dissemination starts.

Sample and Methodology: The sample used for the study has been taken based on the information obtained from Ayurveda Manufacturer's Association (AMA), Thrissur. According to AMA there are 12 major pharmacies in the organized Ayurvedic manufacturing sector, which contributed 81.13 percentage of the total sales of the ayurvedic industry in 2003. According to the information this share was 80 percent in 1996 (See table 3.6).

Table: 3.6 Market share (sales value) of Ayurvedic Manufacturing Units of Kerala

UNITS	1996 (in Rs. Crores) current price	market share '96	2003 (in Rs. Crores) current price	market share '03	%increase in turn over
Arya Vaidya Sala, Kottakkal	40	33.33	70	33.02	75.0
Vaidyaratnam, Thrissur	9	7.50	16	7.55	77.8
Nagarjuna herbal concentrates	11	9.17	15	7.08	36.4
Arya Vaidya pharmacy, Palakkad	8.5	7.08	15	7.08	76.5
Oushadhi, Thrissur	8	6.67	12	5.66	50.0
SD pharmacy	6	5.00	7	3.30	16.7
KAPL	4	3.33	13	6.13	69.2
Sitaram Ayurvedic	3	2.50	5	2.36	40.0
Santhigiri	3	2.50	9	4.25	66.7
Jayabharatam	2	1.67	2	0.94	0.0
Deseeya pharmacy	1.5	1.25	2	0.94	25.0
Pankaja Kasturi	0	0	6	2.83	37.5
Others	24	20.00	40	18.87	40.0
Total	120	100	212	100	55.0

Source: Ayurveda manufacturer's association, 2003.

The present study as stated earlier, is confined to the organized ayurveda-manufacturing sector. Though the time period for the study is from 1993 to 2002, data for longer periods has been used whenever available. As a study of ayurvedic industry in Kerala, ideally all the 12 manufacturing units should have been taken for the study. But due to the non-availability of data three pharmacies could not be included. . The 12 major firms are Kottakkal Arya Vaidya Sala (Malappuram), Vaidyaratnam Oushadha Sala (Thrissur), Coimbatore Arya Vaidya Pharmacy (Palakkad), Nagarjuna Herbal Concentrates (Ernakulam), Kerala Ayurvedic Pharmaceuticals (Alwey), Pharmaceutical Corporation (Thrissur), Pankaja Kasturi Herbal Concentrates (Thiruvanthapuram), Santhigiri Oushadhasala (Thiruvanthapuram), SD pharmacy (Alappuzha), Sitaram ayurveda Pharmacy (Thrissur), Deseeya Pharmacy (Kozhikkod) and Jayabharatham (Punaloor).

Table: 3.7 Ownership and Market share of the sample selected

SL.No	Firm	Ownership	Market share, 2002 (%)	Market share, 1996 (%)
A.1	Kottakkal Arya Vaidya Sala	Private Trust	33.02	33.33
B.1	Kerala Ayurvedic Pharmaceuticals, Ernakulam	Public	11.79	10.01
B.2	Oushadhi, Thrissur			
C.1	Nagarjuna Herbal Concentrates			
C.2	Vaidya Ratnam			
C.3	Santhigiri	private	27.37	26.63
C.4	SD pharmacy			
C.5	Pankaja Kasturi			
C.6	Sitaram Ayurvedic Pharmaceuticals			
Total			72.18	69.97

Source: Ayurveda Manufacture's Association, 2003.

Kottakkal Arya Vaidya Sala alone constitutes more than 33 percentage, while the public sector firms contributed less than 12 %. Table shows that there is not much change in the share of the pharmacies. The sample consists of the firms coming under different types of ownership such as public limited, private limited and private trust. This will help to understand the differences in the performance by types of ownership also.

Sub Section: 1 Growth of the Industry

To understand the growth of the ayurvedic industry, the major variables used here are increase in number of manufacturing units, trend in sales turn over, growth of net profit, growth of assets and its value added to the manufacturing sector of the state, net profit margin, return on assets, return on capital employed etc. are used. Some efficiency ratios also worked out to see the firm wise efficiency in the industry.

3.2.1 Growth of Manufacturing Firms in Kerala

In Kerala the increase in ayurvedic firms or manufacturing units can be clearly seen. Table 3.8, which present the chronological growth of the number of manufacturing firms.

Table: 3.8 Number of organized ayurvedic manufacturing units in Kerala 1975-2001

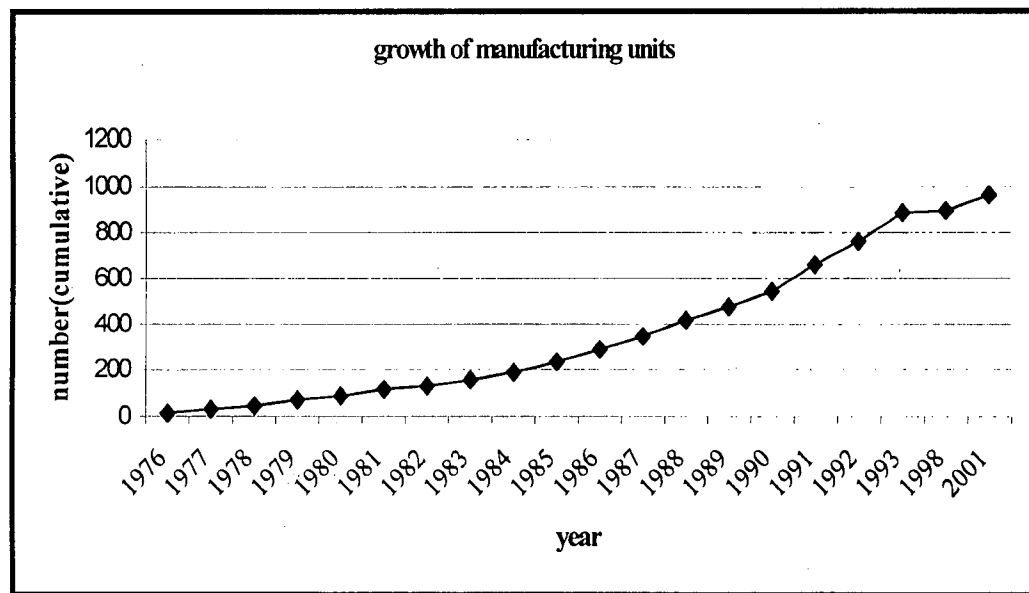
Growth of ayurveda manufacturing units		
Year	Cumulative number	CGR*
1975-76	15	-
1979-80	88	55.63
1985-86	288	21.85
1989-90	543	17.18
1992-93	887	17.77
1997-98	893	0.13
2000-01	962	2.51

Source: Drug Controller's office, Thiruvananthapuram.

Note: compound annual growth rate is calculated with respect to the previous year of reference. For e.g. 55.63% is from 1976 to 1980, 21.85% is from 1980 to 1986.

The above table shows that there has been a sustained growth of ayurvedic manufacturing units from 1975. Compound growth rate of manufacturing units is good enough to portray the growth of ayurveda in Kerala. From 1982 to 1992 there was a continuous increase in the annual registration of firms, showing an annual compound growth rate of 18.11 percent. But it may be mainly due to the entry of small manufactured units. While considering the last decade also, there is a decline in the growth of manufacturing units, but the decade has seen the emergence of some big companies.

Figure: 3.3 Growth of Manufacturing Units



Source: Drug controller's office, Thiruvananthapuram.

3.2.2 Regional distribution of manufacturing units: A district-wise analysis of the distribution of ayurveda firms is important to understand the reference concentration of manufacturing units (see table: 3.9). A large number of manufacturing units is concentrated in Thrissur. There are 195 manufactured units in Thrissur mainly because of the concentration of the Ashta Vaidya families in the region under Moossath. This region has a major market for medicinal plants also. Kollam and Ernakulam follow with 121 and 112 units and account for 13 and 12 percent of the total units respectively. Wayanad, Pathanamthitta and Kasargode districts have only a small number of licensed ayurvedic manufacturing units, i.e., 2, 5, and 7 respectively.

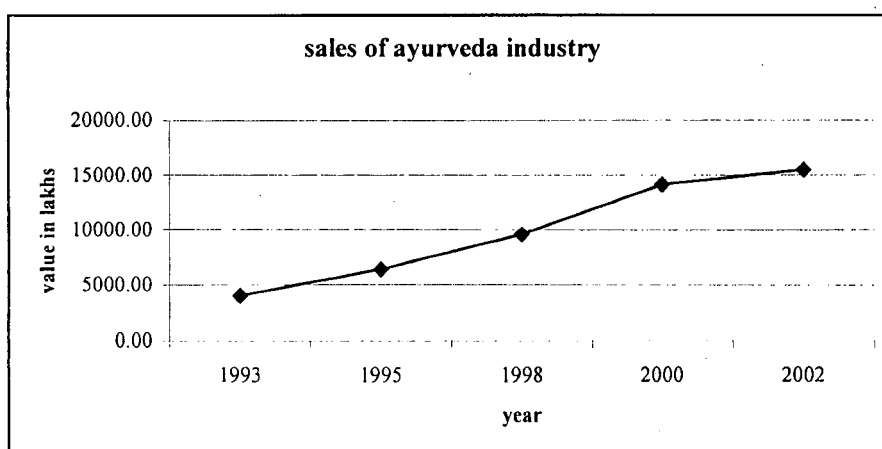
Table: 3.9 District wise registered ayurveda manufacturing units, 2003

Sl.No	Name of the districts	total units registered	Percentage
1	Thiruvananthapuram	90	9.36
2	Kollam	121	12.58
3	Pathanamthitta	5	0.52
4	Kottayam	93	9.67
5	Idukki	16	1.66
6	Alappuzha	87	9.04
7	Ernakulam	112	11.64
8	Thrissur	195	20.27
9	Malappuram	26	2.70
10	wayanad	2	0.21
11	Kozhikkode	93	9.67
12	Kannur	66	6.86
13	Palakkad	49	5.09
14	Kasargode	7	0.73
	TOTAL	962	100

Source: Drug Controller's office, Thiruvananthapuram.

3.2.3 Trend in major variables of ayurvedic industry

Figure: 3.4 Sales of ayurvedic industry⁶



Source: compiled from firm's annual reports

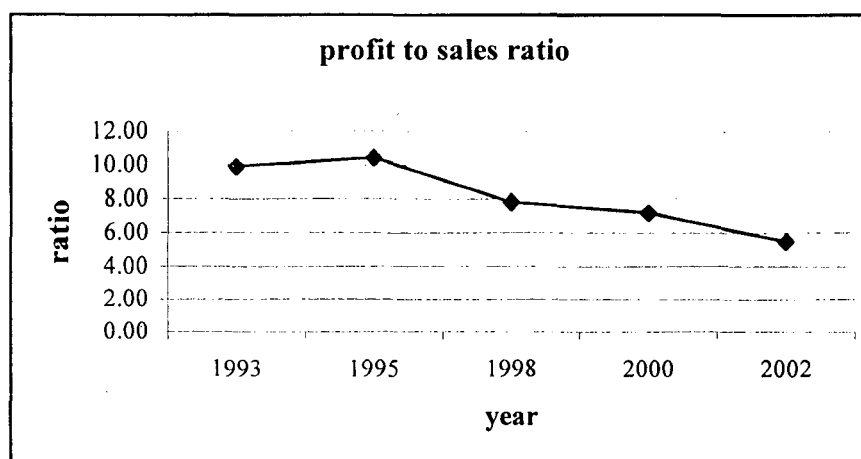
Using the 9 firms' data, we have estimated value of sales for the industry for the period 1993-2002. The figure shows the trend in sales in the years 1993-2002. Since there is not much change in the market share in terms of the sales of the sample units between 1996 and 2003 as coverage of the sample, we are taking its average i.e. 71.08 percent for the study period with the assumption that share in terms of sales has not changed in the period of study. Based on this average, the sample has blown up to estimate for the industry. The figures are deflated with the increase in the price of ayurveda products and medicines. During the period of

⁶ In all the figures, we used in the chapters, the year is taken as a calendar year, i.e. 1993 represent 1992-93, 1995 represents 1994-95 etc.etc.

analysis, there have been two-price revisions by the industry. One was in 1998, around 3% increase and another in 9% in 2002. This price change is taken as an average of the major products. In order to get the real value of the sales; we have deflated it with the price index in the years of analysis. The sales value of 2000 is deflated by the price index 103 and sales value of 2002 is deflated by the index 112 (i.e., 100+3%+9%), since the impact of the price revision has an impact on the nominal sales value in the next year of analysis.

The overall trend of sales is increasing. For the period 1993- 1998 the growth rate is 18.89 percentage while in the period 1998-2002 the growth rate is 12.81 percentage. The overall growth rate for the period 1993 to 2002 is 16.15 percentage. In absolute terms, after deflation it has increased from Rs. 40 crores to Rs. 154 crores, while the figure in current price is almost around 173 crores. This goes well with the information obtained from the Manufacturers association, i.e., in 2003 the sales value was over 200 crores. From 1993 to 2000 it shows a very good growth rate, while there is a small decline in the growth rate after that period. After 2000 there is an increase in the price by 8-9 %. This increase in the sales is partly attributed to the growth in the entry of some manufacturing units in the 90s and partly due to the increase in the demand for herbal medicines. But the effect of the increase in the demand could be the more important factors, since growth in the entry also a result of the same.

Figure 3.5: Profit margin in ayurvedic industry

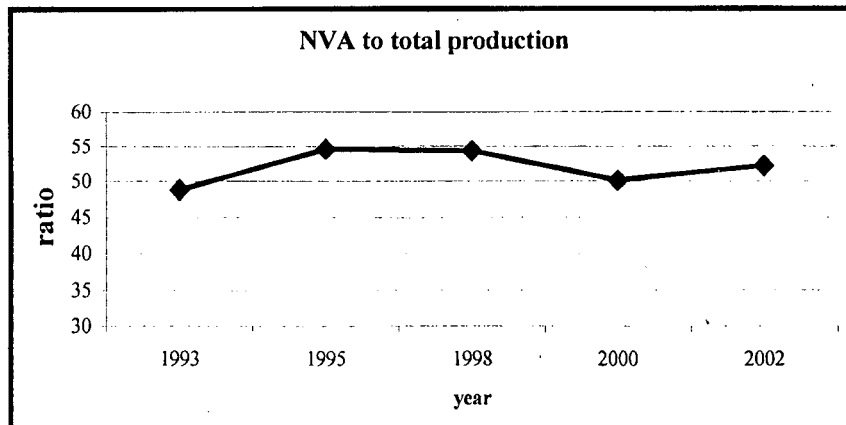


Source: compiled from firm's annual reports

The above figure shows the profit to sales ratio of the ayurvedic industry in Kerala. In the absence of an appropriate deflator for profit and since it is a ratio, we use current price data only. It shows an increasing trend in the initial years and then declines in the later period.

Overall trend also shows a declining trend, i.e., it has decreased from 9.98 in 1993 to 5.48 in 2002. But in 1995 there was an increase in the ratio from 9.90 in 1993 to 10.42. The annual rate of decline in the later years is higher than in the initial years of the analysis. While the sales value has increased at the rate of more than 18 percent the profit has increased at the rate of profit is just more than 13 percent during the period 1993-98. In the year 1998-2002 also the rate of growth of the profit is only half the growth rate of the sales. There are factors that contributed to the declining ratio, like increasing raw material expenditure, managerial inefficiency, problems in the external sector etc. There are threats to the export of ayurvedic medicines due to the regulation from some of the foreign countries like United Kingdom. But the major factor according to the officials of the ayurvedic manufacturing units is increasing raw material expenditure.

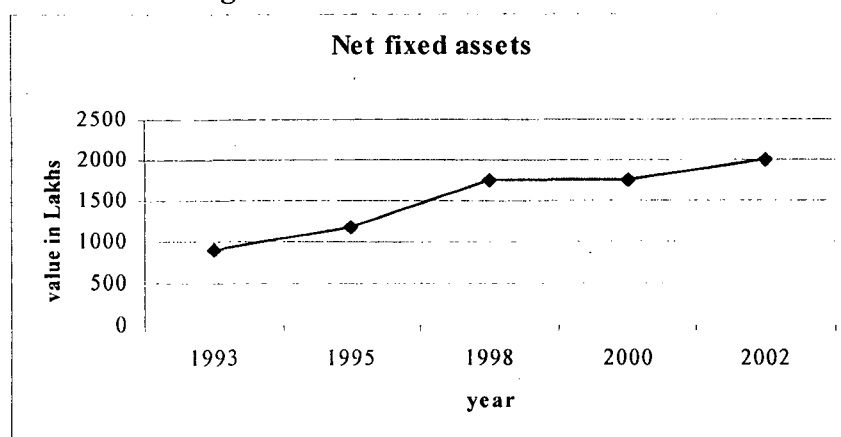
Figure: 3.6 Net value added to the total production.



Source: compiled from firm's annual reports

Net value addition is considered to be one of the major growth indicators of a particular industry. Here the value addition to the total production has been taken into consideration in terms of the factor incomes and other payments in the total value of output. The graph shows a fluctuating behavior, with an increase from 1993 to 1995 and then stagnation from 1995 to 1998 then declining till 2000 and again goes on increasing, and overtime it is hovering in the range of 50-55 percentage. But if we look into the trend of both the production and Net Value Addition (NVA), is going up. If we fit a trend line in the NVA to output ratio, it is marginally increasing.

Figure: 3.7 Trend in net fixed assets



Source: compiled from firm's annual reports

The above table shows the trend in the net fixed asset deflated with the index of machinery and machine tools for food and textiles. The trend shows it is sharply growing till 1998 and then there is a decline in the growth rate and it again picks up. But the growth rate of later period (1998-2002) is lower than the earlier period. There is a 9.3 percent growth in fixed assets from 1993 to 2002. During 1993-1998 it grew by 14 percentage but in the later period that is 1998 to 2002, it increased only by 2 percentage. The overall trend of net fixed assets is quite promising.

Table: 3.10 Return on net assets and return on net worth (aggregated for sample)

Year	Gross profit (values in lakhs)	Net assets (values in lakhs)	net worth (values in lakhs)	Return on Net assets (%)	Return on net worth (%)	Return on capital employed (%)
1992-93	303.79	1502.39	341.86	20.22	88.86	19.35
1994-95	531.50	4291.16	769.50	12.39	69.07	11.50
1997-98	628.71	4332.53	1397.51	14.51	44.99	14.94
1999-00	887.14	4355.64	1609.83	20.37	55.11	16.12
2001-02	742.78	5253.24	1446.09	14.14	51.36	10.76

Source: compiled from annual reports

Table 3.10 gives the trend in the profitability ratios of the ayurvedic industry. Here three profitability ratios are used, return on net assets, return on net worth and return on total capital employed. For calculating the profitability ratios the numerator used is gross profit. A net asset is equal to total fixed assets plus current assets net of liabilities. Net worth is equal to share capital plus reserves. All profitability ratios showing a declining trend in the recent years after an improvement in 2000. This is mainly due to the decrease in the overall profit earning in the recent years. As mentioned earlier, decrease in the total profit earning is due to the loss making of some firms like KAPL and Santhigiri.

Sub Section: 2 Significance of the Ayurvedic industry in Kerala's Manufacturing Sector

Table 3.11: share of ayurvedic industry in State Manufacturing

Ayurvedic industry (in lakhs)							
	Fixed capital	Productive Capital	Value of Output	Depreciation	GVA	NVA	Net profit
1992-93	920.02	2143.70	4885.34	45.66	2429.43	2383.77	398.08
1994-95	1274.09	5789.78	7226.87	144.13	4082.16	3938.03	666.52
1997-98	2384.14	4863.12	11041.87	201.01	6190.87	5989.86	743.11
1999-00	2528.56	5690.86	15825.36	286.79	8214.52	7927.73	1043.97
2001-02	3106.50	7832.58	17853.82	472.67	9783.93	9311.26	948.85
manufacturing Sector (in lakhs)							
	fixed capital	productive capital	value of output	depreciation	GVA	NVA	Net profits
1992-93	351824	465136	935575	25823	207178	181355	44998
1994-95	430597	590086	934993	25666	254674	229008	65936
1997-98	829190	1275757	1995730	50977	376064	325087	43507
1999-00	631256	892594	2486296	51650	414630	362980	120475
2001-02	772231		2372355	68860	435671	366811	
Share of ayurvedic industry in total manufacturing by factory sector							
	fixed capital	productive capital	value of output	depreciation	GVA	NVA	net profits
1992-03	0.262	0.461	0.522	0.177	1.173	1.314	0.885
1994-95	0.296	0.981	0.773	0.562	1.603	1.720	1.011
1997-98	0.288	0.381	0.553	0.394	1.646	1.843	1.708
1999-00	0.401	0.638	0.637	0.555	1.981	2.184	0.867
2001-02	0.402		0.753	0.686	2.246	2.538	

Source: ASI and annual reports of the manufacturing units.

In table 3.11 attempts to analyse the significance and contribution of ayurvedic industry to the manufacturing sector of Kerala using ASI data. For some variables the data for year 2002 is not available. The share of major variables like gross output, net value added and gross value added has improved over the years. Data show ayurvedic industry is contributing around 2.24% to the gross value addition and 2.6 percent to the net value added to the manufacturing sector, while the gross output comes to around 0.8 percentage of the total output of manufacturing sector. Share of fixed capital showing an increasing trend moving from 0.26% to 0.4% but productive capital increased from 0.4 percent to 0.9 in 1995 percent, but decreased to 0.6 percent in 2000. This is because of the fluctuation in the share of working capital. Table 3.12 gives an idea about the growth rate of the same variables in the ayurvedic industry and in the manufacturing sector for the same period.

Table: 3.12 Comparison of the Compound growth rate of the growth variables in Manufacturing Sector and ayurvedic industry

	ayurveda	manufacturing	ayurveda	manufacturing	ayurveda	manufacturing
	1993-98	1993-98	1998-02	1998-02	1993-02	1993-02
fixed capital	20.98	18.70	6.84	-1.76	14.48	9.13
productive capital*	17.80	22.36	12.65		15.49	
value of gross output	17.71	16.36	12.76	4.42	15.49	10.89
depreciation	34.50	14.57	23.83	7.81	29.65	11.51
GVA	20.57	12.66	12.12	3.75	16.74	8.61
NVA	20.23	12.38	11.66	3.06	16.35	8.14
net profits*	13.30	-0.67	6.30		10.13	

Source: ASI data and annual reports of the manufacturing units

*ASI data is not available for the year 2002.

Here the growth rate for different periods are shown. As we used in the earlier analysis, two time periods have been taken, i.e. 1993 to 1998 and 1998-2002.

During the time period of 1993-1998, except productive capital, all other variables are showing a much higher growth rate in the ayurvedic industry. As mentioned earlier, the slow growth of productive capital is the outcome of the slow growth of the working capital in the sector. But in the second period, i.e. 1998-2002 there is a decline in the growth rate of the ayurvedic variables as compared to the earlier period, but still much higher than the growth rate of all the factory sector variables. The reduction in the growth rate, may be a part of the overall slow down in the industrial sector. While the growth rate of the factory sector decreased at a much higher rate, in the ayurvedic industry, it is not much significant. This shows the resilience power of the industry created by the increasing demand for ayurvedic products. The secular growth for the period shows a higher growth with respect to the ayurvedic industry. In toto, the growth of ayurvedic industry was higher in the early part of the 90s and in the recent years, with a small slow down in the late 90s.

In brief, though the share of ayurvedic industry to the total manufacturing is less than 3 percent, the growth of NVA and all other variables like gross value added, gross output, fixed and productive capital, net profit etc are higher than manufacturing sector for both the periods and overall. That means, in the manufacturing sector ayurvedic industry is a fast growing segment with higher potential and importance to the development of Kerala.

Sub Section: 3 Prospects for future Growth

3.3.1. Export of Ayurveda Medicines and Herbal Products

There are no official estimates available regarding Kerala's present share in India's export of medicinal plants, extracts/concentrates, ayurvedic preparations etc. The industry sources (personal interview with industry experts) have revealed that Kerala has an excellent potential for increasing the present share of exports owing to its large bio-diversity. This is possible through the export of raw plants and ayurvedic formulation. Ayurvedic food supplements and cosmeceuticals also contribute to a major share in the foreign demand. According to the Report on the Feasibility of Agri- Export Zone, 2003, a team has calculated the possible share of Kerala in the total export of Indian herbal products of the order shown in Table 3.13.

Table 3.13: Kerala's share in exports (2002)

Product	Present export from India (Rs crores)	Estimated share of exports originating from Kerala	
		Percentage	Value (in Rs crores)
Raw medicinal plants	34	20	7
Extracts/ value added capsules	44.5	20	9
Ayurvedic medicine for bulk sale	94	60	55
Ayurvedic medicines for retail sale	151.2	60	90
Total	323.7	50	161

Source: Report on the feasibility of Agro- Export Zone, 2003

The estimate seems to be an exaggerated one. It is based on the assumption that Kerala contributes 50 percent of the total ayurvedic exports from India. With respect to the first two categories the data may be right as the export in this head is mainly from the unorganized sector. But the exports in the categories of ayurvedic bulk sale and retail sale drugs of the order of 145 crores of rupees appear unreliable. The data we have on the total sales value of the major manufacturing sector is less than Rs. 230 crores. This raises doubts as to how the export of ayurvedic medicines and products alone can contribute more than 140 crores. This to be read along with the fact that major companies like Arya Vaidya Sala have not yet entered the export market. The data available with us shows the total export of ayurvedic medicines and ayurveda products from Kerala is not more than Rs.15 crores in the manufacturing sector.

It cannot be expected that the unorganized sector will contribute more than the organized sector to the aggregate in terms of export.

Since Kerala is a consumerist state, liberalisation opens up a wide range of opportunities for the import of a multitude of items. But the ayurvedic sector is an area where thrust on the export front can be made. According to Dr. Ramanathan⁷, Kerala has the potential to export ayurvedic medicines of the value of Rs.100 crores, but earnings are meagre at present solely due to the restrictions with regard to the protection of endangered species. Licensing and other procedures are so stringent that it is simply impossible to export ayurvedic medicines. Most of the India's ayurvedic exports are in the form of food supplements, toiletry products and cosmeceuticals. This is mainly because most of the countries have not accepted ayurvedic medicines as a category of their import sticking to the argument that most of the ayurvedic medicines and drugs are not scientifically proven⁸. So far only a few countries like Malaysia and UAE have accepted ayurveda in its original form and term. This remains a major hurdle in the way of ayurvedic medicine export. There are plenty of medicinal plants available in the countryside, which are not commonly found in the forests. A permit is required for the use of even such items. The problem is aggravated by the fact that for manufacturers from Kerala this license should be obtained from Chennai. Since there is no stringent evaluation of the formulated drugs there are chances that the companies may start producing formulations from which the ingredients of the endangered plants are also included, but difficult to find out in a minor investigation. This is one of the reasons why countries have approved single drug formulations in their import list, but not the complex drugs. So the big manufacturing units are now mainly concentrating on single drug formulations avoiding the complexities of formula drugs. But some companies of Kerala have been successful in exporting the original ayurvedic medicines and made their mark in the international herbal market. Kerala Ayurveda pharmaceutical Limited of Aluva is an example of this.

⁷ From the personal interview with the President, Ayurveda Manufacturer's Association of India (AMAI).

⁸ EU rules suggests that the herbal products are required to be in traditional use for the last 30 years of which, 15 years should have been in EU itself. The 15-year use period in any EU country seems to be an unrealistic expectation given the fact that the original use of the traditional product is in some other countries.

Table 3.14: Export Value of major ayurveda firms, 2001-02 (value in Rs. Lakhs)

Firms	Export	Sales	Export as % of sales
KAPL	150	1200	12.50
Kottakkal Arya Vaidya Sala	100	6200	1.61
Coimbatore Pharmacy, Palakkad	48	1500	3.20
Pankaja Kasturi	160	1400	11.43
Nagarjuna	17.38	1400	1.24

Source: Information from Balance sheets and EXIM Bank.

The growth in exports of the major firms overtime is not available. The markets for Cosmeceuticals and the nutraceuticals are increasing in the foreign countries. The main export destinations of Pankaja Kasturi are Malaysia, South Africa and the Middle East. Malaysia acquires 75% of their export through the Oze marketing agency. Now there are increasing efforts to acquire Russia as one of the export destinations. The UAE is emerging as another major destination having recently recognized ayurveda as an official medical system. Nagarjuna's export has increased from 17.38 lakhs in 2002 to 39.42 in 2003, which accounts for a growth rate of more than 100 percentage. Arya Vaidya Sala Kottakkal has an export of Rs.1 crore only because their main products contain materials, which are banned under the CITES agreement and the company feels that it is unethical to export the same product in another name. Otherwise, the company, which has a huge share in Kerala, could have earned more foreign exchange by exporting more in the form of food supplements. KAPL is rapidly expanding its export market in Europe, Middle East and the US attesting to the growing popularity of ayurveda for the world⁹. Most of the company's products are exported as herbal and dietary supplements except one proprietary drug that is exported to Japan. It has also entered the Russian market recently with their Chyavanaprash. If more and more countries are ready to accept ayurveda as part of their official medical system there is a chance for ayurvedic exports to grow at a higher rate especially in the case of pharmaceuticals rather than in the fields of cosmeceuticals and food supplements. The EXIM bank survey brought out the lack of experience among most of the manufacturing firms in the production of herbal cosmetics and other nutraceuticals. But Pankaja Kasturi with their huge growth in the sales and export shows that innovation and R&D in the ayurveda sector can capture major markets in the foreign countries. Lack of credible documentation of the therapeutic values of medicines and the formulations is a major constraint in exports, especially in countries like the USA. Lack of assured availability of information regarding the demand for exports, quantity

⁹ From the interview with Mr. Anil Kumar, Managing Director, KAPL.

and price, the world trade and other demand dynamics, the specific regulations on the importing countries, and the lack of quality and standardisation are considered to be the major bottle necks of export promotion.

3.3.2. Research and Development and Standardization

With the growing 'beauty sense' of the world, Research and Development (R&D) and innovations are increasingly becoming major factors in achieving/maintaining the market share in the herbal market. This is of major concern especially for companies, which produce cosmeceuticals and nutraceuticals because market for beauty products and dietary market demand are highly responsive to the factors like better quality, innovative products etc. This is equally true with respect to ayurvedic medicine industry, but standardization is a must in this section.

The R&D in the ayurvedic industry is mainly concentrate on: (1) *clinical research* (2) *Process related research* and (3) *medicinal plant related research*. Clinical research is aimed at evolving new methods and procedures for dealing with difficult ailments such as cancer, rheumatic arthritis etc. Process related researches broadly cover activities like bioactive research, standardization, development of new product etc. Now there are more and more efforts to discover new drugs, since after 2005, product patent is going to become very important. These new medicaments are based on classical knowledge but are intended to deal with new ailments. In this direction, steps have been taken under the leadership of Kottakkal Arya Vaidya Sala, an institution, which has being always a pioneer in R&D activities in the ayurvedic industry. There are medicinal plants research activities, which will strengthen supply to meet the increasing demand for the resource. Kottakkal has recently set up a Medicinal Plant Research Centre with a view to satisfy a long felt need for an institution for conservation and study of medicinal plants used in ayurveda. Kottakkal has research collaboration with many national and international institutions like, Council of Scientific and Industrial Research, International Development Research Centre etc.

The firms, which are producing ayurvedic medicines, encourage research mainly on:

- a) standardization of ayurveda medicines
- b) analysis of medicines with an objective to identifying the active ingredients, and
- c) clinical trials of new dietic range of medicines.

There is empirical evidence for the positive outcome of the research and activities. According to Nagarjuna Herbal Concentrates report, R&D expenditure helped Nagarjuna to:

- a) make some of the patent medicines more effective based on the market response
- b) continue the standardization process for quality improvement of existing medicines, and
- c) to Start specialty diabetic clinic with a new range of medicines which had undergone clinical trials and

Co-operation between research institutes and the firms will improve the supply of raw material and quality of products. Research on various therapeutically important areas and medicinal plants are going on in different firms in collaboration with other research institutes. The Arya Vaidya Sala and Pankaja Kasturi have signed an agreement with Tropical Botanical Garden and Research Institute (TBGRI) for further research. Arya Vaidya Pharmacy has received financial help from National Health Institute of USA to develop and consolidate scientific collaboration between researchers at the Ayurvedic Trust, Coimbatore and top US universities.

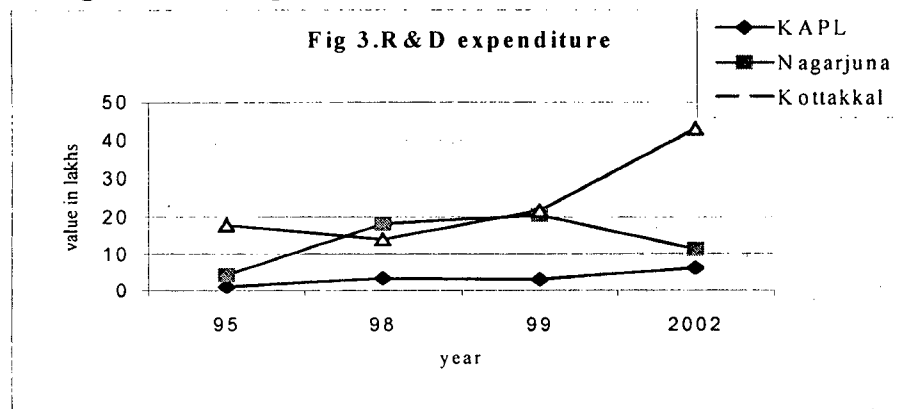
Table 3.15: R&D Expenditure to total sales in percentages

	1994-95	1997-98	1999-00	2001-02
KAPL	0.5	0.6	0.4	0.6
Nagarjuna	0.5	2.04	1.1	0.9
Kottakkal	0.6	0.3	0.4	0.9

Source: Compiled from annual reports

Only three firms' R&D data were available from the balance sheets. For most of the companies the R&D investment is less than 1 percent of their sales turn over. This has to be improved upon as R&D forms an important factor in the sustenance of the industry. But in absolute terms, there is an increase in R&D in most of the ayurveda firms. Kottakkal's R&D expenditure has increased from Rs. 13.19 lakhs in 1992-93 to Rs.42.79 lakhs in 2001-02. In contrast, the pharmaceutical industry as a whole spends only 2 percentage of its income on R&D (M.D Nair, 2004). Primary survey on Pankaja Kasturi shows that they are spending more than 3 percent of the sales to the research needs.

Fig: 3.8 R&D expenditure of major firms



Source: compiled from firm's annual reports

In Kerala, of the firms, which produce nutraceuticals and cosmeceuticals, Pankaja Kasturi remains at the top. This is the first ISO certified company in Kerala. It encourages research activities, mainly concentrating on the new formulations and new products because innovation in the form of products and formulations alone will help these companies to remain in the cosmetics business. Pankaja Kasturi granule was a result of this innovation process. In 1999, the company came out with two more wonder drugs; Ilogen excel Tablets for diabetes and Somatone Capsules for hypertension. Now the company has monopolized the market through the Pankaja Kasturi granule. Products like Kaveri fairness cream, hair tonic etc are doing well and are being reflected in the market trends. So there is a tendency towards a greater diversification of products in the case of the cosmetic- producing firms. This follows from the theoretical standpoint that the more you diversify the firm the less would be the chances of incurring losses.

Now, a large number of institutions like, Department of Science and Technology, Indian Council for Medical Research, Central Council for Research In Ayurveda, Technical Information Forecasting and Assessment Council, Ministry of Science, Department of Biotechnology, Ministry of Environment and Forests etc. are actively involved in the researches related to herbal medicine and products. But in most of the manufacturing units R&D facilities continue to be a major concern. Good Clinical Practices (GCP) and Good Manufacturing Practices (GMP) are becoming more and more important in ensuring that products are manufactured in accordance with the WHO guidelines. Recognising the profound influence of R&D on the prospects and opportunities for the growth of Indian Pharmaceutical industry (includes all the medical systems), the Department of Science and

Technology, Government of India has also mounted a programme for drug development during 1994-95. It supports the joint research projects of Industry and institution and normally works on a 50:50 sharing basis. So far the GOI has invested Rs. 32 crores as its share under this programme and the industries share is Rs. 45 crores making a ratio of 2.2:1 of Industry versus government share. Recently, government allotted 150 crores for R&D in the ayurvedic sector.

In this era of globalization, it is important to promote quality control and certification in the case of ayurvedic medicines to make them suitable for the global market as China does in the case of their herbal medicine¹⁰. Research is vital for the validation of claims and for ensuring that the claims printed on marketing labels are rooted in scientific data. Adulteration of market samples is one of the major hurdles in the promotion of ayurvedic products in Kerala as well as in India. Plant samples in the market are stored under unhygienic conditions and often contain plants, which are not really needed in the combination. Because of this adulteration and altered efficiency, the faiths in herbal medicines have declined. So it is necessary for all ayurveda-manufacturing units to maintain some form of standardization. The Indian System of medicine has adopted the Good Manufacturing Practices (GMP) from June 2002 for ayurvedic product of manufacturing units with the objective of quality assurance covering all the aspects of manufacturing system. It was actually formulated based on WHO report on pharmaceuticals. This has been reviewed and modified from time to time and now it includes various aspects such as location, surroundings, factory premises, water supply, disposal, buildings, disposal of wastes, storage area, machinery and equipment, health and hygiene of workers, documentation and records, and quality control system. A GMP certificate is issued for 2 years. Along with this the Ministry of health and Family Welfare has taken up the task of developing pharmacopoeia standards for both single and compound drugs. By 1970 Government of India had established the Pharmacological Laboratory for Indian Medicine (PLIM). It was approved under the Drugs and Cosmetics Act, 1940, and it helped in laying down the standards of ayurveda and Siddha medicines. There are more than 60 manufacturing units in Kerala, which have obtained the GMP certificate, including, Kottakkal Arya Vaidya

¹⁰ China has better R&D infra structure, which covers five P's namely; Good Agricultural Practice (GAP), Good Manufacturing Practice (GMP), Good Laboratory Practice (GLP), Good Clinical Practice (GCP) and Good Selling Practice (GSP). They have an integrated medical system, in which state council has also suggested a tax-free policy for the production and processing of Chinese materia medica.

Sala, Sitaram Ayurveda Pharmacy limited, Santhigiri, SD pharmacy, Kerala Ayurvedic Pharmaceutical Limited, Nagarjuna etc.

Despite the government initiatives, the interface between the Government R&D efforts and commercial or community enterprise is generally weak and as a result most of the R&D efforts of government is becoming futile.

3.3.3. Selling Cost and Product Pattern

There are two ways of marketing ayurvedic medicines. It can be either 'over the counter' (OTC) with heavy advertisement or promotion through physicians. Earlier, pharmaceutical companies sold what is known in medical parlance as *ethical* products or life saving drugs through chemist's stores. It was only recently that these companies resorted to brand building through advertisements. In the ayurvedic medicine market the successful companies have adopted both the alternatives. OTC and the physicians route is made use of by Kottakkal Arya Vaidya Sala, Arya Vaidya Pharmacy, Coimbatore, Vaidyaratnam Oushadhasala and several others. Thus the general marketing strategy appears to be: a) focus the campaign on one or two OTC products such as *Chyavanaprash*, *Jyothish Brahmi* etc and b) Promote non-OTC products through physicians within the agency premises. Leading companies like Arya Vaidya Sala have introduced another strategy, i.e. open dispensaries and agencies in major allopathic hospitals. This strategy is aimed at improving the visibility of the company and restoring the image of Ayurvedic medicines as effective where allopathy has failed. With product diversification, advertisement is an important determinant of sales especially in the case of ayurveda cosmetics and nutraceuticals i.e. over-the-counter Drugs (OTC) sales can be promoted through the boosting of the advertisement in mass media. Companies like Pankaja Kasturi and Nagarjuna largely use this facility. But as in the case of non-herbal pharmaceutical products, advertisement of the therapeutic drugs is prohibited. The table 3.16 shows the advertisement sales ratio of some of the major ayurveda firms. Both the public firms show almost same picture with around 2% of the total sales value. But the difference is that in KAPL it has declined from 5% while in Oushadhi it has increased from 0.75% (1995-03). But a private firm like Nagarjuna is spending more than 10% of sales value for the advertisement. A conversation with the marketing manager of Pankaja Kasturi reveals that almost 25% of the total sales (around 5 crores) is spent on advertisements. (Year wise trend is not available)

Table 3.16: Advertisement sales ratio of some major ayurveda firms given in percentages

KAPL	Year	1994-95	1997-98	2000-01	2001-02	2002-03
	ratio	5.37	2.35	2.25	2.16	2.48
Oushadhi	year	1990-91	1994-95	1995-96	1996-97	1997-98
	ratio	0.75	0.76	2.02	2.06	1.76
Nagarjuna	year	1992-93	1994-95	1997-98	1998-99	2001-02
	ratio	13.32	8.60	11.03	8.35	11.73
Kottakkal	Year	1992-93	1994-95	1997-98	1999-00	2000-01
	ratio	1.08	1.16	1.87	1.18	2.01

Source: compiled from firm's annual reports

* Data for all the years and all the companies are not available.

In absolute terms the expenditure of KAPL on advertisement has increased from 10 lakhs in 1995 to more than 30 lakhs in 2003. In the case of Oushadhi, it has increased from 1.76 lakhs to 12 lakhs from 1991 to 1998. However, Nagarjuna herbal concentrates show a tremendous increase in expenditure for advertisement (from 55 lakhs to 1.6 crores in 1993- 2002) though its relative share to the sales turn over has decreased. Kottakkal's advertisement share is increasing overtime and now it is more than 2% of the net sales with their absolute share being Rs. 1.13 crores in 2001. Even with a lower level of advertisement expenditure Kottakkal has been able to find a market for its ayurvedic medicines and arishtams, thailams, asavams both inside and outside Kerala owing solely to the trust that institution has instilled with its age old traditional practice. So it has created a brand loyalty of its own among the patients. Santhigiri spends a very meager amount on advertisement, which hardly coming up to one percent.

Table 3.17: Correlation of advertisement and sales- firm wise

firm	Correlation of advertisement and sales
KAPL	.9685
Kottakkal	.9147
Nagarjuna	.8953
Oushadhi	.8535

Source: compiled from firm's annual reports

A very good correlation exists between the sales and the advertisement expenditure, which is shown in Table No.3.17. As seen earlier, a minimum importance to advertisement expenditure is at least given irrespective of the size of the firms. In the case of Pankaja Kasturi, the expenditure on advertisement is almost 25% of the sales value. It comes up to around 3.4

crores according to the 2003 data. They claim that the impact of advertisement is such that it has increased the sales turn over of company by 100% in 2003 compared to the previous year¹¹.

3.3.4. Major Trends in the Product Pattern

The major traditionally produced ayurvedic medicines are arishtams, asavams, ghruthams, lehyams, thailams, choornams, kerams etc. These medicines are prepared according to conventional ayurvedic texts. But of late, innovations and hence new products are the norm. Chyavanaprasam and other health tonics have become popular. Some pharmacies make formulations with the help of the tribal knowledge and the information they get from knowledge owning communities. Jeevani¹² is a very good example of this. Arya Vaidya Pharmacy markets this revitalizing tonic, in collaboration with the Kani tribe. This tribe carries the knowledge about Jeevani, which later obtained by AVP. Now nutraceuticals and cosmeceuticals form the major attraction of the ayurvedic market more than the pharmaceuticals. This does not indicate a down turn in the demand for the ayurvedic pharmaceuticals. There is a wider and larger market for herbal products since there is a global demand for the same, but as a system of medicine, ayurveda still remains to be recognised abroad. Foreign countries are yet to integrate ayurveda in their modern medical system most of the foreign countries have not integrated ayurveda to their official medicine list nor recognized it as mainstream medicine.

As an example of the changing demand pattern, the main products and their sales value in the last two years of Pankaja Katuri is given in table 3.18.

¹¹Information obtained from the personal interview with the marketing manager of Pankaja Kasturi

¹² This has developed from arogyappacha (*Trychopus Zylanicus*), a plant that is known for revitalization, which was considered to be the private knowledge of Kani tribe till TBGRI commercially developed it with the consent of this tribe.

Table 3.18: An analysis of product wise sales of Pankaja Kasturi (in Rs)

Name of the Product	2000	share to total	2002	share to total
Pankaja Kasturi Granules	27190277	45.03	29235058	47.22
Illogen Excel	29897271	49.52	13292733	21.47
Somatone	1184699	1.96	288984.1	0.47
Peekay Tablet	34252.56	0.06	90683.54	0.15
Herbal soaps	1749093	2.90	1209026	1.95
Sandal soaps	322150	0.53	186134	0.30
General medicine			327061.7	0.53
Brahmi capsule			224390	0.36
Kaveri fairness milk cream			17025855	27.50
Kasturi cough mix			3218.88	0.01
Kasturi hair tonic			29199.84	0.05
TOTAL	60377742	100.00	61912345	100.00

Source: Primary survey, 2003

The above table gives an explanation of the major trend in the ayurvedic industry. In the year 2000 we can see that about 92 percentage of the total sales are shared by Pankaja Kasturi medicine (granules and tablets) and Illogen Excel, an anti-diabetic medicine in 2000. But the market pattern has changed in 2002. Kaveri fairness cream (which is a cosmetic) suddenly rose to become the second largest product, with Rs.1.70 crores of turn over and contributing around 28 percentage while the Illogen medicine share declined to 21 percent from 47 percent. Pankaja Kasturi granules and tablets still remain at the top with the total sales turns over of Rs.2.92 crores. This is an evidence of the sudden shift in emphasis from medicine to cosmetics. Kerala has a large market for herbal beauty products.

Table 3.19 Efficiency in utilization of Assets

GROSS PROFIT MARGIN										
	Oushadhi	Sitaram	Pankaja	KAPL	Nagarjuna	Santhigiri	Kottakkal	SD	VR	total
1992-93	-0.06	0.04		0.05	0.06		0.14	0.09	-0.04	0.10
1994-95	0.01	0.01		0.03	0.09		0.14	-0.01	0.01	0.10
1998-99	0.04	0.05	0.03	0.01	-0.07	0.11	0.13	0.00	0.06	0.08
1999-00	0.03	0.01	0.12	0.04	-0.03	0.03	0.12	0.00	0.01	0.07
2001-02	0.09	0.01	0.03	-0.12	0.01	-0.01	0.12	-0.07	0.01	0.05
ASSET TURN OVER RATIO										
	Oushadhi	Sitaram	Pankaja	KAPL	Nagarjuna	Santhigiri	Kottakkal	SD	VR	total
1992-93	0.76	2.16		0.07	1.29		4.49	0.54	0.83	2.08
1994-95	1.01	2.14		0.12	1.04		2.55	3.76	1.28	1.16
1997-98	1.81	2.56	1.78	0.43	0.94	7.39	2.91	0.86	1.97	1.71
1999-00	2.42	1.05	1.82	0.56	1.13	6.41	20.19	1.02	10.31	2.59
2001-02	3.25	1.08	0.48	0.63	1.26	52.81	56.59	1.38	10.27	2.56

Source: compiled from firm's annual reports

Asset Turnover Ratio (ATR) gives the picture of the capacity of the company to generate sales with one rupee of capital investment. This is calculated by dividing the net sales by net assets. The table 3.19 shows that both Kottakkal and Santhigiri are working efficiently. Both these firms show a dramatic improvement in the recent years. Oushadhi, Vaidya Ratnam and Santhigiri show the signs of improvement in 2002. Overall, the ayurveda sector is able to promote sales of Rs 2.6 with an additional one-rupee investment. Gross profit margin is a measurement of a company's profit per unit of sales. A company that has a higher gross profit margin than its competitors and industry is more efficient, though it has declined overtime. As per this criterion too Kottakkal seems to be more efficient. It is calculated by dividing the sales by gross profit. But the industry as a whole shows a decreasing trend as some of the companies like KAPL and SD have turned to be loss-making units.

3.3.5. State Patronage to the Ayurvedic Firms

Institutions such as Kerala State Industrial Development Corporation (KSIDC) and Kerala Finance Corporation (KFC) have been actively supporting the manufacturing of ayurvedic products in Kerala. KSIDC has funded about 14 ayurveda-manufacturing units with an exposure of almost Rs.150 crores¹³. KSIDC has made ayurveda one of its thrust sectors. Tourism development is being promoted with finances being channeled towards improving tourist ayurveda resorts. As a part of the tourism package, the Kerala government gives a maximum subsidy of Rs. 10 lakhs for setting up ayurvedic resorts and Rs. 15 lakhs for ayurveda manufacturing units (EXIM bank, 2003). This shifting priority is mainly based on the enlargement of the linkages of the ayurvedic industry. Adequate support to the industry as well as medicinal plant cultivation and for conservation is also necessary. Usually these loans are given for 4-6 years.

3.3.6 Financing Pattern of Firms

a) *Source:* First we analyse the sources of funds that is available to the industry.

Table 3.20: Share of Internal funds (in percentages)

	Oushadhi	KAPL	Nagarjuna	Santhigiri	Sitaram	SD	Pankaja	V.Ratnam
1992-93	43.2	79.35	29.21	-	67.84	36.17	-	32.39
1994-95	44.4	92.81	76.22	99.53	54.8	97.88	-	48.76
1997-98	97.19	51.54	50.42	96.99	87.46	15.6	35.83	42.72
1999-00	NA	43.58	50.34	95.56	31.35	15.5	72.9	36.79
2001-02	NA	37.69	57.16	96.73	31.57	22.84	76.84	31.66

Source: compiled from firm's annual reports

¹³ KSIDC annual report 2003.

There are mainly three types of sources of funds viz. equity share, loan funds (can be secured or unsecured) and reserves and surplus. Some Ayurvedic companies show a complex of behavior. The fund, which is raised from equity and reserves and surplus, are considered to be the more dependable sources than the loan funds. Here we have made two classifications, i.e. internal funds and external funds. Internal funds include equity and reserves and surplus, while external funds include loan funds. But if the external fund mainly comes from secured loans from the reliable financial institutions it would not be a problem. Otherwise, the high interest rate they would have to pay for the unsecured loans would put an additional burden on the operation of the company. There is an increasing move towards more internal funds among companies like Oushadhi, and Santhigiri. Though Santhigiri is very consistent in the share of equity to total source its dependency on internal fund is more than 95 percentage. For the others it is declining or more or less stable. If we consider the overall industry there is wide variations in the proportion across the firms and fluctuating overtime. In contrast to Santhigiri, Sitaram, SD are very less dependent on the internal funds. Sitaram's equity share is less than 2 percent of the total source.

Table 3.21: Internal funds to total source (in percentages)

	Oushadhi	KAPL	Nagarjuna	Santhigiri	Sitaram	SD	Pankaja	V.Ratnam
1992-93	56.80	20.65	70.79		32.16	63.83		67.61
1994-95	55.60	7.19	23.78	0.47	45.20	2.12		51.24
1997-98	2.81	48.46	49.58	3.01	12.54	84.40	64.17	57.28
1999-00		56.42	49.66	4.44	68.65	84.50	27.10	63.21
2001-02		62.31	42.84	3.27	68.43	77.16	23.16	68.34

Source: compiled from firm's annual reports

Though in the initial years, Pankaja Kasturi depended on loans, in the recent years, the major portion of its funds comes from the reserves and surplus. Companies like Nagarjuna, Oushadhi and KAPL are generally more dependent on loans from institutions like KSIDC, Canara Bank, Federal Bank and KFC. Vaidya Ratnam's two third of the funds comes from loan funds. And in the recent years, its tendency is more dependency on unsecured loans.

Table 3.22: Secured loan to the loan funds (in percentages)

	Oushadhi	KAPL	Nagarjuna	Santhigiri	Sitaram	SD	Pankaja	VR
1992-93	90.65	100	93.49		78.98	0		98.43
1994-95	90.62	100	96.70		87.81	0		4.01
1997-98	100	77.325	90.05		82.81	88.00	93.96	0.74
1999-00		74.36	88.57	100	92.84	76.62	100	
2001-02		72.46	89.06	100	89.76	57.49	100	

Source: compiled from firm's annual reports

b) Expenditure: Table 3.23 gives an overall picture of the main costs incurred by the firms. The single highest expenditure for most of the firms is raw material expenditure. For Santhigiri raw material expenditure is as high as 85 percent.

Table 3.23 Cost segregation of the companies as a percentage of total expenditure (2001-02 data*)

	Oushadhi	Santhigiri	Nagarjuna	Sitaram	Pankaja	Vaidya Ratnam	Kottakkal
Raw material	46	85	39	56	22		51.72
Administration		9				80	
Manufacturing	8	3	55	33	65		11.02
Financial	20	3	4	11	13		7.5
Excise duty			2				
Selling cost						11	
Others	26					9	29.76
Total	100	100	100	100	100	100	100

Source: compiled from firm's annual reports

* More segregation in depth is not available from the balance sheet table.

Different firms have classified their expenditure under different heads and hence a comparison is very difficult. For example, Pankaja Kasturi's 25 percent selling cost is included in the manufacturing expenditure, Vaidya Ratnam's administration cost includes the cost for raw material also and it surely turn out as a single most expenditure and Nagarjuna's manufacturing cost includes the advertisement cost etc. Oushadhi shows a high financial expenditure because of the high interest payments to the unsecured loans. Interest burden has decreased significantly in recent years (not shown in table)

Table: 3.24 Trend in the percentage share of raw material expenditure to the total expenditure for ayurveda industry

Year	Total Expenditure (in lakhs)	Raw material Expenditure (value in lakhs)	Percentage share
1992-93	2441.51	1337.17	54.77
1994-95	4001.97	2038.69	50.94
1997-98	6133.18	3023.31	49.29
1999-00	8142.47	4088.32	50.21
2001-02	8940.76	3964.36	44.34

Source: compiled from firm's annual reports

The table (3.24) gives the share of raw material expenditure of the industry in total expenditure. Though declining over the years, it is the single highest expenditure and ranges between 44 to 55 percent.

c) Employment and Expenditure on Salaries: The Ayurvedic industry offers scope for large employment, particularly because of the linkages it offers to different sectors. So the

calculation of employment generation also becomes difficult. Data of permanent employees of some of the manufacturing units are available. But when the casual employees also are considered, it will be several folds. The number of permanent employees in the ayurvedic-manufacturing sector is considered to be around 12000 (AMAI). Since there are a large number of unregistered manufacturing units, a considerable labour force also works there. In collection, cultivation, trading and processing a huge manpower is engaged. Besides, tourism related ayurvedic resorts, massage centres also gives employment to a large number of youth. Number of permanent employees in some of the leading-manufacturing firms is available. For example Kottakkal Arya Vaidya Sala has 1782 permanent employees (Primary survey). KAPL has 140 permanent employees (Bureau of public enterprises, 2002), while Pankaja Kasturi has 160 (Primary survey). It gives employment opportunities through its different branches and selling counters, which covers almost all-metro towns of India.

Table 3.25: Trend of expenditure on wages and salaries as a percentage of total expenditure

	1990-91	1997-98	1998-99	2001-02	2002-03
NAGARJUNA	13.88	12.80	13.26	16.95	17.50
	1996-97	1997-98	2001-02	2002-03	
KAPL	25.33	22.90	21.89	21.72	
	1989-90	1990-91	1993-94	1994-95	
Oushadhi	19.39	19.17	14.20	9.46	
	1990-91	1992-93	1994-95	1997-98	2000-01
Kottakkal	13.06	13.26	10.72	11.83	11.03

Source: compiled from firm's annual reports

Since the data on all the years across firms are not available the Table 3.25 represents the data of available years only. The salary paid in Arya Vaidya Sala is three times higher than the basic wages prescribed for the ayurvedic medicine industry. Various welfare funds and other perks are allotted for them. KAPL employs 200 people while Pankaja Kasturi gives employment for 150 people. The actual number of workers is much higher as marketing of the medicine demands more labourers. The Table (3.25) shows the share of expenditure on the wages and salaries in the total expenditure of the companies. Most of the companies are spending more than 10 percent for the emoluments. Nagarjuna's share has been increasing over time. Available data shows a decrease in its share in total expenditure for Kottakkal, Oushadhi and KAPL.

Chapter Summary and Conclusion

In this chapter, an attempt has been made to understand the status and performance of the ayurvedic industry in Kerala, with the chief objective of exploring the potential and the extent to which, the industry can be energized to play a major role in the Kerala manufacturing sector. It gives an account of the industry in India as also the importance of the Kerala's ayurvedic industry in its manufacturing sector through the share of key variables and their growth rate. Analysis points some of the factors, which need special attention regarding this particular industry.

Though ayurveda holds 84 percent share of the domestic market, among indigenous medicines, the Indian share in the world herbal trade is less than 3 percent. In recent years, the external market i.e., the export of Ayurvedic formulations to other countries is improving at a fast pace and the USA, Russia and the UAE have emerged as important destinations for Ayurvedic products. China is considered to be the *de facto* authority in world herbal trade with more than half of the total trade. One major finding has been that India is catching up China in the US pharmaceutical market, with the help of the increasing sales of indigenous medical products especially ayurveda. With the given resources and keeping to standards and raw material preservation, it appears that India could register a major presence in the world herbal industry.

The main aim of this chapter was to analyze the present status of the industry in Kerala, which is, considered to be the home of ayurveda, with the great tradition it enjoys. The trend in variables like, sales turnover, net value addition, net fixed assets and net profit as a percentage to net sales etc. are analysed to assess the performance of the industry. All the variables except some profitability ratios like net profit to net sales, return on net worth, all give a positive picture with very high growth rate. Since growth rate in the profit is less than the growth in the sales; there is a decline in the profit to sales ratio. The main reasons for the low growth and a dip in the profit in 2002 are external factors like UK's move against import of ayurvedic products and the inefficiency shown by some firms like KAPL and SD pharmacy.

In the analysis of the contribution of the ayurvedic sector to the manufacturing sector in Kerala and its share in, most of the key variables like net fixed assets, productive capital, net value added and gross value added of total manufacturing etc were found to be low, i.e. less

than 3 percent only. But an important factor to be noted that the growth rate of these variables is much higher than that of the manufacturing sector. This suggests that ayurvedic industry in Kerala is growing and holds prospects of becoming a significant contributor in the manufacturing sector.

In the analysis the factors determining production, raw material expenditure is found to be the major factor influencing production compared to the other expenditures like manufacturing and financial and the significance of the dummy (given in appendix) shows, Kottakkal has an omnipotent presence in the overall ayurvedic industry.

Due to the competitive spirit, the industry opted for Research & development to enhance their venues. These developmental ventures helped to realize the potential areas of Ayurvedic medicines. In the analysis of the different heads of expenditure R&D has emerged as a very important factor for capturing the market. Now most of the researches in ayurvedic industries directed towards improving the quality and standardization of products and to discover new formulations. New formulations and patenting have become the major aim of most of the cosmeceuticals companies. Such formulations are likely to enter the market in a big way. But it is found that most of the firms spent relatively little for R&D. It is between 1-2 percentage of the total sales turnover. In the case of advertisement expenditure, Pankaja Kasturi and Nagarjuna, i.e. the firms, which mainly produce ayurvedic food supplements and cosmetics, lead with 25 percent and 12 percent respectively, while the other firms are spending only 4 percent or less according to 2000 data and is emerged as a major marketing strategy.

Though the production capacities of most of the companies are higher than the actual production and since the resources are in plenty, Kerala's present status in the export front is not as high as expected. Firms like Kottakkal have not entered the export sector while the others have entered in only recently. More over the main hurdle in the way of export promotion is the lack of acceptance of ayurveda as a system of medicine. But companies like Pankaja Kasturi have been successful in finding a market for their ayurvedic products like Pankaja Kasturi granules, Illogen excel and Kaveri fairness cream in Malaysia, UAE etc. Russia and some of the African countries are expected to open their market to India shortly.

In terms of efficiency in using the assets, Kottakkal holds a leading position in terms of asset turnover ratio and return on assets. There is no attempt to analyse the impact of size or

economies of scale and one important point to be noted is that these firms are not strictly comparable. But to get some idea about the performance, a firm-wise comparison has been helpful. Ayurvedic industry as a whole is also found to be reasonably efficient with an asset turnover ratio ranges between 12 to 20%.

The share of expenditure on raw materials is higher than on other items of expenditure in most of the companies. Since medicinal plants also form the bulk of raw materials. As for product demand there is an increasing demand for cosmetics. This is shown from the example of Pankaja Kasturi. Since their major share comes from the export market, it can be assumed that it reflects the western market trend. But in the case of other firms, since they are not in the export market and there is not much diversification in the case of products it is difficult to show the changing structure.

Except Santhigiri, most of the firms show a higher dependence on external funds than internal funds. It could be considered an unhealthy aspect but at the same time the loans are mostly from the government institutions and other secured sources. So though dependency ratio is high on debt the firm is secured enough to face the contingencies. Kottakkal has assumed the role of a leader with respect to mechanisation, while the other firms have followed in the recent years. So by mechanisation and by improving quality and because of the availability of huge resources Kerala ayurvedic industry holds tremendous potential and could perform well, as all major indicators show. Though the share in the total manufacturing is lower, the rate of growth is promising. Efforts are being made in the right direction and the firms are responding to the market in the right way with changes in product pattern and innovations.

Appendix

Concepts and Definitions

Gross Value added = the increment to the value of goods and services that is contributed by the factory and is obtained by deducting the value of total intermediate inputs from the value of output.

Fixed capital = It is the depreciated value of fixed assets owned by the factory as on the closing day of the accounting year.

Working Capital = it is the sum of the physical working capital and the cash deposits in hand and at bank and the net balance of amounts receivable over amounts payable at the end of the accounting year.

Net value Added = Gross value added –depreciation.

Total loan funds = secured loan + unsecured loan.

Net profit = gross profit after tax.

Net sales = gross sales – depreciation.

Net profit Margin = net profit/ net sales

Net Assets = (fixed assets + investment + capital work in progress + current assets like sundry debtors + cash and bank balances + other current assets) –depreciation.

Asset Turnover Ratio = Net sales/ Net assets

Fixed capital = value of fixed assets –depreciation (as per the ASI definition)

Working capital =Includes some total of the physical working capital and the cash in hand at the bank and the net balance of the amounts receivable over amounts payable at the end of the accounting year. (As defined by ASI)

Productive capital = Fixed capital + Working capital.

Depreciation =is consumption of fixed capital due to tear and wear and obsolescence during the accounting year.

WHO has provided the following definitions for reference (methodologies for Research and Evaluation of Herbal medicines, 2001)

Herbs: include crude plant material such as leaves, flowers, fruit, seeds, stem, wood, bark, roots, rhizomes and other parts of plants, which may be entire, fragmented or powdered.

Herbal Medicines: include in addition to herbs, fresh juices, gums, fixed oils, resins and dry powders of herbs. These include 'processing' by various local procedures such as steaming, roasting, backing with honey or other materials.

Herbal preparations: are produced from herbal materials by extraction, fractionation, purification, concentration or other physical and biological processes.

Finished herbal products: consist of herbal preparation made from one or more herbs.

Herbal medicines: include herbs, herbal materials, herbal preparations and finished herbal products, used for medicinal purposes.

Table A1: Sales Value of the firms

sales of the sample units (deflated by price)										
	Oushadhi	Sitaram	Pankaja	KAPL	Nagarjuna	Santhigiri	Kottakkal	SD	VR	Total
1992-93	335.72	90.13		17.59	419.23		2191.52	0.73	63.16	3118.08
1994-95	518.73	152.95		200.41	844.22		3112.17	9.30	122.97	4960.75
1997-98	686.87	304.36	255.82	514.01	976.94	26.46	4438.00	13.27	191.71	7407.42
1999-00	848.92	373.53	586.19	1122.89	1118.53	52.44	5684.15	17.35	1165.05	10969.05
2001-02	933.93	393.06	552.79	1177.90	1244.89	800.25	5614.81	27.45	1250.00	11995.08

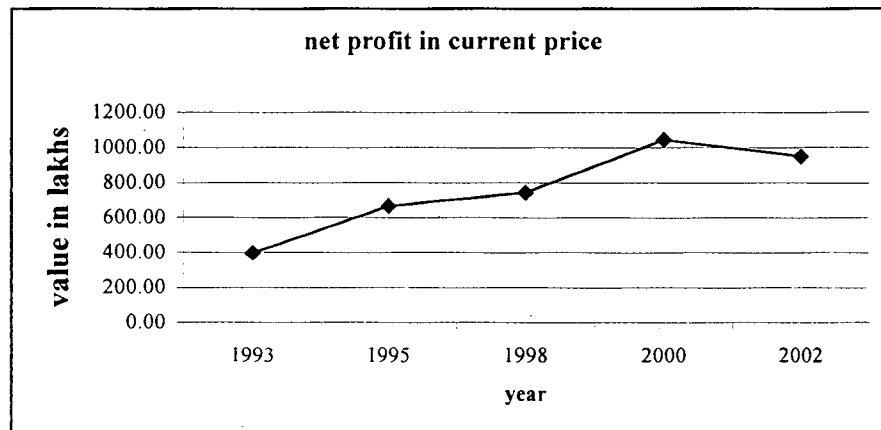
Source: Annual Reports of firms.

Table A2: Net Fixed Assets of Firms

Net fixed assets*(in current price)										
	Oushadhi	Sitaram	Pankaja	KAPL*	Nagarjuna	Santhigiri	Kottakkal	SD	VR	Total
1992-93	272.00	158.69		224.10	12.04		7.75	1.03	38.03	598.08
1994-95	281.45	267.97		305.27	27.37	0.33	62.48	2.16	41.21	853.48
1997-98	297.65	793.29	44.92	387.52	23.97	1.02	247.79	11.95	41.21	1664.37
1999-00	327.42	884.58	116.17	377.31	248.42	5.34	-57.14	13.76	45.48	1732.77
2001-02	344.99	1378.22	158.34	384.71	239.63	5.38	-169.88	15.74	52.48	2151.33

- In the text calculation is done by deflating with the price index of machinery and machine tools for food textiles.
- * For KAPL 1994 figure is used for 1993.

Figure: app.1 Net profit of the ayurvedic industry in current price



Source: annual reports

Cost as Determinants of Output in Ayurvedic Industry

Here we are trying to analyse the major determinants of production in the ayurvedic industry from the cost side using three major firms' data, namely AVS Kottakkal, Nagarjuna and Oushadhi for the period 1990-99 i.e. the firms for which, the data for a reasonably long period is available. In this; Kottakkal is a private trust, Nagarjuna, a private limited Company and Oushadhi, a public sector company. The result is taken as a proxy for the ayurvedic industry. The Sales turnover is being used as a proxy for the output and the major items of cost considered as cost of raw material, manufacturing expenditures, financial expenditures and the net block as a proxy for capital expenditure.

Here, the value of sales is the dependent variable and all the expenditure side variables are considered as independent variables. Since the data available pertains to a period of 10 years we have pooled the data. For the purpose of the analysis we assume the same production and working environment for all the three firms. To identify the firm specific importance two dummy variables have been incorporated.

The production function takes the form of: $Y_{it} = \alpha + \beta_1 R_{it} + \beta_2 M_{it} + \beta_3 F_{it} + \beta_4 N_{it} + \beta_5 D_1 + \beta_6 D_2 + U_{it}$, Where, Y= value of sales, R= raw material expenditure, M= Other manufacturing expenditure, N= net block and D₁ and D₂ are two dummy variables. Dummy is defined in such a way that; D₁=1 for Nagarjuna and 0 for others and D₂= 1 for Oushadhi and 0 for others. Kottakkal's functional form is taken as the basic function. Since the observations are very few (30), ordinary least square regression is used. Normalised (log transformation) data is made use of for the regression. Results are given in the table below.

Table: A.3 regression results-1

Sales turn (dep.)	Coefficient	T value
Raw	.7121*	11.31
Manufacturing	.3248*	5.18
Financial	.0014	0.06
Net block	-.0281	-0.95
D1	-.3137**	-2.10
D2	-.3571*	-2.68
constant	.9134	2.12

* Significant at 1 percent and

** Significant at 5 percent

Though the model shows a perfect fit with high R² of 0.998, it is evident from the table that two explanatory variables are not significant i.e. financial and net block or capital expenditure. That means, wages and salaries and interest payments are not significant in their aggregate in determining the sales of the ayurvedic industry. Kottakkal's major source of investment is from profits ploughed back and has little dependence on bank loans. That may be why the financial expenditure is insignificant in determining production. And as far the emoluments to the employees is concerned, it is relatively less important in this industry. Similarly the net block which is used as a proxy for the capital expenditure is also not significant in the analysis. Even though ayurveda is making use of machines in a larger way, it is primarily a labour intensive industry. So both these variables were aborted from the analysis and the regression was run again. The results are furnished below.

Table: A.4 regression results-2

Sales Value (dep.)	Coefficient	T value
Raw	.6865*	12.62
Manufacturing	.3402*	5.74
D1	-.3458**	-2.45
D2	-.3628*	-2.92
constant	.6615	2.37

* Significant at 1 percent and

** Significant at 5 percent.

Table 3.12 show that while the raw material expenditure increases sales/output too increases. A higher raw material consumption and hence higher sales could be an indication of the higher demand for the ayurveda products and hence the growth of the industry. But the higher raw material consumption can be a matter of

concern as well, since it contributes to more than 50 percent of the total expenditure in most of the major firms. At the same time the manufacturing expenditure, which includes the advertisement and packing charges emerges as another major component and is found to be significant in determining the sales. In the case of Nagarjuna and Oushadhi, which produce 'over the counter drugs' also, advertisement (selling cost) emerged as a major component. Another important factor to be noted is the significance of dummy variables. Both the dummy variables are significant and show that the intercept of the equation for Nagarjuna and Oushadhi is less than that of Kottakkal reaffirming the dominance of Kottakkal in the ayurveda market with its higher market share.

To check the association with the *sales turnover* and the *profitability* of the firm using the same data we have run a regression with profit as a dependent variable and sales turn over as independent variable.

Table: A.5 regression results-3

Profit	Coefficient	T value
Sales	1.3511*	12.09
D1	-.9405*	-4.23
D2	-.7598*	-3.15
constant	-8.0517*	3.71

* Significant at 1 percentage

This association is significant at 1 percentage level. That is, the profit of the ayurvedic industry is determined by sales income. This is truer in the case of Kottakkal than Nagarjuna and Oushadhi. This is shown by the intercept difference. So Kottakkal has influenced this result more than that of the other firms. As the result shows, the major determinants of the growth of output depends on the major expenditures like raw material, manufacturing and financial. And in the overall industrial growth in terms of output, Kottakkal has a leading role.

Chapter 4

AYURVEDIC INDUSTRY AND ITS LINKAGES

In the preceding chapter we have found the growth and performance of the ayurvedic manufacturing industry in Kerala. In this chapter we attempt to analyse the possible linkages that can arise in the growth of the ayurvedic industry in Kerala.

4.1 Linkages for Development - Theoretical Argument

Among the different sectors of the economy, industry is generally considered to be the efficient linkage creator. Hirschman (1958) through his book, 'the Strategy for Economic Development', conferred that an investment in those industries that can create maximum backward and forward linkages would be the best strategy for industrial development. According to him, the back ward linkages come from the provision of input for the industry, which is a derived demand, by inducing the supply through domestic production of the inputs needed for the activity. The forward linkage effects come from the utilization of the products other than the final demand sector, which is as inputs in some new activities. Development policy must attempt to enlist these well-known backward and forward linkages. For this a knowledge about the likely implication on the economic activities through the ways of external economies, complementarities, cumulative causation etc. is required. The total linkage effects can be measured by the sum of the products of these two elements, backward and forward connections. In other words, if the establishment of the industry 'W' may lead through linkage effects, to the establishment of n additional industries with net output equal to X_i where, $(i=1,2,\dots, n)$ and if the probability that each one of these industries will actually be set up as a result of the establishment of the industry W is equal to P_i $(i=1,2,\dots, n)$, then the total linkage effect of industry W,

$$\text{is equal to } \sum_{i=1}^n X_i P_i$$

The backward linkages mainly depend on the size and potential of the industry where linkage originates, but the forward linkage does not depend on this alone. Very often the minimum size of the industry to be created will be larger than that of the industry where linkage starts. Such industries are also called satellite industries.

In a study done by Chenery and Watanabe¹, the industrial linkages for different countries like Italy, Japan and United States were computed. There are two different ways of calculating the linkages. One by taking the interdependent ratios- that is by dividing the intermediate purchases from other industries by output to understand the back ward linkage and the ratio of output used as input by other industries for forward linkages. Another method is taking the inverse of the input- output matrix. This inverse matrix makes it possible to understand the direct and indirect repercussions of an increase in the final demand requirement for any one industry on the other sectors of the economy. This method is considered to be comprehensive. Chenery and Watanabe used the former method for their study. The ratio method has a limitation is that; it is not possible to capture the indirect implications.

The close connection with the Leontief's input-output model, which is a practical application of the linkage impacts, through the input-output tables in different national economies, contributed to the favourable reception of the linkage concept and probably gave it a relative advantage over related attempts at describing the dynamics of industrialization in terms of leading sector (Rostow, 1960), the propulsive industry (Perroux, 1958) or the development block arguments (Dahmen, 1950). On the other hand, this connection that is the connection with the input-output model also sometimes made for too mechanistic a concept of linkage dynamics, which is strongly influenced, by state policies and other institutional factors (Raj, 1975).

Hirschman added that the propulsive industries should bring more linkages and advocated a growth pole strategy in a more unbalanced way. According to Francois Perroux, who developed the growth pole strategy, economic development is the structural change caused by the growth of the new propulsive industries that are the poles of growth. Growth poles first initiate, then diffuse development. A key industry develops and grows at a single pole. As that industry grows, employment increases, purchasing power increases and new industry will be attracted through its linkages². The locational advantage and the resource specificity can bring an industry in to the way of a growth pole with more spread effects than the back wash effects. These will lead to more and more trickledown effects from the core area where the propulsive

¹ H.B. Chenery and T. Watanabe, "International Composition of the Structure of Production' paper presented at the Cleveland meeting of the Econometric Society, Dec. 1956.

² Perroux, F. (1988) 'The pole of development's new place in a general theory of economic activity' in Higgens, B. and Savoie, DJ (eds.) *Regional Economic Development. Essays in Honour of Francois Perroux*. Unwin Hyman Ltd., London.

industry will affect more linkages and the periphery will get the positive externalities and there will be a balanced development in the future. Against this background, we analyze the linkages of the ayurvedic industry in the economy and the trickledown effect it could create in the form of employment and income generation.

4.2 Linkages of Ayurvedic Industry

The increasing acceptance of ayurveda within India and outside has resulted in a mushrooming of ayurvedic manufacturing units, along with a variety of products. The medicinal plant industry and the tourism industry respectively have both linked to the ayurvedic industry creating and contributing a major share to Kerala's industrial growth and are indicative of a growth pole through the cumulative impacts of this cluster.

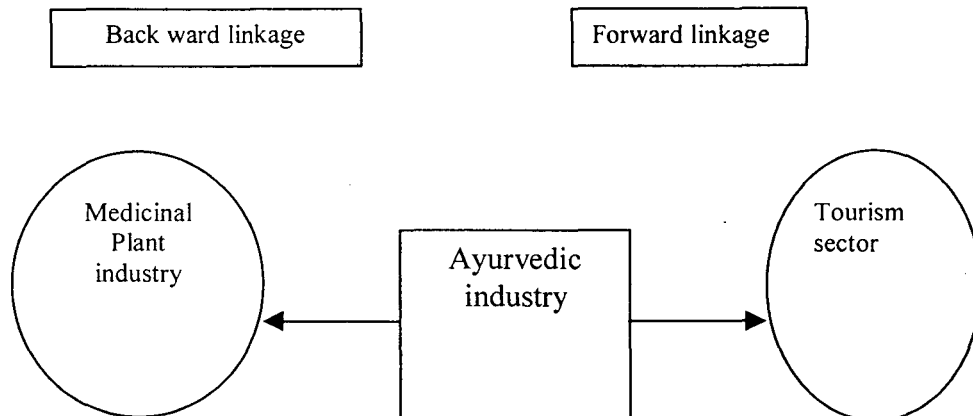
In this chapter, there is no attempt to quantify the linkages, due to the complexities involved in the intra industry trade in the case of medicinal plants. Besides Input-output matrix needs an extensive data to capture the linkage. So an effort has been made here to identify both the backward and forward linkage and to give a description about the actors in the linking process and how the connections are established in the supply chain³.

Data source: This section is largely based on primary information that was collected directly and through interviews. To understand the backward linkage, information was collected from firms like Kottakkal Arya Vaidya Sala and Pankaja kasturi and by interviewing some medicinal plant collectors. Personal interviews were conducted with six medicinal plant collectors, two from Kottur, one from Bonakkad (Thiruvananthapuram), one from Nagarcoil (Tamilnadu), one from Kottakkal (Malappuram), from Pacha, Palode (Thiruvananthapuram) and traders from Attappadi (Palakkad) and from Vithura (Thiruvananthapuram). Information was also collected from Medicinal Plant Federation, Poojappura, Thiruvananthapuram. For understanding the forward linkages, information was collected from Somatheeram and Travancore Ayurvedic beach resorts.

³ A commodity chain (developed by world system theorists as a way to analyse the structure of the world economy (Hopkins and Wallerstein, 1986, Gereffi and Korzeniewicz, 1990, 1994) defined as the network of labor and material processes that precede the finished commodity (Hopkins and Wallerstein, 1986). Commodity chain analysis focus on the sequence of processes which extends from the production or extraction of the primary commodities, through the intermediate processing stages, to the production of the finished products and their sales to consumers. Supply chain management usually focuses on only a single aspect of the commodity chain.i.e. it examines a value chain only in one direction from midway along the value chain. Supply chain management often helps a manufacturer to examine how to secure all the materials needed (their supply) to operate efficiently and profitably. Each production operation in a commodity chain is called a node

The cumulative effect of the recent market trends in the herbal market has led to a quantum jump in the volume of plant materials extracted and traded within the country and exported outside. This has increased the importance of the medicinal plant market and the people who belongs to this trade. A large number of tribals are making a living out of the medicinal Plant industry collecting the plants from the wild and at times cultivating them too. As for forward linkages, in Kerala, medical tourism has emerged as prime attractions in the tourism sector. This provides income for many families and is also an income earner for the economy. In the medical tourism sector, the ayurvedic-manufacturing sector mainly relies on rejuvenation therapies.

Figure 4.1 linkages of Ayurveda



This chapter is organised in two sections. First section gives an analysis of the back ward linkages, while the second section presents the forward linkages. We shall first discuss the backward linkages with the medicinal plant industry.

Section 1: Backward Linkages - Linkage With Medicinal Plant Industry

The growth of the Ayurvedic industry is mainly dependent on several factors like industrial infrastructure, domain of knowledge, managerial ability, raw material availability, external factors and so on. Among these factors, the most important one, which determines future growth and sustainability of the industry is the easy and continuous availability of raw material. The major raw material needed for the ayurvedic industry are medicinal and aromatic plants since this is a health system, which makes an extensive use of herbal resources. Hence an analysis of the working of the medicinal plant market is important, since Kerala possessing large variety of flora and fauna with manufacturers in equal measure. The

medicinal plant market in Kerala has developed well over the last few years as a result of the increase in the number of manufacturers. This is evident from the large number of traders and middlemen who provide an uninterrupted supply of raw material to the main Ayurvedic manufacturing units. The ayurveda pharmacies of Kerala use around 500 plant species for the manufacture of medicinal formulations. Around 95 percent of these medicinal plants, which are in use by the Ayurvedic industry, are directly collected from the wild. Less than 20 species are under commercial cultivation. There has been an increasing demand for the major medicinal plants in Kerala over the last decade (Joby 2000). Secondary studies show that price elasticity is positive in all the major medicinal plants demanded by the manufacturing firms of Kerala (Devi and Joby 2003). This is true for plants endemic (the plants, which cannot be found any other parts of the world) to Kerala also. This shows the unhindered growth of the demand for medicinal plants in Kerala.

Though ayurvedic medicines, do contain the food items like jaggery, spices, cardamom, oils, sugar, salt, milk, ghee, animal products, preservatives, animal products, honey, fresh and dry fruits, around 70 percent of the total raw materials are plant based or in one or the other way related to plant materials. Timely and adequate provision of the raw materials is most important for the manufacturing units.

Table 4.1 gives the backward linkage ratio for the ayurvedic industry and its change over the period 1993-2002. Since more than 90 percent of the raw material used in the sample units consists of medicinal plant, the simple ratio i.e. intermediate inputs used by the ayurvedic industry to value of total output is calculated can be used, as a proxy for estimating backward linkage.

Table: 4.1 Backward Linkage ratio of the ayurvedic industry

Year	Value of output (value in lakhs)	raw material expenditure (in lakhs)	share of raw material to total output (in percent)
1992-93	3789.43	1719.22	45.37
1994-95	5605.70	2621.17	46.76
1997-98	8564.90	3887.12	45.38
1999-00	12275.33	5256.40	42.82
2001-02	13848.76	5097.04	36.80

Source: annual reports of the ayurveda manufacturing units.

Until 1998 the share of raw material expenditure in total output is almost stagnant. Since then ratio has been declining, yet, it still accounts to a high proportion of almost 37percent. One

possible reason for this decline could be that while the price of ayurvedic medicine increased by 3 percent and 9 percent respectively in 1998 and 2000, a similar increase did not occur in the case of medicinal plants though there was slight change⁴. In short, the growth of nominal value of output was higher than the growth of nominal value of raw materials.

In Kerala the major market for medicinal plants exists in Thrissur, while Thiruvananthapuram, Palakkad and Ernakulam are considered to be the minor markets. For Pankaja Kasturi and other South Kerala -based pharmacies, the tribal belt of the southern parts of the Western Ghats are the major providers of medicinal plants, particularly from areas like Palode and Kottur. Primary information collected from Kottakkal Arya Vaidya Sala and Pankaja Kasturi shows that different sections of suppliers of raw materials exist in this field. Arya Vaidya Sala mostly depends on conventional suppliers i.e. the age-old suppliers (contractors) who have been supplying herbal raw materials for the past few decades. But of late, the conventional suppliers have not been able to meet the increased requirements because of the bulkiness of the quantity needed and the non-availability/extinction of some of the raw materials they used to supply. In the case of AVS, NAFED is one major source of obtaining raw materials especially in the case of medicinal plants like Chukku, kurumulaku etc. Now suppliers from other states increasingly interfering in the Kerala market with their raw material supply potential. The linkages of the ayurvedic manufacturing units with the tribal co-operatives and other traditional collectors provide a livelihood for millions of people in the state, thus assuming great significance in the context of employment linkages. This employment linkage factor can be better understood through an analysis of the extent of the chain that goes behind the raw material, made available to the pharmaceutical units.

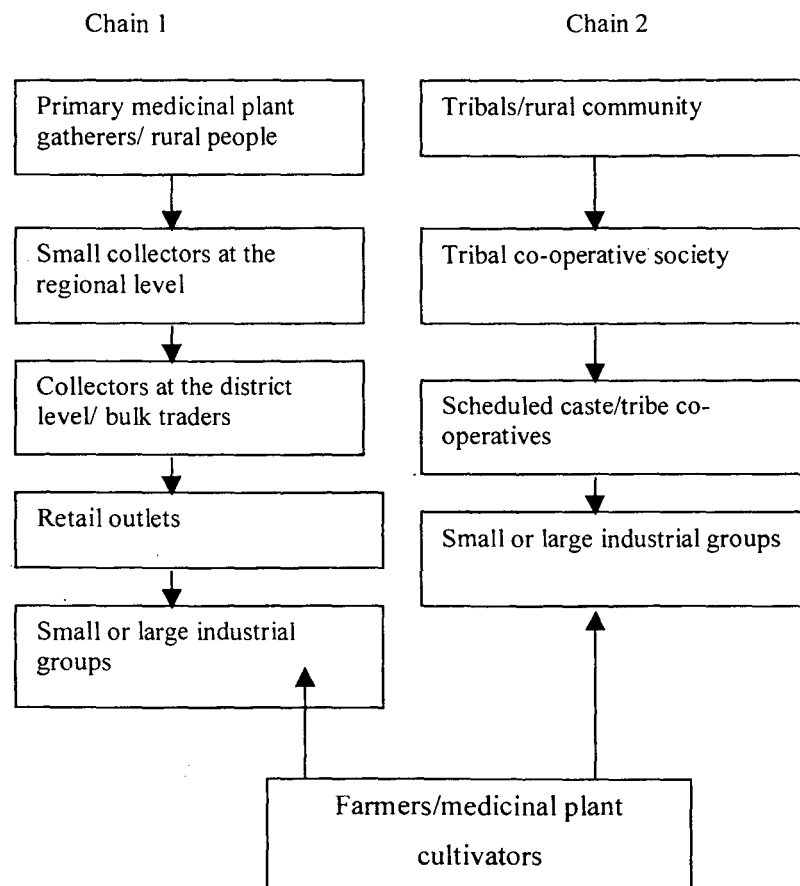
4.2.1. Employment Linkage through Supply Chain in Kerala Medicinal Plant Market

The tribal belt of Kerala is richly endowed with medicinal plants and most of the tribes are dependent on the collection of medicinal plants and their sale to the traders, community groups or directly to the small and large industrial units. So in the medicinal industry, it is very pertinent to understand the relations exist in the supply chain of the medicinal plants.

⁴ Information collected from the major medicinal plant shops of Thiruvananthapuram. Although there are some individual studies, regarding the demand for medicinal plants by different pharmacies of Kerala, even now the detailed data regarding medicinal plant market is not available.

In the Kerala medicinal plant market, there are mainly two types of supply channels. One, which involves a large number of agents (chain 1) and the other mainly from the tribal co-operatives or their federations (chain 2). The chart shown in fig: 4.2 gives in detail an idea about the various intermediaries in different chains. This is mainly a buyer driven supply chain and many intermediaries are involved and influence the market decisions and the final price. The second type of chain involves the co-operatives, which collect the medicinal, and aromatic plants, sell it to the co-operatives and then co-operatives, which in turn supplies it to National Agricultural Federation of India (NAFED). Pharmacies obtain their needed raw material from the NAFED.

Fig: 4.2 supply chain in the medicinal plant market



Source: Primary survey, 2003.

A discussion of the intermediaries in the different chains will give us an idea of who controls the major transfers in the industry. The major agents in the first chain are discussed below:

The collectors are usually tribals or the rural poor, depend on the forests for their basic needs like fuel and fodder. Most often those who go in to the forests for firewood will also collect the herbs. Collection from the wild is a labour-intensive activity often involving entire

families. There is no correlation between the payment given to these collectors and the market price of the commodities. The rates paid to the collectors of the herbs are extremely low, often just a fraction of the price paid by the final consumer. It is undoubtedly clear that this is mainly because of the large number of tiers in the supply chain.

The local agent or traders, who buy the raw material from the collectors, form the second tier in the supply chain. They often operate in different villages simultaneously. They operate most commonly in groups and take the collected medicinal plants at a cheaper rate and transport and sell it to the district based traders at higher rates. The margin they get is invested in the further purchase of the herbs from the rural people. With the growth of the ayurvedic pharmaceuticals this has increased. This increases the stress on the primary collectors. The traders have two ways of increasing their profit margin, either reduce the purchasing cost or increase the selling cost. Traders usually select the first method to gain more profit. This is because of the easy bargaining capability and ignorance of the collectors regarding the market dimensions. So the traders opt the way of exploiting the primary collectors to increase the profit margin. This will ultimately end up in further exploitation of natural resources but less money benefits to the collectors. Some of the plant collectors interviewed told that, some times they travel all the way to the towns in bicycles to sell the herbs that they collected, since what they get from the traders is not at all sufficient to cover the physical and social cost they put. But it is a cumbersome effort to go to the cities and sell their herbs, especially when the collection is not large enough to cover the daily expenses.

The third tier of the chain is mostly concentrated in the cities. They are generally big business men (bulk traders). The urge for high profit starts here. In fact they are the initiators of the business in the sense that they place the orders with the commission agents or the manufacturing units and this results in the backward chain, which extends till the collectors. Value addition also some times take place at this stage, because there are some commission agents or traders, who collect herbs in a raw form but convert it into the semi finished form and then sell it to the pharmaceutical companies. These traders own machines and integrated factories, which convert the raw material into the exact form, which the company needs. They simultaneously sell their raw herbs to the districts outlets. So in any chain there may or may not exist all of the tiers. But the general working of the supply chain in the medicinal plant sector in the major towns of Kerala follows this pattern.

There is another chain (chain two), which follows from tribal collectors to tribal co-operatives. Many of the tiers that come in the earlier chain do not prevail here. In this case, the tribal co-operatives some times supply to the SC/ST co-operatives at the state level and some times to the pharmaceutical units directly. One study has pointed out that the tribal co-operatives of Kerala provide only a very small percentage of the total requirement of Kerala manufacturing units (Meerabai, 2001). In Kerala the marketing is taken in a relatively organised manner, though a large number (34) of tribal co-operatives in different districts through Medicinal Plant Society's four branches in Thiruvananthapuram, Adimali, Thrissur and kalpetta. But the private traders still do most of the trade. Some of the tribal societies have established collection depots but inadequate storage facilities form a major hurdle. In spite of the efforts made by this federation, the private traders' control 60 to 70 percent of the medicinal plant trade. These private traders will offer the collectors a higher return for their product to compete with the federation, but still less than their subsistence needs. In the places like Kottur and Bonakkad in Kerala these tribal communities sell their products through direct auction in the market.

Although the chain working through the federation is more beneficial to the collectors and the pharmacies, either the lack of tribal co-operatives or the under functioning of the co-operatives remains a major hurdle for this medicinal plant market chain. The survey of three pharmacies shows that they have very little connection with the tribal co-operatives. While, AVS depends on the conventional suppliers and buy back arrangements, Pankaja Kasturi gets its medicinal plants mainly from traders.

Many officials in the pharmaceutical company have pointed out that there are advantages in getting the medicinal plants from the traders rather than from the co-operatives. These are mainly easy and timely availability, complete information about the stocks, age-old relations with the suppliers etc. There is a lack of linkage between the tribals and the pharmacies and especially the co-operatives and the pharmacies. This asymmetry of information puts the tribals in the lowest tip of gainers. Table: 4.2 show the difference between the selling prices through two chains. A large price difference is evident here in. In most of the medicinal plant items, the purchasing cost of the firms is 100 percent higher than the selling price of federations. This alone shows the loss of benefits due to the lack of linkages. This co-ordination problem between the manufacturing units and the potential suppliers affects both the companies and the consumers adversely. The structure of relation ships between

collectors, middle men, traders and wholesalers can be highly complex, involving various elements of exploitation, risk, co-operation, collusion and resistance... the character of these relationships can shift through time, from locale to locale and at different points along the marketing chain. Lack of access to information, transport and credit and storage facilities combine to keep collectors at a great disadvantage in the market place. And these conditions provide plenty of opportunities for intermediaries to position themselves as almost unavoidable links in the marketing. Extension of the chain through more tiers may either distribute the benefits unevenly by keeping the sum of the benefits same, or in some cases can lead to an increase in the raw material cost also. But the extent of linkage is clear from this narration.

Table: 4.2 Purchase rates (Rs/Kg) of medicinal items by the ayurvedic medicinal Manufacturing units and Sale of Medicinal item by Co-operatives- a comparison

Sl.No.	medicinal items	X	Y	Z	R
1	Tuber Crops	57.6	24.55	33.05	134.62
2	Root items	13.5	6.33	7.17	113.27
3	Fruits	10.6	3.3	7.3	221.21
4	Barks	92.7	5.66	87.04	1537.81
5	Bushes and Creepers	19.3	7.07	12.23	172.98
6	Liquids	52.1	38.61	13.49	34.94
7	Seeds	17.3	9	8.3	92.22
8	Flowers	50	35.56	14.44	40.61
9	Oil seeds	9	4.02	4.98	123.88
10	Kundirikkam	76	31.24	44.76	143.28
11	Spices	428	128.16	299.84	233.96
12	Miscellaneous	82	54.86	27.14	49.47

Source: Meerabai (2001)

Note: 'X' denotes the average purchase rate of medicinal items by the Ayurvedic manufacturing units of Kerala from 1990-91 to 1993-94. 'Y' denotes the average sales rate of the medicinal items by the SC/ST federation from 1990-91 to 1993-94. 'Z' denotes the price difference. 'R' denotes the percentage of difference.

4.2.2 Features of the Medicinal Plant Market

Both on the supply side as well as the demand side, the market imperfections are apparent in the case of the medicinal plant trade. There is an '*asset specificity*' character attached to the supply side, because full information about the supply function is not possible. Here asset specificity is in the form of the difference in the quality and the form in which they prefer raw materials (whether in semi finished form or fresh form) etc. The agents on the supply side will be aware about the right quality material, right maturity and availability of the plants that are needed for the production. This information will not be available with all the suppliers or gatherers, but only with some (Suneetha, 2001). This works as a hindrance for the new

entrants in the tiers of the market and the firms will prefer their conventional suppliers. In a way, this helps the traders as well, because they are forced to be very careful in the selection of the agents.

4.2.3 Need for Regulated Market Structure

The major problem in the medicinal plant trade is that the price is determined not by the receiver, but by the player of the next tier and is characterised by exploitation. This is somewhat different from what is expected, because the major advantage of linkages is considered to be the 'trickling down' of benefits. Our analysis suggests that 'percolation' of the benefits of the booming industry is not occurring to a large extent, but only a 'drizzling down' is taking place. Although considering that the per unit benefit is less at the lower stratum of the chain, linkage in terms of the number of beneficiaries in the medicinal plant industry, the process creation is very significant. The price of the producer (collector) is determined by the trader who gets it from him, and the price of the trader is determined by the wholesale dealer of the medicinal plants. A relatively rich producer can bargain for a better price. But as a collector comes mainly from a tribal community, he will not be able to bargain. This leads to indifference to preservation and also to adulteration, since their livelihood is threatened otherwise. So in a sense, getting more shares to the first level agents in the chain can to a certain extent ensure the quality of the raw material and sustainable utilisation of the available resources. This can be clearly seen from the table 4.3 given below:

Table: 4.3 Gatherer's Share in the final price of the medicinal plant trade (prices in Rs. are denoted per Kg)

No.	Scientific name of med. Plants (1)	Malayalam name (2)	Avg. Price in firms (3)	Price in private outlets ⁵ (4)	gatherer's (collectors) price (5)	percentage to firm's price (6)	Percentage share of gatherers to private outlets (7)	traders margin* who supplies to firms (8)
1	Withania Somnifera	Amukkuram	30	135	23.5	78.33	17.41	21.67
2	Adatoda Vassica	adalotakam	22	60	13.5	61.36	22.50	38.64
3	Sidda spp	kurunthotti	21	35	4.5	21.43	12.86	78.57
4	Tinospora cordifolio	amruthu	6	15	3.5	58.33	23.33	41.67
5	Phyllanthus emblica	neli	24	75	19	79.17	25.33	20.83
6	piper longum	thippali	115	165	57	49.57	34.55	50.43
7	Tragia involucrata	kodithuva	15	60	8.5	56.67	14.17	43.33
8	Commifora Mukul	guggulu	180	325	75	41.67	23.08	58.33
9	Tricosanthes cucumerina	Kattu padavalam	120	150	45.5	37.92	30.33	62.08

Source: Primary survey, 2003

* Calculated by (100- column 6)

⁵ The private medicinal plant selling shops are included in the category of private outlets. This information is the average price of the sample units. We have taken three private outlets for the analysis.

Table 4.3 shows, the share of the final price that the medicinal gatherer's get in the trade of different medicinal plants, most in demand among ayurvedic manufacturing units. In most cases, the gatherers do not get even half the final price (see column 6). If we compare with the price charged at the open outlets, the share becomes even less, indicating that the rest of the share is cornered by the traders.

Most of the times the wholesale traders intercept these gatherers before they reach the pharmacies and offering them prices, which are reasonably satisfactory promising them more business. Since the material collected from individuals, the quantities that each tribal has at a particular time will be very little. This deters them from approaching pharmacies, since they believe that these pharmacies require bulk amounts. Being unaware of the exact price, the tribals sell their collection at a lower price. Wholesale traders put together the material obtained from the different gatherers and sell it to the pharmacies in bulk at a higher price and obtain a large share of the final price (see column 8). The above analysis raises some issues that need to be addressed.

So the possibility of ensuring better returns through better value addition at the local level and the potential for organisation at the community/ collector levels need to be explored. Organisation and control of production may also be encouraged if consumers or retail buyers express preference for supplies that come from socially and environmentally sustainable production. For sustaining production and ensuring better returns, a number of issues need to be addressed like;

- a) Better information about the current status and potential production of medicinal plants, which would provide a baseline from which a strategy for sustainable production could be developed.
- b) More transparent supply chain information in order to improve the bargaining power of those near the start of the chain, and to help ensure good quality raw materials.
- c) Organisation of collectors at the local level help to put in place mutually enforced codes of collection and sharing of market benefits.

Generally, the manufacturing units get the medicinal plants at a lower rate because they purchase in bulk. The demand from the firms' part is regular and they rely on the conventional suppliers. There are also some herbs that the pharmacies get in the semi finished form in

smaller quantities, the need for understanding value addition in different nodes does not seem to be that relevant in the case of medicinal plants because,

1. The production process involved in making the formulations includes drying, powdering, and making aqueous extracts, boiling, distilling and cooking. Most of these are done in sequence and are logically best done in a central place.
2. If semi-processed material in the form of powders, extracts, pulp etc is purchased, it will be very difficult to ascertain the quality (whatever little quality standards are being maintained) of the raw material being used.

From the point of view of profitability of the firm, the restructuring of the value chain needs attention and should be a matter of primary concern, because the data obtained from the firms shows that a major expenditure item of the firms is that on the raw material and in most of the firms it constitutes more than half of the total expenditure. It is evident that it can be reduced to a larger extent if the chain is restructured. But there is not much effort from the part of the firms towards this, mainly because of the loss in terms of procedures and transaction costs. In short, if the local gatherers are to secure a fair price for their work and participate willingly in sustainable harvesting and local cultivation, new models of trade are called for which will shorten the supply chains. Co-operatives of gatherers or a greater link with bio-enterprises combining cultivation with managed wild harvesting and value added processing might offer new possibilities. These could offer enhanced levels of returns to local communities and hence a sounder basis for the sustainable use of the resources.

But in terms of the employment through backward linkage of ayurvedic industry, the benefit will be substantial and undoubtedly this is visible from the tiers of chain. There is employment creation in each tier of the supply chain through millions of tribal collectors, traders, loaders and co-operative employees.

Table 4.4 Indication of the back ward linkage: Major suppliers of raw materials to the ayurveda medicine-manufacturing units of Kerala.

State (1)	Location (2)	Number of major suppliers (3)	Number of manufacturing units in Kerala having linkage (4)	Major items supplied (5)
Kerala	Thrissur, Kozhikkod, Thiruvananthapuram	20	45	All materials
Tamil Nadu	Coimabatore, Salem, Madras, Kunnathoor	7	40	Root items, gur, oils, ghee, and fruits.
Punjab	Ludhiana, jalandhar, Chandigarh	6	23	Gulgulu, Amukkuram, Kottam, Karpooram, Saffron, Kunthirikkam
Kerala federation	SC/ST Thiruvananthapuram	1	6	Root items, tuber items.

Source: Abraham, A (2003)

Table 4.4 gives a better picture of the backward linkage of the manufacturing units with the raw material suppliers. Column 3 explains the number of major suppliers of medicinal plants. There are 20 major private medicinal plant suppliers (mostly collective traders) from the state. Though manufacturing units depend on the suppliers from outside as well, the major dependence is still on the suppliers within Kerala. 45 pharmaceutical units are linked to the private suppliers. But the number of the tribal co-operatives is relatively low in number. They connect with only 6 manufacturing units showing, the need for increasing the linkage with the tribal federations. Another point to be noted here is an increasing interference by suppliers from outside the state. This necessitates linkage improvement in order to check the outsourcing of raw material.

4.2.4 Factors Determines the Demand for Medicinal Plants

The neo classical demand curve (i.e. higher the price, lower the demand) is not applicable in the case of the demand for medicinal plants. The demand for medicinal plants is such that the huge demand is unresponsive to the price change. The firms adopt a strategy of vertical integration of raw material. Thus only it is a substitution of the source that occurs, while the total demand moves up. But at the same time there is no increase in the natural supply. The reason for increase in the demand for medicinal plants is the same as that for ayurvedic medicines, the demand for medicinal plants being derived demand. In other words, increased demand for medicinal plants are a corollary to the increasing number of patients opting for

ayurvedic treatment and the ineffectiveness of allopathic medicines in alleviating certain chronic diseases like diabetes, blood pressure etc. This direct relationship between the quantity demanded and the price of medicinal plant has been shown by a study done by Devi and Joseph. The result of the study is given below.

Table 4.5 Market analysis of the major medicinal plants

Name of the plant	Quantity demanded (in tons)	Price elasticity of demand	Scarcity ratio (ratio of availability to needed)
Sida spp.	608	0.54	2.79
Tinospora cordifolia	282	0.35	0.00
Terminalia chibula	164	3.31	-3.20
Withania somnifera	149	0.60	-4.02
Adathoda sp	141	1.46	-1.60
Cedrus deodara	138	1.98	-3.80
Woodfordia frutisoca	123	0.42	-5.16

Source: Devi and Joseph (2003)

This table gives an exact picture of the direct relation between price and quantity demanded. All the figures in the price elasticity column are positive. This aspect has led to the non-availability of many of the medicinal plants. Unscientific collection in many places and encroachments in to the forests are leading to the extinction of many rare species. The same table above shows the scarcity ratio of the respective medicinal plants. Except *Sida spp* (Kurunthotty) and *Tinospora Cordifolia* (chittamruthu), all the plants are highly scarce. Scarcity of different plants leads to substitution by other parts of the same plant instead of the right parts, adulteration with the plant that has the same organoleptic properties or same vernacular name, use of exhausted plants etc.

4.2.5 Supply Crisis, Vertical Integration and Backward Linkage

Unsustainable ways of harvesting and unrestricted marketing have led to the reduction in population of some of the high demand medicinal plants leading to a sudden escalation in prices of these crude drugs in the market. AVS has done a research on the propagation of nine species based on its own statistics and experience and found out the declining availability of the raw materials. They have done an analysis of viability of cultivation of these medicinal plants. The results of the study are furnished in (Table 4.6).

Many plants were found viable for cultivation and AVS has started contract-based farming with some of the farmers. Farmers free to sell their products in the open market and if they

find the difficulty in doing so AVS would buy them at the market rate. But some problems faced by farmers include the long gestation period for some plant need for distress sales in the case of perishable species and vulnerability to the market fluctuations etc. This kind of cultivation or contract farming can give more employment and a source of income to the rural poor.

Table 4.6 Viability study in cultivation of medicinal plants in AVS

Name of the plants	Parts used	Annual consumption in AVS (kg)	Economic viability in cultivation	Pure as well as inter crop
Baliospermum montanum	Roots	5000	viable	Pure as well as inter crop
Ceastus fenestratum	Fruits	1500	Not viable	-
Coscinium fenestratum	Stem and roots	10000	Not viable	-
Crateva magna	Bark and leaves	10000	viable	Pure as well as inter crop
Embelia ribes	Fruits	7500	Not viable	-
Holostemma adakodien	Roots	7000	viable	Pure as well as inter crop
Rubia cordifolia	Runners	9500	viable	pure
Saraca indica	Flowers, bark	9000	Not viable	-
Trichosanthes lobata	Whole plant	13000	viable	Pure as well as inter crop

Source: AVS-MAPPA

Arya Vaidya Sala acquires most of the medicinal plants in the raw form except those like *Kurunthotti* (*Sida ssp*) and *Cheru Vazhuthana* (*Solanum anguivi*). There is scarcity in the availability of many medicinal plants as mentioned earlier and some of them are coming from other states like Punjab, Tamilnadu, Uttar Pradesh, Madhya Pradesh etc. AVS gave the example of *Kottam* (*Saussurea lapa*)⁶, the herb, whose cultivation is prohibited under the Wildlife (Protection) Act, and hence is not cultivated in the State. This plant grows in the high altitude areas and is not suitable to Kerala. It is procured from Himachal Pradesh and it is very difficult to get the plant for Kerala pharmacies. AVS, Kottakkal informs that it is unable to get sufficient raw drugs of *Saussurea lappa* (Kustha), *Aconitum heterophyllum* (Ativish), *Trichosanthes cucumerina* (Jangli Padwal), and *Coscinium fenestratum* (Maramanjil), *Kattu padavalam* (*Trichosanthes cucumerina*) for use in their pharmacies. These kind of medicinal plants increase the cost of the raw material and hence affect the profit.

⁶ This herb is an essential ingredient of several ayurvedic preparations, like *thailams* and *choornams* especially for rheumatic complaints.

There are many plants that can be cultivated here itself. This includes many endangered species also. AVS feels that the cultivation of *Cheru Vazhuthana*, which is facing extinction, is very easy and possible in Kerala. Another plant called *kadukka* (*Terminalia Chebula*) currently obtained from Madhya Pradesh can also be cultivated here. These possibilities encouraged many pharmaceutical firms to practice vertical integration, i.e. production of their own raw material. As a step towards this, AVS started a herbal garden in 1970. Now, they have herbal gardens in Kanhirappuzha and kottapputram in Palghat district. The Garden in Kottakkal cultivates about 1000 medicinal plants including *Adalaodakam* (*Adatoda Vassica*), *Brahmi* (*Bacopa monneiri*), *nelli* (*Phyllanthes emblica*), *karinkurinji* (*Nilgirianthus ciliatus*) etc. and few other endangered species as well.

But the problem remains that all medicinal plants used for ayurvedic preparations cannot be completely vertically integrated. That means, in the case of some plants vertical integration is not possible, because they should grow in their original habitat (In-situ) to acquire its therapeutic value. So in the case of the ayurvedic industry there is a constraint regarding the complete vertical integration unlike the other industries. Now various efforts are on from the part of research institutions and from the part of the government for ex-situ⁷ cultivation through seed bank, pollen bank, DNA libraries etc. Tropical Botanical Garden and Research Institute (TBGRI)⁸ of Palode in Kerala is making an excellent effort in the combination of ex-situ and in-situ preservation through gene banks etc. This effort has found expression through contracts and fallback arrangement that they have made with the major pharmacies like AVS and pankaja Kasturi etc.

But, vertical integration avoids the supply chain aspects of the medicinal plant trade, since eschews the role of gatherers and subsequent stakeholders. This reduces the transaction cost involved in the raw material availability. However, this also reduces income available to the gatherers, wholesale traders and other stakeholders. The income generated through the employment in the herbal gardens (through vertical integration) is considered to be much

⁷ In-situ cultivation is the cost-effective way of protecting the biological and genetic diversity on the site itself wherein a wild species or stock of a biological community is protected and preserved in its natural habitat. Ex-situ cultivation is conservation of medicinal plants out of their natural habitat in botanical garden parks, other natural sites, gene banks etc.

⁸ India has a net work of about 140 botanical gardens, which include 33 botanical gardens attached to 33 universities botany departments. But hardly 30 botanical gardens have any programme on conservation. TBGRI is one among the most successful botanical gardens in India that promote conservation activity. The field gene bank programme launched by TBGRI from 1992-99 is now well acclaimed as a very effective method of conservation of medicinal and aromatic plants.

lower than the income distributed through the supply chains. However, complete vertical integration in the ayurvedic industry thus hence ensuring better return to the tribal gatherers is important.

Since, a complete elimination of the supply chain aspect of this industry is impossible, the alternative is to find an economically efficient and sustainable way of cultivation, conservation and utilization. There are many approaches like, eco-system approach⁹; sociological approach¹⁰, technological approach¹¹, economic approach¹², and some holistic resource approaches¹³ for better conservation (Wilder, 2000). But a bio-partnership approach is becoming very important in recent years. This is a sustainable and efficient way of sharing the benefits through the partnership of two agents, here the community that is gathering the medicinal plants and the herbal drug industry. To make sense of this approach in the context of the ayurvedic drug industry, it will likewise be necessary for the industries involved to begin to follow certain practices regarding collection and harvesting of medicinal plants, which, if followed by large enough number, will actually increase the productivity of the entire sector and hence the growth opportunities of each firm in the long run.

Conservation of valuable bio-diversity and realization of social benefits in the form of food security, poverty alleviation and employment are the other options. In fact, the development of 'social contracts' with local communities could address not only the basic problem of supply of medicinal plants raw materials but could also assist the industry in lifting the ceilings to growth identified earlier. A closer involvement with local communities and a clear indication that these target groups started to benefit from a more productive sector can attract increased

⁹ It recognizes the dynamics of the ecosystem as the basis for resource management. These approach aims at the rational allocation and management of resources based on ecological characteristics, component behavior, change processes and functional relationships among different components within ecosystems.

¹⁰ The sociological approach emphasizes the significance of culture, ecological and social ethics, indigenous knowledge, the role of local people and social institutional arrangements in resource management.

¹¹ It aims to monitor and mitigate environmental change using physical tools and modern technologies such as mapping, Geographical Information Systems (GIS), remote sensing, etc, environmental impact techniques, soil management, biotechnology and other techniques.

¹² An economic approach to resource management is based on the premise that there is a need to rationalize the allocation of natural resources and optimize their use through competitive market economies to achieve maximum economic efficiency. This approach has dominated the resource use policies in many developing countries using cost benefit analysis (CBA) as the yardstick against which resource allocation and use decisions are evaluated.

¹³ A holistic resource management (HRM) refers to a management strategy that endeavors to recognize the interrelationships among a wide range of resource management activities and bring together a variety of needs and values into the decision making process. This approach recognizes that management and use of anyone resource inevitably affects the management of other resources and emphasizes on participation, consultation before action, cooperation, communication, coordination, comprehensives and shared decision making.

public investment in research and development, as well as technology transfer and marketing opportunities. Intensive management of plant resources will create new employment opportunities to the rural people and ultimately lead to development of primary processing units in rural areas.

Section 2: Forward linkage: Linkage with Tourism industry

Forward linkage reflects the linkage that emerges through the use of output of the industry under reference by other industries as inputs. The main forward linkage of the ayurvedic industry is with the tourism industry, more specifically health tourism. Data pertaining to this forward linkage is mainly obtained from the department of tourism with primary information being obtained from ayurvedic beach resorts like Somatheeram, Manaltheeram and Travancore beach resorts etc.

Kerala's natural beauty, eco-diversity and the cultural heritage have turned it into an ideal become a holiday destination for different types of tourists. Health tourism is increasingly becoming the major Unique Selling Proposition (USP) for Kerala tourism. According to an estimate of the tourism department around 0.21 million international tourists visited Kerala in 2002 with 10-percentage growth in the last 6 years, while the domestic tourists accounted for 5.24 million with a growth of 300 percentage in the same period. It generated US\$ 900 million income to the State GDP (6.29 percentage to the GDP) with an employment creation of 7 lakhs. The major attraction for the tourists is its natural beauty and its cultural heritage. Ayurveda plays a prominent role in drawing the tourists to this '*God's own country*'.

A separation of purpose-based visits is not clear. The TATA consultancy study shows some light on this aspect. This shows those foreign tourists' ayurveda rates second in the attraction held for tourists of their visit highest intention of their visit. Ayurveda treatments are becoming increasingly popular for many tourists to Kerala as is evident from the mushrooming ayurvedic health resorts in different parts of Kerala. For nearly 7.6 percent of foreign tourists and 5.5 percent of domestic tourists, the purpose of the visit was ayurvedic treatment.

Table 4.7: Purpose of visit for domestic and foreign tourists

Purpose of visit	Domestic Tourists	Foreign Tourists
Vacation/ Relaxation	60.9%	81.60%
Business trip	14.6%	4.20%
Passing through	3.8%	3.40%
Pilgrimage	11.0%	0%
Ayurveda	5.5%	7.6%
Others	4.26%	3.2%

Source: "Economic Benefits of Tourism Sector in Kerala" prepared by TATA Consultancy Services, 1999

Over the last decade there has been a huge spurt in the number of rejuvenation centres, because of the growing demand by both domestic and foreign tourists especially in monsoon season. Hence government offers special Ayurveda packages during the monsoon period, considered ideal for Ayurvedic treatments. This coincides perfectly with the peak period of tourism. Therefore, many hospitals in Kerala are specialising in these treatments. Aiming at tourists, ayurveda is promoted in special ways for e.g. as a relaxing oil massage treatment. Because medical benefits can only be attained with an enduring treatment, the relaxation needs to be stressed to the tourists. The average number of days of treatment in Kottakkal is between 25 to 30 days. The herbs needed for this are grown in gardens by the various Ayurvedic centres in the state and are crushed and ground with the oil. There are also herbal powders and juices, which go into the making of arishtams (liquid portions) and lahams (thick jellies), for consumption. Their smell, extracts and flavours help in various curative treatments, which today attract people, from all over the world. These firms are commodifying the ayurvedic health care system as a rejuvenation therapy for the tourists.

4.2.6 Effective Demand for Herbal Tourism

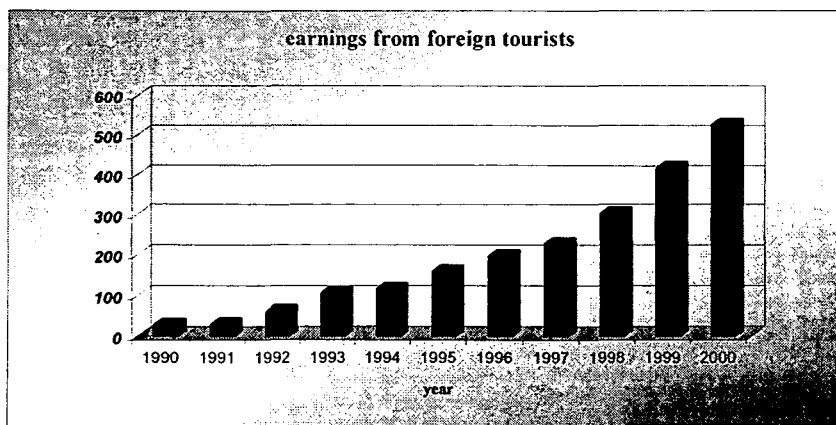
According to an ayurveda physician of a leading Ayurvedic resort, the Kerala tourism markets mainly to access countries like Germany, Italy, France etc. But recently, the market has widened with the increasing demand from United Kingdom and United States. As a result, the demand for the raw materials is bound to rise particularly those herbs, give the better inputs in this rejuvenation therapy. There is no reliable estimate of the demand for raw material in these ayurvedic beach resorts. The huge growth in terms of income of this industry and number of tourists encourages the promotion of Ayurvedic tourism. The awareness particularly among Europeans of Ayurveda is very high. The average duration of stay of ayurvedic tourists in Kerala is 32.4 days. They are also mostly from the high-income group with more than 60% of the tourists having a monthly household income of more than \$12000. (TATA Consultancy

Service, 1999). It can be seen that Ayurvedic tourists spend as high as Rs. 2800 per day. Most of their money goes into the medical expenditure. About 31% of the expenditure goes into the purchasing of medicines, ayurvedic massage etc. That means, as high as Rs. 880 per day per person is spent by each tourist on massages and medicines in Kerala. Though the tourists are worried about the cost of treatment they are satisfied with the treatment that these rejuvenation centres are offering, with the quality control measures adopted by the government.

As mentioned earlier, though tourists from all parts of the world visit Kerala every year, the top five countries in terms of tourists' origin are the United Kingdom, Maldives, Germany, USA and Sri Lanka. A sizeable number of tourists also come from France, Italy, Switzerland, the Arabian Gulf, Japan and Australia. The distribution of tourists by occupation shows that the proportion of service and business segment is dominant. The distribution of tourists according to income level shows that Kerala attracts higher income tourists in both domestic and international categories (Planning board, 2002). Increase in the earnings from the foreign tourists is evident from the figure 4.3. Tourists interested in holidaying, sightseeing and relaxation predominantly visit Kerala. 83% of the foreign tourists are found to be pleasure tourists (Planning board, 2002).

Figure: 4.3 gives the earning in tourism from foreign tourists from the year 1990 to 2000. Kerala has achieved an increase of 26.25% in its earning from the foreign tourist from 2000 over the previous year. The value of earnings has increased from Rs. 26.99 crores in 1990 to 158.76 crores in 1995 and then to 525.3 crores in 1999-'00.

Fig: 4.3 earnings from foreign tourists (in Rs.crores)



Source: planning board, 2002.

Table 4.8 shows the main tourism centres in Kerala and their relative share on the basis of different markets. In these areas, Kovalam is considered to be the centre of health tourism. A large number of spas (rejuvenation centre) are located in South Kovalam. The information available from the resorts shows that a large part of their demand is from the Europeans and the overall tourist data also shows that Europeans account for a major part.

Table: 4.8 Centre wise market shares of tourism

Market shares in various centres						
Centres	AFRICA	USA	East Asia Pacific	EUROPE	MID-EAST	South Asia
Tvm City	0.21	9.16	7.02	27.49	0.98	53.64
Kovalam	0.26	10.64	9.27	63.94	0.82	9.69
Kollam	0.42	9.14	11.45	73.43	0.52	2.98
Alleppey	0.54	19.27	10.77	67.52	0.89	3.02
Kottayam	0.51	12.79	6.03	70.98	0.47	3.4
Kochi	0.96	14.73	12.92	61.86	1.2	4.1
North Kerala	0.55	9.8	9.72	48.96	19.19	2.64

Source: department of tourism.

4.2.7 Treatments that Demands Herbs

According to the Pancha bhuta (5 elements) philosophy, which is considered to be the base of Ayurvedic treatment, every body is made up of Vata (gas), Pitta (heat), and Kapha (phlegm). The five parts that need to be taken care of are vasti (bladder), vamana (digestion), videdama (waste), nasya (nose), and asravisru (blood). The Ayurvedic oils, herbs, powders, potions balance these elements so that the body, mind and spirit are in the right form. The treatments are variously divided into rejuvenative, preventive, and curative. The most common rejuvenative therapy is the herbal oil massage, where two oils are selected according to one's body constituency and massaged lightly but firmly throughout the body-head, back, thighs, and limbs. The massage tones up the whole body and, if followed by a steam bath (in water mixed with herbal powers), is fresh and invigorating. Most Ayurvedic regulars have this massage once a week and swear by its rejuvenative qualities. There are more elaborate treatments, but they may take between 7-20 days at a time. That is why it is preferable that the patients stay at the centers. In fact, outstation and foreign patients come to Kerala on a yearly basis as they claim that the unique oils and powders soothe them. Ayurveda has become a sector that accounts for the lion's share of the income from health tourism as well as the tourism industry as a whole. Kerala, through its *Panchakarma therapy* has attracted a wide number of tourists for treatment alone.

Interviews with the physicians of the health centre show that they are using both raw herbs as well as the semi finished products. For raw herbs they generally depend on the medicinal plant collectors and for the semi finished herbs, ayurvedic manufacturing units. Though the leading resorts have their own herbal gardens or plantations, most of the medium and small-scale rejuvenation centres still depend on the conventional collectors. This implies that the supply chain we have seen in case of the ayurvedic-manufacturing units will be prevailing here too. These tourist resorts have a linkage with the ayurvedic-manufacturing units for processing raw materials like oil, lehyam, choornam etc. An over view of the health tourism industry suggests that it has more linkages with the medicinal plant industry than with ayurvedic manufacturing industry.

4.2.8 Government as a Facilitator for Promoting Health Tourism

Government acts as a facilitator and catalyst in the field of Tourism and encouragement has been given to private participation in the tourism sector. Government has taken Ayurvedic tourism as a new thrust-area in Tourism, marketing the concept. The state has become technology savvy, utilizing video conferencing with experts and other modern techniques for tourism promotion. Other reasons for a considerable growth of the industry are: 1) private sector has responded to the outside demand positively in selling the services, 2) entry of trained youth to the industry in big numbers, 3) better sharing and dissemination of information on health management through ayurveda via Internet and satellite channels.

Considerable concessions/incentives have been announced for tourism projects. A tourism Investment Guidance Cell is functioning in the department to give guidance to the investors. Innovative schemes such as "Grihasthali" for the conservation of heritage building, approval centers, approval for motels, home stay schemes etc have been introduced to enhance the quality of the services provided. Ever since tourism was declared an industry in 1986, several incentives, which were available to investors in other industries, have been extended to the tourism sector. These include investment subsidies, electricity tariff concessions, technical guidance, marketing assistance, publicity through government publication, help in availing loans etc.

4.2.9 Somatheeram- An Example for Employment Linkage

Department of Tourism has brought out a new scheme for the classification of Ayurveda Centres into '*Green Leaf*' and '*Olive Leaf*' categories based on the qualities in facilities and services. Those centres, which satisfy these criteria, will get the classification accordingly (details given in appendix). Green leaf is the highest available classification. Only the ayurveda centres, which are classified/approved by Department of Tourism, will be eligible for claiming 10% state investment subsidy or electric tariff concession offered by Department of Tourism, Government of Kerala. Only these centres will be considered for publicity and promotion through print and electronic media by the Department. So far (till 2003) there are 34 accredited ayurvedic centres, which have satisfied the criteria of either green leaf or olive leaf (names given in appendix).

Somatheeram Ayurvedic Beach Resort is the pioneering institution in this type of venture in Kerala. It was started in 1985 in Chowara, south of Kerala, near Kovalam. It is providing high quality ayurvedic therapeutic facilities to the tourists. This institution is certified with green leaf. This resort has a turnover of more than 12 crores (personal interview with the officials). Though it started with only 12 cottages, now it has about 59 cottages and it can accommodate around 150 people for treatment at a time during monsoon season the cottages are always full. It has a sister concern called 'Manaltheeram' with 37 cottages. There are around 320 permanent employees working here now. This is an example of perfect vertical integration in this sector. As a rough estimate around 4000 to 5000 per year foreigners visit this institution annually for treatment. They are well aware of the outcome of the ayurvedic treatment and various rejuvenation therapies. They are mainly come from European countries like Germany, Italy etc. Now they are getting more and more tourists from United States also. They have started consultation centers in countries like Germany, Italy and Switzerland etc.

The resort has a herbal garden growing up to around 400 species of plants occupying two and half acres of land. According to their chief physician, the raw material needs are satisfied from the herbal garden and the medicines like lehyam and Kashayam are prepared at the resort itself. They depend on medicinal plant collectors for some rare species and for semi finished raw materials and branded oils on ayurvedic-manufacturing units.

There are a large number of small ayurvedic beach resorts, in the same area, which do not have their own production or herbal garden. They depend on conventional collectors and some of the manufacturing units for their raw material supply. Such kinds of linkage are not seen in the case of the leading ayurvedic beach resorts like Somatheeram, Manaltheeram, Travancore heritage etc.

Summing Up

In this chapter our endeavor has been to understand the linkages that the Ayurvedic industry generates with other industries and the dimensions of those linkages. This includes both backward and forward linkages. Backward linkage with the medicinal plant industry has been analysed in a more extensive way, in terms of the employment and the income that the major agents get using the theory of supply chain. We have used the share of raw material expenditure in total output as a proxy for the backward linkage, considering the fact that that about 90 percent of the raw materials used are mainly medicinal plants. The analysis shows that the linkage was 46 percent in the initial 1990s, which then declined to 37 percent in 2002 mainly because of the price rise in the ayurvedic pharmaceuticals, while the price of the medicinal plants remained more or less stagnant.

The backward linkage analysed through the supply chain shows that two types of relationships exist. In the first type of chain, since there are many tiers of channeling, the share is distributed among the agents and lastly reaches the medicinal plant collector. Though this chain is more employment oriented, it is considered to earn less income for each agent. In the second chain, the number of tiers are less and hence the income acquired by the collectors through the federations are higher than in the earlier chain and it leaves a lesser burden on the end users also, because of the comparatively lower price of raw materials. Notwithstanding this, the companies prefer the first chain mainly because of the timely availability, availability in the company premise and the age-old relation with the suppliers etc. Therefore there are less linkages between tribal co-operatives and the companies.

Another type of linkage is with medicinal plant cultivation per se. Arya Vaidya Sala, Kottakkal is promoting this kind of traditional plant cultivation. Since there are a large number of endangered species, cultivation of the same are very useful to meet the demand for the future. AVS- MAPPA study has found out some of the viable species that can be

cultivated in Kerala. Though some of the companies like AVS are trying to vertically integrate the raw material market, a complete integration is not possible because of the specific nature of the medicinal plants. So the linkage through channelisation of the raw material will exist, as the industry grows. Better subsidy from government for intercrop or other type of medicinal plant cultivation and better assurance from the companies like AVS for the buy back arrangement will give a greater initiative for the cultivator, and the linkage arising from that will create better returns to the collector.

As far as the forward linkages are concerned, no quantitative analysis has been done, since the data regarding the use of output from ayurvedic industry in the health tourism sector is not available. There are a large number of health resorts coming up following the success of the health tourism in Kerala and growing demand from international consumers. Customers for health tourism are mainly from Europe as in the case of tourism industry as a whole. A study shows that of the main purpose of the visits, about 8 percent is ayurvedic tourism and this industry is mainly concentrated in the south of Kerala.

Though some of the leading ayurvedic beach resorts are vertically integrated with their raw material market, small resorts are still dependent on the conventional collectors and some of the manufacturing units for semi-finished goods. But information available so far shows that the tourism industry has more linkages with medicinal plant industry than the ayurvedic manufacturing industry. So the government has been moving in the right direction in giving more importance to the medicinal plant industry than to the manufacturing industry. These industries together can initiate cluster development in Kerala, which can create more externalities than mere 'drizzling down' impacts and that will be a big step towards the generation of a 'growth pole'.

Appendix

Major Ayurvedic treatments in health resorts

Udwordhan is for those who want to lose weight. A restricted diet of varadhi kashayams is given, followed by special 'upward' massages with herbal oils and powders, in order to reduce body-fat.

Nasyam can cure a series of ailments from headaches and sinus to mental and paralytic disorders. It involves removing the vitiated Kapha (phlegm) from the head and neck by pouring herbal oil and juices into the nose.

Snehapanam is meant for various stomach and skin diseases it involves the internal consumption of herbal oils, starting with an amount of 30 ml. Depending on the digestive capacity of the patient and the seriousness of the ailment, the quantity of oil is slowly increased to a maximum amount of 250 ml.

Rasayanam is a rejuvenative therapy and involves a nutritious diet and the intake of medicated oil with milk. This quantity is increased by 10 g according to the digestive capacity of the patient.

Sirodhara is for problems of insomnia, fatigue, paraplegia, and bad memory. It involves the pouring of medicated oil on the forehead in a continuous stream, which improves the power of the sensory organs.

Sirovashti is meant for those with nervous, mental and speech problems, as for facial paralysis. It is a specialized treatment, where a 'cap' made of urad dal (lentil) powder is fixed on the head (sometimes it involves shaving of the hair). Medicated oil is poured into the cap from a hole on top, until the oil comes out from the nose.

Kwatha and **Mathura Vasti** are meant for arthritis, paralysis, nemiplegia, as well as gastric problems. It involves the intake of kashayams and oils so that the impure wastes (vasti) are removed.

Tharpanam and **Pudapakam** are applied for eye diseases. It involves the pouring of herbal juices and medicated ghee (clarified butter) into the eyes, for strengthening the optic nerve, as well as the intake of herbal medicines at night.

Vamana is meant to cure various stomach ailments, as well as leprosy, leucoderma and psoriasis. It involves the intake of various herbal medicines and a strict diet.

Aragahaswedam is for gynecological problems, slip-disc, and chronic back complaints. For this, the patient is massaged with medicated oil and then sits in steaming-hot water mixed with herbal leaves and powders.

Niavarakizhi can be applied for arthritis, spondylitis, and stiffness of muscles. A kizhi consists of a cloth-ball, which is filled with hot and roasted herbal powders and leaves that is rubbed into the body. The kizhi for this treatment is made up of medicated rice powder, herbal oils, and leaves.

Pizhichil is well known for the rejuvenation of old people, as well as a preventive for premature aging. It is a very popular treatment. The kizhis are made up of four medicated oils, and are rubbed vigorously all over the limbs until the whole body perspires. This treatment can be done only once a year.

Criteria for Olive Leaf Certificate

For obtaining Olive Leaf Certificate, Ayurveda centres should observe the following criteria.

i) Technical Personnel: -

- a) The treatments/therapies should be done only under the supervision of a qualified physician with a recognised degree in Ayurveda.
- b) There should be at least two numbers of masseurs (one male and one female) having sufficient training from recognised ayurveda institutions by the Government.
- c) Following the Kerala tradition, male will be massaged only by male masseurs and female by female masseurs.

ii) Quality of Medicine and Health programme: -

- a) The centre will offer only those programmes, which are approved by the approval committee.
- b) The Health programmes offered at the centre should be clearly exhibited. The centre should also exhibit the time taken for normal massage and other treatments. The generally approved time limit for a massage is 45 minutes.

c) The medicine used should be from an approved and reputed firm. These medicines should be labeled and exhibited at the centre.

iii) Equipment: - The Centre should have at least the following equipments.

a) One massage table of minimum size 7 feet x 3 feet in each treatment room, made up of good quality wood/fiber glass.

b) Gas or electric stove.

c) Medicated hot water facility for bathing and other purposes

d) Facilities for sterilization.

Every equipment and apparatus should be clean and hygienic.

iv) Facilities: -

a) Minimum two numbers of treatment rooms (one for males and one for females) having minimum size of 100 sq.ft with width not less than 8 feet. The rooms should have sufficient ventilation and it should be with attached bathroom of size not less than 20 sq.ft. The toilets should have proper sanitary fittings and floors and walls should be finished with proper tiles.

b) One consultation room having minimum size of 100 sq.ft with width not less than 8 feet. The room should be equipped with equipment such as BP apparatus, stethoscope, examination couch, weighing machine etc.

c) There should be a separate resting room of minimum size 100 sq.ft with width not less than 8 feet, if the centre is not attached with a hotel/resort/hospital.

d) The general construction of the building should be good. Locality and ambience, including accessibility, should be suitable. Furnishing of rooms should be of good quality. The entire building, including the surrounding premises, should be kept clean and hygienic.

Criteria for Green Leaf Certificate

The basic facilities required for Green Leaf Certificate is the same as Olive Leaf. In addition to the requirements for Olive Leaf, the following additional facilities also are essential to get Green Leaf Certificate.

i) The general construction, architectural features etc of the building should be of very high standard. The furnishing curtains, fittings etc should be with superior quality materials.

ii) There should be adequate parking space in the premises.

iii) The bathroom should have facilities for steam bath.

The following are additional desirable conditions to get Green Leaf Certificate.

i) There should be separate hall for meditation/yoga.

ii) The centres should be at picturesque locations with greenery in abundance and quiet atmosphere.

iii) There should be herbal garden attached to the Centre.

4.A.1 Accredited ayurvedic centers by Government of Kerala

SL.NO	Name of The Center	Address	District	Classification
1	M/s.Somatheeram Ayurvedic Resort.	Chowara, Kovalam.	Thiruvananthapuram	Green Leaf
2	M/s. Coconut Bay Beach Ayurvedic Centre.	Coconut Bay Beach Resort, Mulloor P.O, Vizhinjam.	Thiruvananthapuram	Olive Leaf
3	M/s.Travancore Heritage Ayurvedic Centre.	Joy's The Beach Resort Pvt.Ltd., Chowara P.O. (via) Balaramapuram.	Thiruvananthapuram	Olive Leaf
4	M/s. Manaltheeram Ayurveda Beach Village.	Manaltheeram Beach Resort Pvt. Ltd,Chowara P.O. (via) Balaramapuram.	Thiruvananthapuram	Green Leaf
5	M/s Taj Varkala Ayurveda Centre.	Taj Garden Retreat, Janardhanapuram, Varkala.	Thiruvananthapuram.	Green Leaf
6	M/s. Ashtamudi Resorts.	Malibhagom, Chavara South, Kollam - 691584.	Kollam	Green Leaf
7	M/s.Amrutha Ayurveda Hospital	Kottarakara,Amurtha Ayurveda hospital, Near T.B. Junction, Kottarakara.	Kollam	Olive Leaf
8	M/s. The Marari Beach Ayurvedic Centre	Mararikkulam.	Alappuzha	Green Leaf
9	M/s. Ayurvedic Speciality Hospital	Near YMCA, Kannamkode, Adoor.	Pathanamthitta -691 523.	Olive Leaf

10	M/s. Softouch Ayurvedic Centre	Hotel Le Meridian, Near NH Bye Pass Kundanoor P.O. Kochi.	Ernakulam	Green Leaf
11	M/s. Amrutham Ayurveda Hospital	Athani P.O., Bank Road, Aluva	Ernakulam	Olive Leaf
12	M/s Nagarjuna Ayurvedic Centre.	Okkal, Kalady - 683550	Ernakulam.	Green Leaf
13	M/s. Tamara Spa Ayurveda.	Taj Malabar, Willington Island, Kochi 682009, Ernakulam.	Ernakulam.	Green Leaf
14.	M/s Rajah Healthy Acres.	Perumanoor, Chalisseri.	Palakkad- 679536.	Green Leaf
15	M/s Kairali Ayurvedic Health Resort.	Olassery P.O, Kodumbu, Palakkad 678551.	Palakkad -678 551	Green Leaf
16	M/s Taj Ayurveda centre.	C/o Taj Residency, P.T.Usha Road.	Kozhikode - 673032.	Green Leaf
17	M/s Coconut Lagoon Ayurvedic Centre.	Coconut Lagoon P.B.No. - 2, Kumarakom.	Kottayam- 686 563	Green Leaf
18	M/s Ayurmana	C/o Kumarakom Lake Resort, Kumarakom North, Kottayam - 686 566	Kottayam	Green Leaf
19	M/s. The Taj Ayurvedic Centre.	Taj Garden Retreat, 1/404, Kumarakom.	Kottayam - 686 563	Green Leaf
20	M/s Kadavu Ayurvedic Health Centre.	C/o Kadavu Resort, Azhinhilam, Malappuram - 673 654.	Malappuram - 673 654.	Green Leaf
21	M/s Ideal Ayurvedic Resort.	Vizhinjam Mukkola, Between Chowara Jn, South Kovalam.	Thiruvananthapuram- 695 501	olive leaf
22	M/s Chamundi Hill Palace Ayurvedic Resort.	Near Kanjirapally, Edakunnam.P.O.	Kottayam - 686512	olive leaf
23	M/s Ayurvedic Health Centre.	Club Mahindra, Lake View Munnar, Chinnakanal- P.O, Munnar.	Idukki.	olive leaf
24	M/s Charakas Ayurveda Hospital	Thodupuzha Municipality(28/2) Vengalloor P.O., Thodupuzha, Idukki.	Idukki	olive leaf
25	M/s. RIBIS HEALTH CARE Pvt. Ltd.	Dr. Franklins Panchakarma Institute Research Centre, Chowara P.O.	Thiruvananthapuram	olive leaf
26	M/s. Nikkis Nest Ayurveda Centre	Pulimkudi, Aazhimala Shiva Temple Road ,Chowara P.O.	Thiruvananthapuram	green leaf
27	M/s. Linchu Ayurvedic Resort.	Kovalam, Sea Rock Beach, Kovalam P.O., Thiruvananthapuram- 27.	Thiruvananthapuram	olive leaf
28	M/s. Warriars Hospital and Panchakarma centre	Puthiyavila P.O., Velenchira, Kayamkulam, Alappuzha	Kayamkulam, Alappuzha	olive leaf
29	M/s.Panchatheertha	Kamyakam Haven Resort, Kothad P.O. Ernakulam - 682 077.	Ernakulam	green leaf
30	M/s. Merry Land Panchakarma Institute	Airport Colony, Akaparambu, Mekkad P.O., Nedumbassery	Ernakulam	olive leaf
31	M/s.Dhanwanthari Ayurvedic Centre	Kalpaka, Perumanoor	Kochi	olive leaf
32	M/s. AYUR YOGASHRAM	Parlikkad, Wadakanchery, Thrissur	Thrissur	olive leaf
33	M/s.Ashtavaidyan Thaikkattu Mooss Vaidyaratnam Nursing Home	Thaikkattussery, Ollur, Thrissur.	Thrissur	olive leaf
34	M/s. Sitaram Ayurveda Sepciality Hospital	Sitaram Hospital Road, Veliyanoor, Trichur - 680021.	Thrissur	olive leaf

Chapter 5

GROWTH OF THE AYURVEDIC INDUSTRY –AS SEEN FROM TWO CASE STUDIES

This chapter is an attempt at understanding the growth and performance of the ayurvedic industry, and the standardisation and commercialisation of the traditional heritage and linkages in the industry through two case studies, Kottakkal Arya Vaidya Sala (AVS hereafter) and Pharmaceutical Corporation of Kerala (Oushadhi). The choice of these two firms has been based on their high market shares and on the availability of data. While the former is a trust, the latter is a public concern. This will help to understand the difference between private and public ownership of firms.

5.1 Arya Vaidya Sala, Kottakkal

While both internal weaknesses¹ and the marginalisation by the British Government were ruining ayurveda along with British rulers' efforts to establish western medicine in the domestic market, Vaidyaratnam P.S. Varier started the Arya Vaidya Sala as a humble manufacturing firm of native medicine in 1902. The modes of ayurvedic treatment that had existed until then were suitable for the traditional village economy, which was based on the localization of services and the direct and personal contact between the physician and the patient (Varier, R; 2002). The fundamental change brought about by AVS was the standardisation and commercial production of medicines. In that sense AVS was one of the pioneers of large-scale ayurvedic medicine manufacturing in India.

The growing faith, in ayurveda and its treatment over the years is reflected in the growth of AVS in the last one century. It has grown from the position of a humble shop of ayurvedic medicines with a small kitchen where medicines were prepared according to the scientific ayurvedic texts to, an institution, which has 33 percent share in the state ayurvedic manufacturing output with around Rs. 70 crores of annual sales value. Now it has two factories (one at Kottakkal and another at Kanjikode, Palakkad district), and three well-equipped ayurveda hospitals (two at Kottakkal and one at Delhi). Among the three hospitals,

¹ The internal weaknesses of ayurveda were related to the factors like the stagnation of new knowledge, ignorance of the practitioners and non-availability of the quality medicine. The main drawback of the system was that its knowledge had become dated.

one is a charitable concern, where treatment for the poor patients is given free of cost. Now this is a vertically integrated firm owning well-maintained medicinal gardens, with many units engaged in medicinal plant research along with education and publication activities. In addition AVS has branches all over Kerala as well as Delhi, Calcutta, Chennai and other major metropolitan cities of the country. There are innumerable agencies and sales depots throughout the length and breadth of the country. Several thousands of people earn their livelihood through this institution reflecting the linkages of the industry. In the new herbal era, the products of AVS have entered foreign markets as well. The international demand for ayurvedic medicines and the foreign exchange earning potential of this industry is evident from this.

Table: 5.1 Sales of medicine in the early years of inception

Year	Amount (in Rs)
1902	1033
1907	10215
1912	28936
1917	45857
1922	71052
1927	97689

Source: Varier, R (2002)

Table 5.1 shows the efficacy and the fast growth that AVS has achieved in the first quarter of its life span. There is an increase of 100 times in the sales value of medicines over these years. In the 1930s, the institution spent around Rs. 10000 for paying its employees for their services to the institution, each one getting two to four annas (one anna was 1/6 rupee). This gives an idea of the number of people who served the institution (shashtivarshika charitham, 1929). The ownership of AVS was transferred to a board of trustees with the demise of its founder (1969) bringing a great change in its organisational structure.

The main objective of the trust is to maintain and develop AVS and the charitable hospital. According to the will of Vaidyaratnam P.S Varier, the agenda of AVS were the following:

1. To manufacture medicines
2. To sell the medicines prepared
3. To charge patients according to their financial capacity
4. To promote ayurveda by further research and study so that it can be of use to a greater number of people.

As Raghava Varier (2002), rightly points out the first two objectives give the company an industrial character and becomes the main source of income while the second two objectives are aimed at the income allocation for charity and the systematical development that branch of medicine. The institutional growth in the early years is reflected in an increase of the value of total assets from Rs. 5.16 lakhs in 1944 to Rs. 14.17lakhs in 1952.

5.1.1 Share in Net Value Added

Table: 5.2 Share in Net value added (Values in Rs. Lakhs)

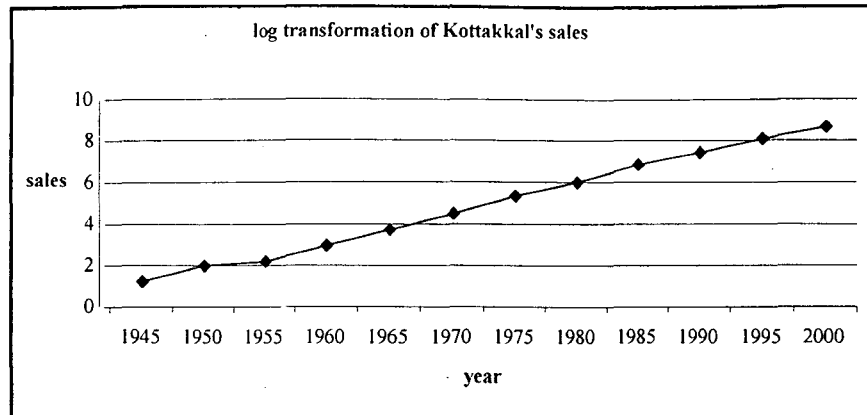
Year	total value added by the industry	Kottakkal	share
1992-93	2383.77	1252.55	52.54
1994-95	3938.03	1941.24	49.29
1997-98	5989.86	2733.27	45.63
1999-00	7927.73	3308.99	41.74
2001-02	9311.26	3604.81	38.72

Source: compiled from annual reports.

Table 5.2 gives an idea of the change in Kottakkal's share in the overall ayurvedic industry in terms of value added. From the early 90s there is a decrease in the share of the value added from 52 percent to 39 percent in early 2000. This is because some new ayurvedic manufacturing units were established in the latter half of the 90s. These new manufacturing units were successful in acquiring a considerable share in the value added in a short span of time. For example, Pankaja Kasturi has got around 4 percentage of the total value added of the ayurveda industry. Another reason is that the Net Value Added of the public sector companies like Oushadhi and KAPL show an increasing trend. As a composite result share of Kottakkal in Net Value Added is on a decrease in the last decade. This is a reflection of the manufacturing units of the industry and increasing competitiveness amongst them. Yet, Kottakkal remains the dominant player in the industry with around 40 percent share in value added.

5.1.2 Sales and profit growth of AVS

Figure 5.1 Sales trend of AVS



Source: annual reports

The figure 5.1 is the log transformation² of Kottakkal's sales value. This shows a persistent positive trend in the growth of sales from its inception. The sales value has increased from 7.5 lakhs of rupees in 1949-50 to 5854 lakhs in 2000-01.

Table: 5.3 Sales growth rate in last five decades

Years	Compound Growth Rate
1950-60	9.79
1960-70	17.03
1970-80	16.16
1980-90	15.01
1990-00	12.91

Source: compiled from annual reports and the Raghava Varier, 2002

The decadal growth rate shows a decreasing trend after the 1960s, but because of the problem of higher initial base. But the important point is that, even during the last three decades, Kottakkal was able to maintain a growth rate of more than 10 percent. This is borne out by the trends in the sales income and profit rate during the last decade. Profit margin will be a true representation of the growth.

² Log transformation has taken because the trend is taken from an extreme lower value to a higher value, and the absolute data will be difficult to show in the diagram. Here our intention is to show the trend, and hence normalised the data through log transformation.

Table: 5.4 Profit to sales trend in the last decade (Value in Rs. Lakhs)

Year	Profit	Sales	Profit to sales
1990-91	130.4	1546.13	8.43
1991-92	131.74	1787	7.37
1992-93	303.4	2191.52	13.84
1993-94	308.12	2607.29	11.82
1994-95	431.75	3172.22	13.61
1995-96	420.91	3698.76	11.38
1996-97	386.63	4079.25	9.48
1997-98	582.49	4502.34	12.94
1998-99	431.85	4831.67	8.94
1999-00	688.22	5620	12.25

Source: compiled from annual reports of AVS

There has been an increase in the absolute profit on the one side and an increase in the sales income on the other in the last decade. Profits have increased from Rs.130 lakhs in 1990-91 to 688 lakhs in 1999-00. But the profit to sales ratio is somewhat fluctuating. It has improved its position from 1990-91 to 1999-00. In the mid 90s it has shown a higher value than at present. This growth in Profit margin has to be read along with the growth in branches and agencies in the last decade (Table 5.5). That means there is a shift from a localised distribution of medicine to a more extended market and hence there is an improvement in sales and Profit Margin.

5.1.3 Expanding Market through Branches and Agencies

Opening branches and dispensaries is considered the major strategy for marketing. There are thirteen new branches, which are directly controlled by AVS and hundreds of sales depots and agencies associated with them. These together give employment to several thousands of people. So many people make a living through the marketing, transporting and loading unloading work of medicines. The chronological establishments of the direct branches are given below. It can be observed from table 5.5 that the time gap in establishing additional branches has decreased in the latter half of the 20th century. Besides, more and more branches were established outside Kerala. This shows the increasing and widening of demand for ayurvedic products in general and AVS products in particular.

Table: 5.5 Establishment of the direct branches of AVS

Year	Branches
1916	Kozhikkod
1932	Palakkad
1946	Tirur
1957	Ernakulam
1959	Trivandrum
1962	Alwe
1968	Chennai
1975	Kannur
1976	Coimabatore
1982	New Delhi
1996	Calcutta
1998	Kottayam
1999	Secundrabad
2002	Madurai

Source: brochure of AVS

Besides an ever-increasing network of agencies exists in almost all the towns of Kerala. Innumerable sales depots and distribution centres of AVS have come up in and outside Kerala. All the branches are under the charge of qualified and experienced physicians who are always available for free consultation. That means, these branches are both medicine distribution centres as well as service providers. AVS has more than 1000 such agencies including, those in Singapore and Malaysia. It also represents the increasing employment opportunities that ayurveda offers.

5.1.4 Mechanisation and Modernisation of Production

As mentioned in the initial chapter, in the earlier days, production and consumption of ayurvedic products were limited to a comparatively smaller area of operation because of lack of transport facilities, unsophisticated communication networks and hence several obstacles to large-scale production. But there was always a push for further production due to the booming demand. Thus an institutional growth seemed necessary through mechanisation of the plants and hence increases in the capacity. This resulted in greater efforts to install machines, to use better technical know-how and above all more research oriented standardised production of medicines. The mechanisation and thereby standardisation of production and consequent large scale production can be seen in the following table:

Table: 5.6 chronological order of mechanisation

Year	Item
1949	Installation of AC generator
1950	Installation of counter line grinding system
1952	Wet grinders for gulika
1952	Installation of additional AC generator
1967	Steam boilers of one and half ton capacity
1967-80	Setting up of steam plant and its expansion
1968	An engineering department
1977	Fully automatic filling system at Kottakkal
1987	Setting up of a new arishtam plant at Kanjikkod.
1987	Fully automatic tableting system
2000	Setting up of a new semi-automatic leham/choornam plant at kanjikkod.

Source: Varier, R (2002)

These mechanisations were largely the result of the demand-push factor. But it did not make any change in the basic principles of ayurveda. But those items, which were difficult for the patients to consume in liquid form, were changed to dried form with the help of machines without losing any of its basic qualities. A fully mechanised tableting section was established and both gulika and lehya were prepared with the help of the machine. Electro-mechanical equipment was necessary for large-scale production and kinetic energy was made use for power instead of coal. That is, mechanisation was adopted in order to cope with the speed of transforming market and for satisfying the increasing demand and not to replace the traditional process as such. The mechanisation effort helped AVS to suddenly shoot up their production and satisfy their demands spread over different countries like Burma, Ceylon, and Iran, Malaysia, Iraq, Africa and Europe.

5.1.5 Vertical Integration

Vertical integration of the raw materials was perceived by AVS as a means of reducing the cost of production and preservation of the medicinal plants. Due to over harvesting and the ignorance of the gatherers, many Ayurvedic herbs now face extinction. Many herbs, which were available in Kerala, cannot be found now. For example the case of *Kadukka*. This herb is now available only in the North Indian states. This is a matter of great concern as one of the arguments put forth for developing ayurvedic industry in Kerala is its locational advantage in terms of easy availability of the raw materials. If over harvesting continues, it will affect the future prospects of the herbal industry. As discussed earlier, the main reason for irrational gathering can be the extension of supply chain and hence the increasing pressure on the tribals to collect more herbs to make their livelihood. This problem is aggravated by adulteration,

which can happen if the original herbs become restricted in supply. Various efforts are taken from the part of the companies to get over this problem. The major plan for the unhindered supply of raw material is the vertical integration of the industry with the source of raw material or the maintenance of herbal gardens by the company. AVS mainly depends on the conventional suppliers, but now most of them are not able to supply the raw material because of the lesser availability and the huge bulk requirement.

AVS started its own cultivation of medicinal plants in 1982. The organisation has 300 acres of herbal garden. AVS is cultivating medicinal plants and herbs at Kanhirappuzha and Kottappuram in Palakkad district for commercial use. According to the raw material manager of AVS, the destruction of forests and the scarcity felt in the availability has necessitated this sort of cultivation of herbs at Kanhirappuzha was the first to be started. The correct identity of the hundreds of medicinal plant poses a problem and in order to overcome; they started a research garden on an eight-acre plot at Kottakkal where identification of the herbs is undertaken and specimens grown, under the supervision of a research officer. But the herbal garden is only able to satisfy 2% of their raw material requirement. The annual raw material requirement of the company is now calculated to be more than 7000 tons. The company feels that the financial and physical management of the herbal garden is difficult but opting for more and more cultivation of medicinal plants is a better choice in terms of cost minimisation and is relatively more attractive than collection, in terms of uniformity of availability and management burden.

Contract cultivation efforts from AVS: AVS has also started cultivation with the help of IDRC (International Development Research Centre), and has drawn up recommendations regarding *in situ* cultivation of the medicinal plants. The best provenance of some of the species were selected and cultivated using the suitable techniques. The planting materials raised by the project were supplied to the state Forest department as well as to interested farmers. The farmers engaged in this project were ready to start cultivation of medicinal plants as an intercrop or pure crop. Planting materials of early yielding and economically viable species were distributed under this program free of cost to farmers as an initial incentive for cultivation and inspections of their fields and technical inputs were provided at frequent intervals. The farmers were free to sell their harvested raw material in the open market, and in case they faced any difficulties in this regard, the AVS was prepared to

purchase this at the market rate. In addition to this, training was important to farmers on the cultivation and need for further preservation was also given. The farmers were thus informed the need for the preservation of rare species like *Gmelina Arboria*, *sterio spermum personatum*, *aegle marmelos*, *premna serratifolia*, *Saraca asoca* and *crateva magna*, which were the major medicinal plants undertaken for cultivation according to the climate and the nature of soil. In order to save the farmers from the clutches of the middle men and avoiding the erosion of profit, AVS took a major hand in forming a farmer's society and getting it connected with NABARD.

5.1.6 Research and Development

Table: 5.7 Research and Development Expenditure (in Rs. Lakhs)

Year	Total expenditure	R&D expenditure	Share
1992-93	1474.8	13.19	0.89
1994-95	2248.64	17.75	0.79
1997-98	3143.31	13.63	0.43
1999-00	3977.74	21.47	0.54
2000-02	4012.76	42.79	1.07

Source: compiled from balance sheets of AVS

AVS has developed a research wing in Kottakkal in order to take the advantage of the modern scientific know-how and technology. Apart from the quality control of the raw materials and end products, this wing is engaged in the research work for modernising production. AVS has research collaboration with many institutes and research organisations like IDRC, CSIR, Department of Science and Technology and Indian Institute of Chemical Technology to evolve modern standards for material and processes and products. A programme on peptic ulcer has been undertaken along with CSIR. Researches on cancer and arthritis are under way. Research on medicinal plants is also given importance. For which purpose, a research garden is maintained in the AVS premise.

Table 5.7 shows the expenditure share on research and development activities. Though the share has been increasing over the last decade, it is still low when calculated in percentages. But absolute amount does not seem to be so low. It has increased from Rs. 13 lakhs to 43 lakhs in the last ten years.

5.1.7 Major Products

AVS has been adhering to the ancient text of ayurveda in the manufacturing of medicines and treatments and has been maintaining the standards without compromising on quality. The main products of AVS are *dasamoolarishtam*, *Chyavanaprash*, *Kottamchukkadi* (medicated oil), and *Dhanwantharam Kuzhampu*. Of these, *dasamoolarishtam* accounts for 10 percent of the market share i.e., around 6 crores in terms of value. To meet the increasing demand for these medicines, they have started another factory at Kanjikkod in Palghat district. Earlier only arishtams and asavams were produced here. After the commissioning of the new plant, churnams and lehams are also being produced.

5.1.8 Export of AVS

As per the will of Dr. P.S. Varier, AVS continues to be a promoter of pure ayurveda and is not attracted by the beauty- business centred product manufacturing. They want to maintain the sanctity of ayurvedic system both in the services they render as well as in the manufacturing process. Though the company can export the medicines under a different label as per the Government of India Act, it does not attempt to do so. It is considered as an unethical business practise (EXIM bank, 2002). The foreign earnings that the company gets is mainly from export of medical services. The medicine exporting destinations of AVS are confined to Malaysia and Penang. These are traditional ayurvedic medicines, not ayurvedic products. AVS does not have any patented products and has no plan to get in to this segment either. At present Kottakkal is getting one crore from its medicine export and 1.5 crore from the export of its services. The company believes that its products have a high export potential but the government policies on the export front remain a major hurdle. There should be efforts from the part of the government to make this system more popular in the foreign countries and to make their import laws more flexible. In a sense, state patronage should increase in the ayurvedic medicine sector. If this happens, they can increase their exports to more than 10 times the present value. The huge potential of this industry can be well understood from this.

5.1.9 Price comparison of Ayurvedic medicine of Kottakkal with other companies outside Kerala (1999 price)

Table: 5.8 Medicated ghee/ choornam/lehyam/bhasmam

firm	MPG(200g)	TC(50g)	CP(500g)	PB(50g)	SB(50g)
Kottakkal	85	12	84	52	12
IMPCOS	NA	4.33	66.5	199.4	36.7
GH	107.5	20	105	NA	NA
VAD	100	10	80	500	75
Zandu	NA	33	166	750	100
Dabur	NA	11	NA	430	180

Table: 5.9 Aristam/medicated oil/Kashayam/vati/gulika

firm	Amr (450ml)	Asok (450ml)	Das (450ml)	DT (200ml)	DKK (200ml)	RK (200ml)	CPV (100nos)	YG (100nos)
Kottakkal	27	26	42	52	50	78	85	110
IMPCOS	33	31	49.5	76	NA	NA	NA	125.3
GH	40	40	55	77.50	65	95	125	112.5
VAD	27	33	33	240	40	40*	NA	NA
Zandu	39	37	32.5	NA	80	80	53	22
Dabur	45	43	56	NA	90	27**	48.8	34

Source: compiled from Kottakkal's price list and ITCOT report o ayurveda medicine.

*200 gram

**Maha rasnadi kashayam.

Column include Kottakkal – Kottakkal Arya Vaidya Sala, IMPCOS- IMPCOS, Chennai, GH- George Herbals Private Limited, VAD- The Venkata Ramana Ayurveda dispensary, Zandu- Zandu Pharmaceutical Works Limited, Dabur- Dabur ayurvedic Specialities limited, New Delhi.

Row include: MPG- Maha Pancha Gavyam, TC- Triphaladi choornam, CP- Chyavanaprash, PB- Pravala Bhasmam, SB- Sankha Bhasmam, Amr- amrutaristam, Asok- Asokaristam, Das- Dasamoolaristam, DT- Dhanwanthara Thailam, DKK- Dasamoola Kadathangadi Kashayam, RK- Rasnadi Kashayam, CPV- Chandra Prabha Vatika, YG- Yuvaraja Guggulu.

As stated earlier, AVS has a unique product mix. The major ayurvedic medicines that Kottakkal produces generally fall into the category of Aristams, medicated oils, Kashayams, gulikas, choornam, lehyam (lehams), bhasmam, medicated ghee etc. In the above table, Amrutaristam, Asokaristam and Dasamoolaristam include in Aristam category, Pravala Bhasmam and Sankha Bhasmam fell into the bhasmam category, Dhanwanthara Thailam medicated oil, rasnadi and Dasamoola Kadathangadi in gulika mahapanchagavyam in medicated ghee, and triphala choornam in choornam Chyavanaprash in lehyam. In the preceding table, we have made a price comparison between main products of Kottakkal with some other popular ayurvedic firms of India. Since Kottakkal mainly produces the medicine items only that category has been considered. In the category of Aristams, medicated oil, choornam, medicated ghee and bhasmam, Kottakkal shows comparative price advantage i.e. they are less priced in Kottakkal compared to the other companies of India. Kottakkal is the largest raw material user for this category of ayurvedic medicines. This cheaper price is the

result of cheaper availability of raw material and the economies of scale that the company enjoys. In the case of Amritaristam, Asokaristam and Dasamoolaristam, Pravala Bhasmam and Sankha Bhasmam also the price is lower. The table shows that in the case of bhasmam, the price difference is very large. At the same time in the category of gulika i.e., Yograj Guggulu and chandraprbha Vatika companies like Dabur and Zandu outweighs Kottakkal in their cheaper price. In the case of Chyavanaprash, the price competition causes mainly from IMPCOS, Chennai and The Venkata Ramana Ayurveda dispensary. But here, though the price is higher, Kottakkal faces stiff competition because of the brand loyalty that the latter enjoys.

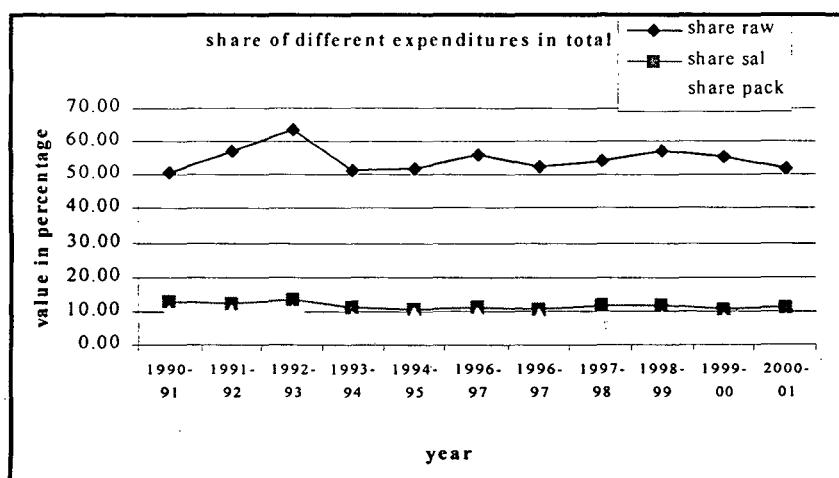
5.1.10 Expenditure pattern of Kottakkal

Table: 5.10 Expenditure on Major Items

Year	Total cost	Raw material	Share raw material to the total cost	Salaries and wages	Share of salaries and wages(%)	Packing and materials (%)	Share packing and materials (%)
1990-91	1074.39	542.75	50.52	140.3	13.06	105.14	9.79
1991-92	1288.44	735.44	57.08	159.21	12.36	127.06	9.86
1992-93	1474.8	938.97	63.67	195.59	13.26	144.47	9.80
1993-94	1845.9	945.9	51.24	205.01	11.11	145.42	7.88
1994-95	2248.64	1170.93	52.07	241.13	10.72	207.43	9.22
1996-97	2646.64	1489.55	56.28	286.26	10.82	248.09	9.37
1996-97	3031.37	1598.84	52.74	316.7	10.45	257.67	8.50
1997-98	3143.31	1705.33	54.25	371.99	11.83	205.79	6.55
1998-99	3494.02	1999.12	57.22	408.69	11.70	277.8	7.95
1999-00	3977.74	2213.31	55.64	419.55	10.55	295.2	7.42
2000-01	3993.12	2065.36	51.72	440.33	11.03	300.22	7.52

Source: compiled from balance sheet of Kottakkal.

Figure:5.2 Major expenditure share trend of Kottakkal



Source: compiled from balance sheet of Kottakkal.

Over the last decade, the cost of raw material purchase of Kottakkal was consistently above 50 percent and ranged from 50-63 percent and formed the major single cost of the company. Medicinal plant constitutes more than 90 percentage of the raw material. This signifies the importance of medicinal plants for the industry. AVS depends chiefly on the conventional providers of medicinal plants. The second highest cost is accounted by the wages and salaries of the employees and officials coming up around 10-13 percent. At present, there are 1779 permanent employees in the company, and as mentioned earlier they are paid around three times higher than the ayurveda (alternative medicine) wages act. Their wages are revised from time to time mostly in every three years.

The third major item in the cost structure are the packing and material charges. It is around 7-10 percent of the total expenditure. Kottakkal has shown an increasing expenditure on advertisement is increasing. Kottakkal also adopts the modernisation techniques in a minor way. The advertisement cost shows a fluctuating behaviour in the last decade, but the year 2001 registered the highest allocation for the advertisement expenditure. It showed around 14 times increase from 1990-91 to 2000-01. The selling cost constitutes only less than 3 percentage of the total expenditure, while most of the other ayurveda firms incur around 10 percentage of their expenditure on this. The firms like Pankaja Kasturi increase their selling cost expenditure every year and it is now around 22 percentage of the sales turn over. They have found that there is an increasing correlation between sales turn over and advertisement expenditure. And the product pattern of these companies also differs from that of AVS. This indicates increasing competition.

Though Kottakkal has the ability to produce other popular products like cosmeceuticals and neutraceuticals, its basic structure and foundational objectives, as a charitable trust, compels in to concentrate on the Ayurvedic traditional medicines. They strictly adhere to the tenets of the pure ayurveda and less affected by commercial market driven factors. This is reflected in their export pattern also.

Table: 5.11 Trend in advertisement share in the total expenditure

Year	Total cost	Advertisement cost	Advertisement share in total expenditure
1990-91	1074.39	8.33	0.78
1991-92	1288.44	10.06	0.78
1992-93	1474.8	23.72	1.61
1993-94	1845.9	17.99	0.97
1994-95	2248.64	36.02	1.60
1996-97	2646.64	58.15	2.20
1996-97	3031.37	42.34	1.40
1997-98	3143.31	82.94	2.64
1998-99	3494.02	49.76	1.42
1999-00	3977.74	65.27	1.64
2000-01	3993.12	113.88	2.85

Source: compiled from Annual reports of AVS, Kottakkal

Other than increasing the number of branches and agencies Kottakkal has adopted other conventional strategies like, Over the Counter sales and popularising through physician. The services of qualified ayurvedic consultants are made available within the company premises itself, which help in promoting the sales.

5.1.11 Efficiency and Profitability

The financial performance of AVS can be understood by looking at some of the financial ratios. Here we have used ratios like current ratio, Asset Turn Over Ratio and working capital turn over ratio. Current ratio is mainly used for analysing the ability of the firm to meet its current obligations with a margin of safety. It is the proportion of current assets to current liabilities. The current assets are those, which can easily be converted in to cash. Though for the creditors better ratio means better liquidity, keeping excessive liquid assets is inadvisable for the firm management in the interest of profitability. Hence a neat balance to be maintained between liquidity and profitability. From the table it is visible that in the early 90s the current assets were five times higher than the liabilities. And then there is continuous decline overtime reaching a level of 1.26, which is quite safe.

Table: 5.12 Trends in efficiency

Year	Current ratio	Asset Turn Over Ratio
1991-92	5.23	3.61
1992-93	3.67	4.48
1993-94	4.98	2.66
1994-95	5.18	2.55
1995-96	3.74	3.01
1996-97	2.86	4.6
1997-98	3.55	2.91
1998-99	1.25	8.23
1999-00	1.26	20.19

Source: Compiled from the annual reports of AVS

Asset turn over ratio gives the ratio of capital to turn over of the company, i.e. the capacity of the company to change the turn over by a one rupee capital investment. In recent years Kottakkal has been showing a healthy trend in this regard. In the initial half of the 90s it shows a decline but the later half it suddenly picked up and reached 20.19. Though the secular trend shows an increasing picture with a six-fold increase, lot of fluctuations is there in the last decade. The healthy aspect is that in recent years a robust growth in recent years. It is an indication of the efficiency with which its assets are used. Profitability ratio, i.e. the capital employed to net profit calculated also shows that of late this ratio has been improving. (See table no 2 in appendix)

5.1.12 Labour intensive production

Table: 5.13 Factor productivity and intensity

Year	Output (in lakhs) (1)	Capital (in lakhs) (2)	Output capital ratio (3)	No. of labourer ('00) (4)	wages and salaries (in lakhs) (5)	Output Labour ratio(5/1)	Labour intensity (5/2)
1991-92	2212.99	42.21	52.428	12.90	159.21	13.90	3.77
1992-93	2855.8	47.83	59.7	13.57	195.59	14.60	4.09
1993-94	2962.32	101.45	29.19	14.38	205.01	14.45	2.02
1994-95	3612.51	110.16	32.79	14.65	241.13	14.98	2.19
1995-96	4358.68	164.44	26.5	14.74	286.26	15.23	1.74
1996-97	4715.72	157.2	29.99	15.35	316.7	14.89	2.01
1997-98	5323.26	318.94	16.69	15.61	371.99	14.31	1.17
1998-99	5864.46	392.8	14.92	16.25	408.69	14.35	1.04
1999-00	6503.53	77.65	83.75	17	419.55	15.50	5.40
2000-01		44.23		17.71			

Source: compiled from annual reports and Babu.C (2002).

The output expenditure showed an increasing trend till 1998-99 after which it came down towards drastically. The reverse of Output capital ratio shows the capital productivity.

Recently there has been a trend of higher capital productivity. That is there is a decrease in the capital expenditure, but still the output is increasing. Labour productivity shows a fluctuating trend and is stagnant in a small range. Labour intensity, which is calculated by dividing the value of labour in terms of the emoluments by value of capital employed, gives a picture that till, 2000 there was a capital intensive system of production, but now there is a shift towards more dependency on labour.

Concluding Observations from Kottakkal Case Study

Kottakkal has attained the role of the “leader” of the Kerala ayurvedic industry through its century long contribution to it. At a time when ayurveda in Kerala had deteriorated because of various internal and external reasons, Kottakkal started its well-acclaimed function and surpassed great hurdles has attained a steady growth. It became a guide for the later established public and private ayurvedic manufacturing units. It guided them all along with the continued leadership in mechanisation and pricing policies. Though it has a monopoly power because of its brand loyalty, the institution has never tried to act like a commercial autocrat, but has to adhere its legacy in pure ayurveda health care and charitable activities. In this hundredth year of its maintenance, it has reached the heights of glory on a sound economic basis and highlighting the future that Kerala has in ayurveda.

While analysing its economic performance, Kottakkal has grown from a firm with Rs. 7.5 lakhs Sales value in 1949-50 to Rs. 62.88 crores in 2000-01 with an annual growth rate of near 15 percent in all the decades after the 50s. Now it has an almost 33 percent share in the state ayurveda manufacturing production and 38 percent in the total ayurvedic value addition and continues to be the highest raw material consumer amongst all the ayurveda firms of India. It has a wide range of the sales depots and agencies all over the state and provides direct and indirect employment to thousands of people. The trend in the establishment of the agencies shows that because of its efficacy the demand is high both from outside and inside Kerala and many agencies have been opened up recently outside the state. Sales and profits show a continuous increase. While the profit has grown with continuous fluctuation, but at compound growth rate of more than 20 percent, sales has grown at 15 percent compound growth rate. In the case of the profitability indicators like net profit to sales ratio and gross profit to sales ratio, the company is almost stagnant, but has a sustained profitability level of 8-12 percent of the sales value.

While the productivity of both labour and capital is improving, in recent years output to labour ratio is considerably high, may be because of the bulk mechanisation process in the late 90s. Hence the company is showing a labour intensive character in the recent years. One important concern for future development is Research and Development expenditure. It is less than 2 percent and in future AVS should give more importance to the R&D, which is considered to be the major determinant of growth in the newer economic theories³. Especially in the case of medicinal plant research, a huge R&D is needed in finding new formulations and further standardisation of already invented medicines. Here invention along with discovery is important. A great wealth of traditional medicinal practices be hidden in the old texts of ayurveda, a discovery of which along with finding new formulations are considered to be the key of growth and success. While the pharmaceutical MNCs are spending crores and crores of rupees to R&D, Kottakkal is maintaining the dominance without much investment in this front. But in future the role of R&D cannot be ignored.

The cost structure shows that like other companies, the single largest expenditure is raw material expenditure. The buy-back arrangement of Kottakkal Arya Vaidya Sala is a model for other institutions. This is necessary in the modern period of bio-diversity concerns and extinction of the major ayurveda plants. The vertical integration effort from the part of the company is to be very much appreciated. It maintains 300 acres of herbal garden and is trying to preserve as many endangered species. The company strongly feels that government should take initiative for providing better infrastructure like subsidies and land for medicinal plant cultivation and changing the regulations existing in the export front. Then there is definitely a bright future for Kerala in ayurvedic sector especially in the context of world-wide interest in this branch of medicine. This case study clearly illustrates the growth, commercialisation and standardisation of the industry, its linkages and the potential it holds for stimulating the regional economy and industrial sector in particular.

5.2 Pharmaceutical Corporation of Kerala (Oushadhi)

Oushadhi was founded as Sree Kerala Varma Government Ayurvedic Pharmacy in 1941 at the instance of the Maharaja of Cochin for the supply of medicines to the government ayurvedic hospitals in Thrissur and the erstwhile princely family of the Cochin State. In 1959 it was

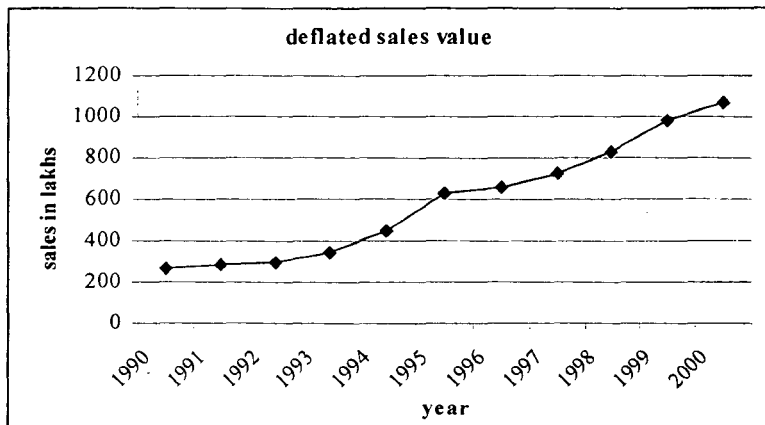
³ Lucas and Romar models

converted and registered as a co-operative society, and was renamed Sree Kerala Varma Ayurvedic Co-operative Pharmacy and Stores Limited. Then in, 1974, it came under the Health and Family Welfare Department of Kerala, with the major objective of bringing this versatile health system closer to the people and to make accessible to them at a cheaper rate; it has come to be called Pharmaceutical Corporation Kerala, Ltd (Oushadhi). Now Oushadhi has a wide market both inside and outside Kerala with more than 230 agencies.

Now, this State Government undertaking had achieved a profit of RS 1.50 crores during 2002-2003 as against RS 91.88 Lakh in the previous year. Oushadhi has been able to improve its sales from RS 10.46 crores achieved in 2001-2002 to Rs. 11.70 crores during 2002-03. Oushadhi paid the state Government a dividend of RS 17.43 Lakh for 2001-02 (Web site, Govt. of Kerala). Oushadhi had distributed ayurveda medicines to the tune of RS 1.75 crore to Government ayurveda hospitals in Chattisgarh, Orissa, and Madhya Pradesh, Rajasthan, Delhi, Himachal Pradesh and Pondicherry during the last year.

5.2.1 Growth in the sales income and profit margin

Figure 5.3 trend in deflated sales value



Source: compiled from annual reports.

The recent official document reference shows that Oushadhi has earned a profit of Rs. 1.2 crore for the current fiscal year (2002-03) over a business turn over of Rs. 12 crore as against Rs. 92 lakh profit on a turnover of Rs. 11 crore in the previous year. Oushadhi had sold to the state government's health care institutions medicines worth Rs. 3.3 crore in the current fiscal year with a subsidy of Rs. 1 crore. Oushadi's most popular product 'Prameha Oushadhi' had fetched a business turnover of over Rs. 60 lakh. Medicines of Oushadhi had become popular in the states of Maharashtra, Madhya Pradesh, New Delhi, Punjab and Rajasthan. Sales value

of Oushadhi has increased in the last decade from 268 lakhs of rupees in 1990-91 to 1100 lakhs of rupees in 1999-00. That is there was an annual growth of 18 percent in the first half of 1990s, which then declined to 11 percent in the latter half. Overall the company achieved a compound annual growth of 14.8 percentage in the sales turnover in the last decade. This is higher than that of ayurvedic companies in Kerala.

Table 5.14 Net Profit margin (values in current price)

Year	Sales Value (in lakhs)	PROFIT (in lakhs)	PROFIT Margin (in %)
1990	268.34	2.69	1.00
1991	287.07	2.79	0.97
1992	300	-43	-14.33
1993	342	-28	-8.19
1994	450.95	-22	-4.88
1995	625.92	2.6	0.42
1996	656.24	23.4	3.57
1997	720.3	39.13	5.43
1998	831.08	67.86	8.17
1999	979.28	54.75	5.59
2000	1100.3	92	8.36

Source: compiled from annual reports.

Though sales were increasing in the initial half of the 90s, the profit earned was not impressive and the firm incurred losses till 1994. In 1992 the loss was around 43 lakhs. It is seen that the interest burden was also very high at this point and this high indebtedness could have been one of the reasons for the loss faced at that time. But as table: shows after 1995, there is a continuous rise in the profit. The profit margin also shows the same picture and it touched an all-time high of 8.36 in 1999-00 and higher than the overall ayurvedic industry.

5.2.2 Trend in working efficiency

Table: 5.15 Net Fixed Asset turn over (value in lakhs)

Year	fixed assets	Income	NET fixed asset turn over (percentage)
1990	83.37	268.34	31.07
1991	264.82	287.07	92.25
1992	270	300	90.00
1993	272	342	79.53
1994	271.27	450.95	60.16
1995	281.48	625.92	44.97
1996	284.4	656.24	43.34
1997	290.6	720.3	40.34
1998	297.65	831.08	35.81
1999	322	979.28	32.88

Source: compiled from annual reports

The working results of Oushadhi in the latter half of the 90s are promising. This is continuing in the recent period also. The profit before tax of Oushadhi as a percentage to the capital employed is an evidence for this. This ratio has increased from 14.95 in 1995-96 to 32.29 in 1996-97 and again 37.14 in 1997-98. This means that the return on capital is also on the increase. Profit as a percentage of gross fixed assets is also on an increase (from 8.23 in 1995-96 to 22.80 in 1997-98). This is a clear indication of the increase in the working efficiency in recent years. It is important to note that while several public sector units in Kerala in many other industries are not doing well, this unit of ayurvedic industry is showing a good performance. A comparison made between, Kottakkal and Oushadhi shows that, Oushadhi is performing better than Kottakkal in terms of Net Fixed Asset Turnover Ratio.

5.2.3 Product-wise Trends in Demand

Since the main aim of the pharmaceutical corporation was to provide medicines to the government ayurvedic hospitals, they concentrated on the conventional ayurvedic non-Over the Counter medicines. But with more and more pressure and encouragement from the demand side this company was forced to go for modern OTC and other therapeutical drugs. Considering the trend in the market and the performance of the economy it can now get in to the market of cosmeceuticals and nuetraceuticals.

Table: 5.16 Product-wise trends in the Oushadhi Sales (sales in lakhs)

	Arishtasavams (ltr)	Kashayams (ltr)	Ghruthams	Gulikas (kg)	Choorname	Kashaya choornams	Lehyams	Med. oils
1992	4.94	*	0.32	0.27	0.38	2.8	0.5	1.65
1994	6.12	1.08	0.27	0.33	0.71	2.53	1.12	1.81
1995	7.05	1.58	0.2	0.52	0.28	3.21	0.67	2.24
1996	7.09	1.48	0.16	0.63	0.28	4.02	0.71	2.15
1999	7.17	1.87	0.22	0.67	0.53	2.78	0.69	2.69
CGR	5.47	11.61	-5.21	13.87	4.87	-0.10	4.71	7.23

Source: compiled from annual reports

Oushadhi Chyavanaprasam, Pramehoushadhi and Hairoil are some of the fast-moving items of the firm. These medicines are available in Delhi, Mumbai and Chennai. Oushadhi is now supplying medicines to the governments of Madhya Pradesh and Orissa. They have 400 products and these are available in their agencies all over Kerala. The state government itself buys medicines worth more than Rs 3 crore every year from Oushadhi for its Ayurvedic hospitals. Pramehoushadhi, a highly demanded medicine for the treatment of diabetes, alone contributes more than 60 lakhs rupees to the turnover. The table (5.17) gives an idea about the

trend in the sales of general ayurvedic medicines of the company in the last few years. In the general category of ayurvedic medicines, arishtasavams account for a value of Rs. 7.17 lakhs according to the data of 1999. Except Kashaya choornams and ghruthams, the sale for all other category of medicines is increasing. Kashayams and the medicated oil growth are promising (with the compound growth rate of 11.61 and 7.23 from 1992 to 1999).

This product mix is very important since it reflects the domestic market. These are the major ayurvedic products dominating the market. The individual share of these ayurvedic medicines (of whole ayurvedic industry) in the total demand as calculated in another study gives the following picture.

Table: 5.17 Demand share of ayurveda medicines

medicines	Share in total demand (in percentage) in the industry
Arishtams/ asavams	30
Medicated oils	20
Lehas	20
Kashayams	10
Medicated ghee	10
Bhasmas/pills/powders	10

Source: ITCOT study.

Arishtams and lehams contribute about 70 percent of the total ayurvedic medicines market, when the traditional ayurveda medicines are considered. Almost the same trend can be seen in the sales structure of Oushadhi also. Among the Arishtams, dasamoolarishtam is more in demand.

5.2.4 Cost segregated trends in Oushadhi

Table: 5.18 Cost segregation (in lakhs)

Year	Raw material	Manufacture	Financial	Total expenditure	Raw to total expenditure (%)	Manufacturing to total (%)	Packing and covering to total (%)
1990	110.24	93.05	13.74	265.64	41.50	35.03	5.17
1991	126.64	100.47	17.94	284.28	44.55	35.34	6.31
1992	148	78	16.34	343	43.15	22.74	4.76
1993	187	117	24	370	50.54	31.62	6.49
1994	181	166.77	22.26	472	38.35	35.33	4.72
1995	243.52	262.14	20.97	623.3	39.07	42.06	3.36
1996	265.8	254.73	18.01	632.84	42.00	40.25	2.85
1997	298.93	282.39	8.95	680.17	43.95	41.52	1.32
1998	339.81	328.09	5.67	763.22	44.52	42.99	0.74
1999	544.91	354.91	7.33	924.53	58.94	38.39	0.79

Source: compiled from annual reports

As the industry analysis showed, raw material cost is the single dominant cost in the cost structure of Oushadhi also 38 to 59 percent. In 1999, Oushadhi spent around Rs.545 crores for raw material. In one way, the high raw material expenditure shows the increasing linkage that the units have with the medicinal plant sector, but at the same time, it is of a major concern due to the mounting cost of production. One thing to be noted here is interest payment (financial expenditure) is included in the manufacturing expenditure and it constitutes a major portion of the same. While the manufacturing cost remains stagnant, packing and covering expenditure share has marginally come down. The manufacturing cost includes the wages and salaries also. In the manufacturing expenditure while the expenditure on salaries and wages remains almost stagnant, financial expenditure has come down, because of the decrease in the interest payments.

Table: 5.19 Share of advertisement and salaries

	1990	'91	'94	'95	'97	'98
Advertisement and sales promotion expenditure	218292	225900	456544.8	1314353	1502361	1992612
salaries and wages	6459712	6734754	8284537	9699916	13115095	15251809
Total expenditure	26094996	27798174	44908123	60333743	66469801	74664041
share of advertisement to total expenditure	0.837	0.813	1.017	2.178	2.260	2.669
share of salaries to total expenditure	24.75	24.23	18.45	16.08	19.73	20.43

Source: compiled from annual reports

Since Oushadhi started producing Over the Counter (OTC) drugs, their expenditure on advertisement also increased from Rs.2 lakhs to 20 lakhs. The advertisement for Chyavanaprasam, Pramehoushadhi and herbal oil consumes a major share of this advertisement cost. As mentioned earlier, there are two strategies for product marketing. The employment of sales representatives to contact ayurvedic consultants for promotion of sales, and second is the setting up of different consultant agencies with all the facilities. The first option is less favoured because, in this case all medicines have to be made available in the locality, maintaining a large team is costly in terms of their salaries and emoluments etc. The second option is preferred because of the advantages that the company will have in terms of better control and feedback. The performance of agencies can be easily monitored and need relatively less organisational requirements. The burden of setting up of additional retail outlets will be taken care by the same agencies and the full range of medicines can be made available

to the consumer. This is the reason why the Oushadhi also concentrating on network of agencies. As ITCOT (1999) study says, since the sales turnover largely depends on the agency network, it is necessary to organise a brand building exercise by the entrepreneur.

5.2.5 Extend of dependence of Oushadhi

Table: 5.20 Dependence on loan funds (in Rs)

	1981	1991	1995	1996	1997	1998
Total Source	4818071	21807290	25714731	20917194	14181406	18268953
Share capital	700000	7511720	10711720	11211720	11211720	11211720
Total loan	2580018	12943044	14297342	9499805	2066035	512501
Secured loan to total loan	45.28	92.53	90.62	85.89	100	100

Source: compiled from annual reports

In the case of Oushadhi the main lenders are the government institutions like KFC, KSIDC, and other governmental institutions. In recent years, loan dependence per se has decreased in the case of Oushadhi. In the last two decades the absolute amount of loan has decreased from 25.lakhs to 5.12 lakhs. Now it depends increasingly on the equity sources. The debt profile of the firm has altered considerably in the later half of the 90s. In the first half the dependence on loan funds went up to more than 55 percent. But in the later period, i.e. in 1998 it has decreased to less than 5 percentage. Table 5.19 illustrates this. In 1981 the loan funds were three times higher than share funds. This has drastically changed in the 90s and debt-equity ratio has reached to 18.43. That is the debt is only 18 percentage of the shares. Loans consist of secured and unsecured loans. Unsecured loans are more of a risky. It is noteworthy that recently there has been a positive move towards loans, which are fully secure. It is important to note it is not the quantity of borrowings per se that matters, but the ability of the firm to repay its loans and the subsequent interest burden. If we look for the interest burden it was increasing till 1994 and reached around 5 percentage of the total expenditure and started declining thereafter as a result of the effort of the company to shift to the share funds and reached less than one percent. In 1998 the additional source of income in the category of the money received in advance, as a part of share also became a major contributor.

Table: 5.21 debt-equity ratio

Year	debt-equity ratio
1981	368.57
1991	172.30
1995	133.47
1996	84.73
1997	18.43
1998	4.57

Source: compiled from annual reports

Table: 5.22 Interest burden (in Rs)

Year	expenditure	loan	interest payments	share of interest in total expenditure	Loan to total income source
1989-90	26094996	2580018	260900	1.00	53.55
1990-91	27798174	12943044	314220	1.13	59.35
1993-94	44908123	14297342	2226051	4.96	55.60
1994-95	60333743	9499805	2097692	3.48	45.42
1996-97	66469801	2066035	895744	1.35	14.57
1997-98	74664041	512501	567230	0.76	2.81

Source: compiled from annual reports.

Thus the debt profile and interest burden suggest that Oushadhi's financial status is improving substantially.

Concluding Observations from Oushadhi Case Study

Oushadhi can be taken as a sample for understanding the performance of a public firm in the ayurvedic manufacturing industry. Starting with an objective of supplying medicines to the government ayurvedic hospitals, the Pharmaceutical Corporation has reached the level of an OTC manufacturing firm. In a way the recent performance of the company reveals that it is efficient enough to enter into the world cosmeceutical market. Along with KAPL, it constitutes the highest raw material demanding public firms in the country (IDRC, MAPPA, 1999).

The trend in sales value, profit margin, increase in demand for its major products debt servicing etc have improved in recent years and reflect an increasing efficiency. Starting with the help of the government and government financial institutions, it has acquired self-sufficiency over the years reducing its indebtedness and interest burden (debt-equity ratio has significantly came down in 2000). More over, Oushadhi is responding to demand for herbal products all over the country with a wide range of products. The chief source of Oushadhi's

raw materials is the various tribal co-operatives spread over the state. Oushadhi stands as a good example for the integration of tribal societies to the manufacturing firm through raw material procurement, which provides a livelihood for several people through medicinal plant demand. But as part of a general concern, the company is planning to vertically integrate to meet at least a small portion of its raw material demand. And there is keen interest on the part of the company to get into veterinary medicine also. This could lead to a whole lot of other linkages.

APPENDIX

Table: 1 Efficiency comparison of AVS, Kottakkal and Oushadhi in terms of Net Fixed Assets Ratio

Year	oushadhi			AVS, Kottakkal		
	Net fixed assets (in lakhs)	Income (in lakhs)	NFATOR	Net fixed assets (in lakhs)	Net sales	NFATO
1990	183.37	268.34	68.33			
1991	264.82	287.07	92.25	8.13	1546.13	0.53
1992	270	300	90.00	9.79	1787	0.55
1993	272	342	79.53	7.75	2191.52	0.35
1994	271.27	450.95	60.16	62.69	2607.29	2.40
1995	281.48	625.92	44.97	62.48	3112.17	2.01
1996	284.4	656.24	43.34	97.36	3633.51	2.68
1997	290.6	720.3	40.34	86.19	4002.53	2.15
1998	297.65	831.08	35.81	247.79	4438	5.58
1999	322	979.28	32.88	282.1	4751.5	5.94

Source: annual reports of Oushadhi and Kottakkal.

Table 2: Some important efficiency ratios calculated for AVS, Kottakkal.

year	Profit (in lakhs)	Sales (in lakhs)	capital employed (in lakhs)	net sales to total capital	profit to net sales	Profits to capital employed
1991-92	131.74	1787	42.21	42.34	0.07	3.12
1992-93	303.4	2191.52	47.83	45.82	0.14	6.34
1993-94	308.12	2607.29	101.45	25.70	0.12	3.04
1994-95	431.75	3172.22	110.16	28.80	0.14	3.92
1995-96	420.91	3698.76	164.44	22.49	0.11	2.56
1996-97	386.63	4079.25	157.2	25.95	0.09	2.46
1997-98	582.49	4502.34	318.94	14.12	0.13	1.83
1998-99	431.85	4831.67	392.8	12.30	0.09	1.10
1999-00	688.22	5620	77.65	72.38	0.12	8.86

Source: annual reports of AVS, Kottakkal.

Chapter 6

SUMMARY AND CONCLUSION

The study is an attempt to find the answers to three relevant questions with respect to the organised Ayurvedic manufacturing industry of Kerala, namely, what has been the nature and process of transition of the ayurvedic industry from a household health care system to a commercialised and modernised system, what is the status of the industry in the state, and in terms of linkages how does it contribute to the growth of the economy. The study is justified by three factors. Firstly, by the phenomenon of increasing global demand for herbal products, secondly, by the growing relevance of this industry in the regional industrial development of Kerala as evident from the extensive citations of the potentialities of the industry in various documents and reports and thirdly, there has hardly been any attempt to understand the growth and status of this industry in Kerala.

The core analysis is based on information relating to nine manufacturing firms of Kerala, which constitute more than 72 percent of the total market share in terms of sales value. Since there is no organised database for the ayurvedic industry, data collection proved to be very difficult task. Secondary level information was collected and was compiled from different sources like, the Confederation of Indian Industries (CII), Drug Controller's Office (DCO), Department of Indian System of Medicine and Homeopathy (ISM&H), Kerala State Industrial Development Corporation (KSIDC), Department of Company Affairs (DCA) etc, which helped to set the background for the detailed analysis. Primary level information was collected from 9 manufacturing units and detailed information was obtained for three manufacturing units, viz. Kottakkal Arya Vaidya Sala, Oushadhi and Pankaja Kasturi helped for the analysis of various dimensions of the industry and two of them viz. AVS and Oushadhi has used for case studies. Personal interviews were conducted with six medicinal plant collectors and three traders from different parts of the state and conversation with the officials of this sector, added to the information source. A well-prepared questionnaire was used to gather information regarding supply chain analysis of the medicinal plant channelisation and aspects relating to cultivation. For information regarding the ayurvedic beach resorts, visits were made to three ayurvedic resorts; namely Somatheeram, Manalatheeram and Travancore beach resorts, all situated in the South of Kovalam.

The chapter second of the study gives an account of the nature and process of the growth of ayurveda from a household localised healing system to a more commercialised industrial status. Here a delineation of 'modernisation' and 'commercialisation' is being made. Modernisation mainly means mechanisation, standardisation and the change in form and appearance of product, commercialisation is a much broader term, includes new marketing strategies, targeted production etc. That means, modernisation can be considered as a necessary condition for commercialisation. In India, both modernisation and commercialisation happened simultaneously in the latter half of the 19th century. In early 19th century, there were efforts from British government to marginalise the indigenous systems of medicines to introduce their own system of medicine. These kinds of attempts were even visible from the activities like biological exploitation in the early 17th century by different colonial powers. In the latter part of the 19th century and earlier half of the 20th century, there was a decline in the spread of ayurveda due to colonial suppression and internal problems within the system. The response from the victims (*Vaids* and *Hakims*) was also cool. Here one major thing to be noted is that, in Kerala, though there was a slowing down of the growth of ayurveda, unlike in the rest of India, it was not much affected by the suppressive rule of the colonial government, because of its wider and stronger roots in different communities, state support etc. It was not the exclusive domain of the Brahmins, but a large number of backward classes also learned and practised household healing and possessed ample indigenous knowledge, which later enriched Kerala medical tradition. In Kerala, the ayurvedic system is a mix of the textual ayurveda and the indigenous system, which existed much earlier, which is known as *Sahasryayoga*. Its strength was enhanced by the support, the indigenous healers obtained from the regional rulers (*nattu rajahs*), especially in Travancore. In Kerala, one difference was that though modernisation has started earlier, commercialisation took place much later, i.e., only in the latter half of 20th century and unlike in other parts of India, the institutions like AVS try to continue the production of ayurvedic medicine in its pure form. In India, it was from Calcutta that the modernised medicine was exported for the first time. The exporters found it very profitable and later extended their exporting activity to different parts of the country. But in Kerala, large-scale manufacturing started with the formation of AVS. The manufacturing units were, for a long-time in Kerala were unaffected by the charm of the global market for fairly long period of time. But the industry as a whole, as expected, pursued a kind of 'modification' through 'commodification', attracted by the cosmetic demand of the global north, though still some of the units continue with the conservative traditional form. In

a sense, though ayurveda in Kerala is modernised, it not fully commercialised. Thus though in many parts of India, commercialisation is in full swing Kerala is still in the final stages of the process of commercialising its sector. Increasing expenditure in the packing and advertisement is a sign of increasing commercialisation of the Kerala ayurvedic industry.

The third chapter gives an overview of the Indian ayurvedic industry and its relevance in the world herbal market. Indian share in the world herbal market is around 2 percentage, i.e., around Rs.1000-1500 crores, which is very little considering the herbal wealth the country has. Though there are multicore rupee firms in this sector, their product range includes non-ayurvedic products also. Due to the import laws of different countries regarding ayurvedic drugs, India has so far not been able to find better market outside the country. But the data shows promising trends. In the US herbal market, India is able to compete with china. She has caught up with China from a much lower level of export penetration within a short span of time.

The major objective of the chapter was to assess the status of Kerala ayurvedic industry in Kerala. The major finding from the section gives a positive picture. Number of ayurvedic manufacturing units has shown a substantial increase with a higher growth in the 80s. It has increased from 15 units in 1976 to 962 in 2001. The industry is mainly concentrated in districts like Thrissur, Kollam, Malappuram etc, which are traditionally known for ayurveda. It is also noteworthy that the last decade saw the establishment of many manufacturing units that have become dominant players in the market within a short span of time. Trends in variables like Sales Turnover, Net Value Added, Net Fixed Assets and Net Profit Margin were analysed to understand growth. Profitability ratios like net profit margin, return to net worth, return to capital employed, return to net assets are analysed. Though these ratios are declining, still maintains a higher value. The recent decline in these ratios is the result of the decline in absolute profit, due to the loss creation of some of the firms like KAPL and Santhigiri.

The deflated figure of sales value shows a 16.15 percent growth from 1993 to 2002. A segregated time point analysis shows that there was a higher growth in the early 90s, which declined in the latter half of the decade. This may be mainly due to the price rise in the later periods. Net Value Addition of the industry is showing a fluctuating trend, but the secular growth rate is promising. Same is the case with Net Fixed assets. The picture becomes clearer when a relative analysis is made with the overall-manufacturing sector of the state in the last

decade. The analysis shows that though with respect to the major industrial indices like Net Fixed Assets, Productive Capital, Net Value addition, Gross Value addition and total output, the share of the ayurvedic industry in the state-manufacturing sector is only (0.4%, 0.6%, 2.5%, 2.3%, 0.8% respectively in 2002) does not seem to be substantial (its share has grown over time), the growth of most of the indices was much above that of the manufacturing sectors in Kerala. This is an important finding as far as the future growth and importance of the industry is concerned, since the increasing share and growth rates reflects the potential prospects of this industry in the industrial sector of Kerala. Since the data on employment in this industry could not be obtained, its share in total employment in the manufacturing sector could not be assessed.

Analysis of costs reveals some interesting results. Raw material expenditure was found to be a major factor, which determines production as the large raw material dependency of the industry shows. Numerical data also support this argument. In the regression analysis, raw material expenditure, financial expenditure like those on advertisement and packaging expenditure (signs of commercialisation) were found to be important and AVS, Kottakkal has had a leading impact (dummy is significant) on the ayurvedic sector as such. In the case of selling cost, the cosmeceutical firms like Pankaja Kasturi is spending around 25 percent of the sales turnover on advertisement and related activities. One of the major concerns of the industry is R&D expenditure. Most of the firms are showing an expenditure of 1-2 percent of the sales value on R&D, which is considered to be very low considering the nature of the industry, because quality control has a special significance in the sector. Cosmeceutical firms like Pankaja Kasturi had been concentrating more on research into new drug formulations (innovations), since in the cosmeceutical market, the sales share depends largely on the launching of innovative products and the setting of new trends.

In the export market of ayurvedic products, participation of manufacturing units of Kerala seems to be low and they have not so far entered the export market in a major way. Still, a large number of Kerala brand products have made their presence felt in the world market, for e.g. Pankaja Kasturi granule, Kaveri fairness cream etc. A shift from medicinal demand to cosmeceutical and food supplement demand could be seen in the product demand of Pankaja Kasturi, which could be considered as the general trend of ayurvedic industry. KAPL and Pankaja Kasturi seem to be the largest exporters with 150 and 160 lakhs each of export income. Kottakkal earns foreign income mainly from services. A rough estimate from the

initial information suggests that the total export from the Kerala ayurvedic manufacturing sector is not likely to exceed Rs. 10 crores. Export is an area that firms should concentrate more on, because with the acceptance of ayurveda as a health care system by the World Health Organisation, the system has been gaining increasing acceptance in many countries as an effective remedy for various diseases.

Analysis of efficiency ratios shows that in asset utilisation, Kottakkal has been found to be very efficient with a higher value in Asset Turn Over ratio and Return on Assets. The industry as a whole also, performs reasonably well with an asset turn over ratio in the range of 12- 20 percent. It was also seen that though many firms are found to be dependent more on external funds, the secured nature of the loans puts the industry on a stronger footing.

Fourth chapter is an analysis of the major linkages that the growth of the ayurvedic industry would generate in the economy. Hirschman's theory of linkages for development provides the theoretical framework for the analysis. It says that, investment in those industries, which generate maximum linkages, is the ideal strategy for development. Hence, we analysed the backward and forward linkages of the ayurvedic industry, to assess the possibilities of the cumulative effect this industry can create in the economy. The information for the analysis was based on primary data obtained through; questionnaires supplied to firms and interviews conducted with medicinal plant collectors, traders (for backward linkages) and from tourist resorts like Somatheeram Ayurvedic beach resorts, Manaltheeram Ayurvedic beach resorts and Travancore Health resort (for forward linkages).

The analysis shows that the ayurvedic industry has an extensive linkage with the medicinal plant industry and the tourism industry. To get a detailed picture of the backward linkage, the proportion of the expenditure on the output of the medicinal plant sector used in the ayurvedic industry as a percentage to its value of output. Taken as an indicator it is seen that 37 percent of the ayurvedic value of output of industry is tricking down to the medicinal plant industry. To understand the dimensions of the backward linkage we used supply chain analysis. It was found that, in the manufacturing sector, there exist mainly two types of linkages. First types of channelisation consists of five tiers of agents including the collectors at the regional and district level, retail outlets and small and large industrial groups. An increasing number of tiers adds to the cost but adding very little value. The sample analysis shows that in many cases, the actual medicinal plant gatherers get a very meagre amount of income since much of

the shares are distributed among various agents. In four out of nine cases, the share of the gatherer was less than 50 percent of the selling price to the firms and in one case, it is less than one fourth. In short, this low income adversely affects the incentive for sustainable management of bio-resources. In the second chain, fewer tiers are involved and the main agents are the tribal societies. The difference between the price of the medicinal plants from the societies and the traders to the firms reveals the extent of exploitation have in. Due, to the existence of a large number of agents, the trickling down strategy does not work in the medicinal plant chain, but a kind of 'drizzling down' only. The second chain is better for the end users and the gatherers because both the parties gain because of the larger return in to the gatherer and lesser price for the products to the end users due to lower cost of production. But these are certain practical problems in the relationship between co-operatives and the firms. There is a lack of communication between firms and co-operatives and an asymmetry of information regarding the actual need of these firms. Another important factor is the 'asset specific' nature of the demand for medicinal plants by the firms. This always encourages firms to rely on the conventional suppliers. The interview with the raw material officers of the major firms like AVS, Kottakkal and the Vaidya Ratnam shows that they prefer the traders supply (to the co-operatives) because of reasons like easy and timely availability of raw material, age-old relation with the suppliers etc. These sorts of demand and supply side constraints curtail full fledged and effective linkages. This shows that though, the ayurvedic industry has lot of linkages in the form of employment and income generation, there is also a loss in benefits, because of the lack of an effective networking of different tiers.

Another mode of linkage creation with the medicinal plant sector is the cultivation of medicinal plants. A study done by the Arya Vaidya Sala (AVS) and IDRC, MAPPA, a Canada based Research Centre shows that there are many medicinal plants, which can be indigenously cultivated and developed as single as well as inter crop. AVS agreed to a buy back arrangement with these cultivators, in the event that they faced any difficulties in the market to cover their cost of production. Similar encouragement would bring more cultivators in to the field of medicinal plant cultivation. This is an effective way of linkage creation through the man days increase in the agricultural sector. Because of the threat of extinction of various rare plant species, many ayurvedic manufacturing units have started vertically integrating their raw material needs, but a complete vertical integration is impossible in this industry because of the specific nature of the raw material needed and the fact that some types of plants cannot

be grown in all climate without losing their medicinal properties. This in turn means that the linkage through chain will exist forever in the industry.

No attempt has been made to quantify the forward linkage since no adequate data is available. A large number of ayurvedic beach-resorts have come up in recent years to reap the possibilities and potential of health tourism. Macro level data shows that a large number of foreigners' (around 8 percent) arrive here with the sole intention of seeking ayurvedic treatment. Most of the foreigners in these resorts are from European countries. A range of treatments is being practised in these resorts, which makes use of a huge quantity of herbs. For the raw material, the leading firms have started their own cultivation partially, while the smaller units still depend on the conventional suppliers. So the supply chain is to some extent relevant in health tourism as well., they depend on the manufacturing units only for some specific treatments. So the initial observation of the sampled resorts shows that the health tourism sector has more linkages with the medicinal plant sector than the ayurvedic-manufacturing sector. The employment that these resorts create also adds to the benefits of the linkage. Thus this industry is like a growth pole in the economy with a large chunk of backward and forward linkages.

Fifth chapter consists of case studies two of the manufacturing units, Arya Vaidya Sala, Kottakkal (AVS), a pioneer in this field and the Pharmaceutical Corporation Limited (Oushadhi), a public sector concern. The growth experience of these two firms has been taken as evidence for the development of the industry in Kerala. Kottakkal is an example for an ayurvedic production unit, which still sticks to the original and conventional form of pure ayurveda. Though it has the options of entering the cosmeceuticals market, AVS has desisted from it and with the domestic sales of the ayurvedic medicine and provision of services to the foreign consumers, AVS Kottakkal still manages to retain its position as leader of the market. Kottakkal's sales value has grown from Rs. 7.5 lakhs in 1949-50 to Rs. 62.88 crores in 2000-01. This comes to around 33 percent of the total ayurvedic sales income of the state. In the last four decades, the sales growth has been very impressive with more than 10 percent annual compound growth rate. The profit margin of the firm is around 8 –14 percent.

The recent establishment of many branches gives an indication of AVS is widening market enjoyed outside Kerala, in response to increasing demand from outside the state. New branches like those in Madurai, Secundrabad, Calcutta, New Delhi are examples for this. It

can be seen that modernisation of ayurvedic production was first started by AVS, with the tableting of the medicine for selling purposes. A large number of machines were introduced in the factory for speedy production and to meet the mounting demand. The problem of under capacity in production was solved by the mechanisation of the production system. While considering the efficiency in production, the ratios like Current Ratio, Asset Turn Over ratio and working capital ratio show an improving picture over the last decade. Labour and capital productivity of the sector has also been improving. The behaviour of capital output ratio suggests that ayurvedic industry remains a labour intensive one.

The study suggests that there is a need for deliberate improvement in the R&D front. The present status of expenditure on Research and development is less than 2 percent in AVS. Mainly concentrates on medicinal plant research and has started cultivation of medicinal plants in the factory premises for the research needs. AVS has the largest area of cultivation and stands out as a forerunner in the conservation of endangered species. The major expenditure item of Kottakkal, as in the case of other firms, is raw material expenditure. Through out the decade it has remained more than 50 percent of the total expenditure. This is one of the reasons why, Kottakkal is practising vertical integration and encouraging contract farming with the medicinal plant farmers. AVS has started such contractual arrangement with the R and D support of IDRC MAPPA, a Canada based research Centre. The company assures the cultivators a reasonable return for the their products if they face any problem in marketing. These details testify the linkage creation by the AVS in the economy. A comparative price analysis has been done to understand the price competitiveness of AVS with the companies outside Kerala. It shows that in the category of arishtams, medicated oil, choornam, medicated gee and bhasmam, AVS demands a comparatively lower prices for its products. This comparative advantage may be due to the regional availability of the raw materials. In the case of Chyavanprash, AVS faces stiff competition from IMPCOS, Chennai and Venkata Ramana dispensary, but in this case the brand loyalty created by Dabur outweighs the comparative advantages of AVS.

Though Oushadhi started with the aim of supplying medicines to the government ayurvedic medicine centres, now it has risen to the status of a multimillion rupee company, with an annual sales turnover of 11.70 crores in 2001-02 and a profit is of Rs. 1.50 crores in 2002-03 alone. The 230 marketing agencies spread both inside and outside Kerala is evidence of the growth of the company. Now Oushadhi is distributing medicines to the different state

government ayurvedic hospitals in Chattisgarh, Rajasthan, Orissa, Madhya Pradesh, Delhi, Himachal Pradesh etc. the company has achieved an annual average of 14.8 percentage growth in sales value during the last decade. In recent years profit growth has also been impressive and a resultant growth in the profit margin of the firm. Profit Margin has increased from 3.57 percentage in 1996 to 8.36 in 2000. This is mainly due to the increasing demand for Oushadhi's products. The problems in the growth rate in profit faced by the Oushadhi in the initial 90s have been overcome in recent years. The earlier slow down was mainly because of the increase in the indebtedness and the burden of interest payments. The debt-equity ratio of the firm has been decreasing and hence the indebtedness of the company. The ratio has decreased from 368.57 in 1981 to 4.57 in 1998. The dependence on the loan source has decreased from 53 percent of the total income source to just 2.81 percent. Since it started producing more and more Over the Counter (OTC) drugs, the advertisement expenditure is also on increase, now with almost 3 percent of the total expenditure.

In the product range, those like Pramehoushadi (medicine for diabetes), Oushadhi hair oil etc. items in greatest demand. And in the medicinal items Gulikas are the most popular with a 13.87 percent annual compound growth in the last decade. The present annual growth of the company is high enough to warrant diversification of its product pattern and enter into the existing cosmeceuticals market. Oushadhi is likely to earn more by concentrating on the export front, since it already has been established an extensive market all over the country. Marketing outside India can be done through contracts with foreign agencies as in the case of Pankaja Kasturi. Both the case studies are suggestive of the growing prospects of this industry in Kerala economy and for manufacturing sector in particular.

According to the ayurvedic manufacturers' the industry faces three major challenges today are, the first, relating to the raw material problem, second to quality control and maintenance and third, protection of the ayurvedic knowledge owned by the communities. There are plenty of endangered species, which are largely used, in the ayurvedic medical system. Though the government has made attempts to protect certain species through *in situ* and *ex situ* cultivation, a greater effort is needed in this direction. Since the major advantage of Kerala is cheap availability of raw material, extinction of major species can be a major bottleneck to the future of industry. Quality control is necessary for both the medicines and the products, since the acceptance of the products abroad largely depends on the satisfaction of their quality standards. Quality control at various stages is very important like Good Manufacturing

Practices and Good Clinical practices. Similar standards should be followed in the agricultural practice also. So most of the manufacturing firms have to spend a large amount for quality control, and it is a tedious task, but one thing, that is unavoidable. If proper attention is given to the traditional medical knowledge-based health practices, a large number of jobs can be created in the rural areas. Even at the current level of conversion of traditional medicinal knowledge into economic opportunities, enterprise-based application can account for thousands of jobs in rural areas. There is no protective mechanism at the national or state level so far, which have grave implications for a system like ayurveda, since indigenous communities form the chief source of knowledge in this system.

This study is very much confined to the industrial growth and its linkages of ayurveda in Kerala. It was an effort to bridge the lacunae, which is found to be very much relevant in the present status of the regional industrial development of Kerala. The fast growth, certainly have the policy implications for, the investment decisions are always based on the growth potential and linkages of the industry. But still, the researcher finds major gaps in the related areas like the potential of ayurvedic tourism in Kerala, and the feasibility for an effective protection mechanism for the local knowledge holders (in comply with the Intellectual Property Rights) of India in general and Kerala in particular, will be of relevance.

Based on the analysis in the preceding chapters, and based on discussions with the manufacturers, some important policy suggestions have been made here.

Firm level and cultivators level

- ❖ Value addition and processing should be encouraged at the gatherer's level so that the collectors can gain a larger share of the distributed income in the chain which would prove a better incentive for sustainable collection.
- ❖ Need for more co-operative societies at the tribal collectors' level and fostering better linkages between these co-operatives and manufacturing firms.
- ❖ Contract farming can be encouraged at the farmers level (preferably those who have collection experiences, i.e., tribal collectors) and starting of neighbourhood groups can be motivated among them. This will lead to system of collective production, marketing and distribution of income.
- ❖ There is an urgent need for transparency in the demand by the manufacturing firms, so that *asset specific* character can be avoided and the unnecessary destruction of rare species can be checked. Better awareness programmes in collection must supplement this.

- ❖ Provide medicinal plants to farmers at block level and promote *Idavetty*¹ model cultivation with some initial financial assistance and arrangements for a buy- back with the major firms.
- ❖ A nodal agency can be formed to act as a link system between the industry, collectors, and NGOs. The State Medicinal Plant Board (SMPB) could take up the responsibility. Market centres at suitable locations need to be developed by government or donor supported projects by providing storing and primary processing facilities in the form of go-downs or Common Facility Centre.
- ❖ Market enterprises need to be developed at the production areas to procure the produce from farmers and a floor price can be given as an incentive for further cultivation.

Institutional level

- ❖ A detailed survey of the demand and supply gap in the raw material of this sector has to be conducted, so that more medicinal plants in short supply and those in great demand can be identified out and strategies framed as well.
- ❖ A legal procedure, either through national or international law to protect community-level knowledge, in compliance with the customary laws of the knowledge-owning communities, should be framed immediately. This will enhance the base for the commercialisation of ayurvedic knowledge.
- ❖ Collaboration of manufacturing firms with research institutes will be helpful in discovering new formulations, better management of the quality control and medicinal plant research.
- ❖ Minimisation of the procedures for new firms to enter into the production and export sector. Several manufacturers have expressed that they face untold problems in going through the procedures involved.
- ❖ Urgent need for increasing the budgetary support to the Indian System of Medicine.
- ❖ Provision of better incentive for new entrepreneurs in the health tourism sector like subsidy in the basic infrastructure because Health tourism has become the Unique Selling Proposition (USP) of Kerala.
- ❖ Develop ayurvedic tourism as a 'Kerala branded' item through advertisement in Tourism brochures and web sites.

¹ Idavetty is the first village officially recognised as a medicinal plant village, where with the government help farmers started cultivating medicinal plants both as single as well as inter crop.

BIBLIOGRAPHY

- Arnold, D (ed.) (1989) *'Imperial medicine and indigenous societies'*, Oxford University Press, pp 1-27
- Bagchi, Asoke K (1997) *'Medicine in medieval India: 11th to 18th centuries'*, Konark Publishing Limited, Delhi.
- Bala, Poonam (1991), *'Imperialism and Medicine in Bengal: A socio-historical perspective'* Sage publishers India limited, New Delhi.
- Balachanran, Indira (2004), *'techniques of commercial cultivation, preservation and scientific harvesting of herbs'* in 'Evolving action plan to facilitate the development and utilisation of medicinal plants', KINFRA.
- Banerjee, M (January 2004) *'Local knowledge for World market: globalising ayurveda'* Economic and Political Weekly.
- Banerjee, M. (March 2002), *'Public policy and Ayurveda- modernizing a great tradition'* Economic and Political Weekly.
- Bureau of public enterprises, *'Review of Public enterprises in Kerala'*, various issues.
- Cebeco India Private limited, (2003) *'Conservation and development of medicinal Plants'*, report on the feasibility study of agricultural export zone.
- Chandrakanth, M.G, Suneetha.M.S, (2001) *'Demand and valuation of medicinal plants in the Western Ghats of Kerala – a resource economics study'*, Department of Agricultural Economics, University of Agricultural sciences, Bangalore.
- Charles Leslie and Allan Young (ed.) (1992), *'Paths to Asian Medical knowledge'*, Munshiram manoharlal Publishers Private limited, New Delhi.
- Conner, Kathleen, R (1991), *'A historical comparison of resource based theory and Five schools of thought within industrial organization economics: do we have a new theory of the firm?'* Journal of Management, Vol.17. No.1.
- Deepa Sankar, (2001) *'the role of traditional and alternative system in providing health care options- evidence from Kerala'*, IEG, discussions paper series no: 38, New Delhi.
- Devi, Indira, P (2004) *'market economy of medicinal plants in Kerala'* in Evolving action plan to facilitate the development and utilisation of medicinal plants, KINFRA.
- Dharmapal (1977) *India Science and Technology in the 18th century: some contemporary European accounts*, Delhi.
- Ernst, Weltrand (1988) *The European insane in British India, 800-1858; a case study in psychiatry and colonial rule* in Arnold, David edited, *Imperial Medicine and indigenous societies*, Manchester University Press, New York.
- EXIM bank (1997). *'Indian medicinal Plants: a sector study'*, Occasional paper No.55.

- EXIM bank, (1997) '*Pharmaceuticals and herbal medicines: a sector study*' Occasional paper No.54,
- Filliozat. J (1964) '*The classical doctrine of Indian medicine; its origin and its Greek parallels*', Munshiram manoharlal Publishers Private limited, New Delhi.
- Gaitonde P.D (1983) '*Portuguese pioneers in India-spotlight on medicine*' Bombay popular Prakashan.
- Gautham Vinayaseel; Raman RMV; Kumar, Asish, (2002), '*Exporting Indian Health care*', EXIM bank, Quest publications.
- George, K.K (1993), '*Limits to Kerala model of development: an analysis of fiscal crisis and its implications*', Centre for Development Studies, Thiruvananthapuram.
- Gheest. S.V.D, Whyte, S.R (1988), '*the context of medicines in developing countries- a study in pharmaceutical anthropology*', Klerwer academic foundations, Netherlands.
- Gopala Krishnan, PK (1984) '*Keralathinte Samskarika Charithram* (Malayalam), State Institute of Languages, Thiruvananthapuram.
- Government of Kerala (1963), Report of the expert committee on ayurveda.
- Government of Kerala, '*Economic Review*', various issues, State Planning Board, Thiruvananthapuram, Kerala.
- Government of Travancore, Reports on administration of the public health department (annual)
- Grove, Richard (1998), '*Indigenous knowledge and the significance of South –West India for Portuguese and Dutch Construction of Tropical nature*', in Grove, *et.al* edited Nature and the Orient, Oxford University Press.
- Gupta, B (1977) '*Indigenous Medicine in 19th and 20th century Bengal*' in C. Leslie edited *Asian Medical System: A comparative study*, California.
- Harrison, David (2001), '*Tourism and less developed world: Issues and Case studies*', ABI publishing limited.
- Harrison, Mark (2001) '*Perspectives on Europe's encounter with Indian Medical Systems*' in Harrison, Mark and Pati, Biswamony edited *Health, Medicine and Empire- Perspectives on Colonial India*, Oxford Logman Limited, New Delhi, pp 1-37.
- Heyn, B, (1987) '*Ayurvedic medicine: the gentle strength of Indian healing*', Thorsons Publishing group, New Delhi.
- Hirschman, A.O (1961), '*The strategy of economic development*' Yale university press.
- Jha, A. Kumar (1995) '*Medicinal Plants: Poor Regulation Blocks conservation*', Economic and Political Weekly, December 23 pp 3270.
- Kabeer, M (2002), '*Growth of Service sector in Kerala: a comparative study of Travancore and Malabar 1901-1951*', PhD thesis submitted to University of Kerala.

- Kaldor, Nicholas (1967), *Strategic factors in economic development*- New York Cornell University.
- Karki, Madhav and Holley Jason (1997), '*Social contract between Industry and rural communities: A framework paper*'. Paper presented at National colloquium on Role of medicinal plants Industry in Rural Development and Bio diversity Conservation in India. ICC, New Delhi Dec. 1997.
- Karthikeyan, S. (1999) 'The Indian Pharmaceutical Industry' in Ravichandran (ed) '*Competition in Indian Industries- a strategic perspective*' Vikas publishing House Private Limited.
- Kenneth G. Zysk (1991), '*Asceticism and healing in ancient India- Medicine in the Buddhist Monastery*', Oxford University Press, Delhi.
- Kerala Planning Board (1983), Report of sub group on health and environmental planning.
- Kumar, A (1998) '*Medicine and the Raj: British Medical Policy in India, 1835-1911*' sage publications, New Delhi, P 68-73.
- Kutumbaih, P (1962) '*Ancient Indian Medicine*', Madras.
- Kuznet, Simon (1959), *Six lectures on Economic Growth*, Illinois, USA, The Free Press of Glencoe, 1959.
- Kuznets, Simon (1955), *Toward a theory of Economy Growth*- New York, Norton, 1955.
- Leonief, Women (1996) '*Input-output economics*', Oxford university press, New York, , pp 44-55
- Majumdar, Asok (1998) '*Ayurveda: the ancient Indian science of healing*', A.H. Wheeler and Co.Ltd, New Delhi.
- Meerabai.M (2001). '*Ayurvedic Industry and its linkages with non-timber forest products in Kerala*', CUSAT, (A paper presented on the seminar of Kerala Development experience)
- Menon, KPP (1924-37) '*History of Kerala*', Ernakulam.
- Nair, M.D (2003) 'Protection of Traditional Knowledge- based Herbal Drugs and Medicinal Plants', in *Evolving action plan to facilitate the development and utilisation of medicinal plants 2004*, KINFRA
- Nair, Vasudevan, K (1997), '*Vaidya ratnam P.S Variar- a biography*' Arya Vaidya Sala, Kottakkal Publications, 6th edition
- Pan. A. Yotopoulos and Jaffery B. Margaret,(1973) '*A balanced growth version of the linkage hypothesis*' the quarterly journal of economics (Cambridge, Massachusetts), Vol. LXXXVII, No.2, May, pp 157-171.
- Panicker, PGK and Soman, C.R (1984), '*Health status of Kerala- Paradox of Economic backwardness and health development*', CDS, St. Joseph's Press.

- Parayil, Govindan (ed.) (2000), *The Development Experience: Perspectives on Development and Sustainability*, London, Zed Books.
- Parikh, M (1999) 'Key issues and problems faced by the medicinal plant industry in India' in Madhav Karki and Radhika Johai edited 'the role of medicinal plants industry in fostering bio diversity conservation and rural development' MAPPA, IDRC.
- Penrose, Edith (1995), *the theory of growth of the firm*, Oxford university Press, New York.
- Pilla, P. Mohanan (1984) *Multinationals and Indian Pharmaceutical industry*, Kerala Sastra Sahitya Parishat, Thiruvananthapuram.
- Pilla, P. Mohanan (2001) *Performance of industrial clusters: a comparative study of pump manufacturing cluster in Coimbatore and Rubber manufacturing cluster Kottayam*, Centre for Development Studies, Thiruvananthapuram.
- Pillai, P.Mohanan and Shanta.N (1997) *Industrialisation of Kerala: status of current research and future issues*, Centre for Development Studies, Thiruvananthapuram.
- Planning Commission (2000), *Task force on conservation and sustainable use of medicinal plants*.
- Pushpangadan, P (2004) 'Quality control and standardisation for herbal drugs' in Evolving action plan to facilitate the development and utilisation of medicinal plants, KINFRA.
- Pushpangadan, P; Rajasekharan S; Ratheesh Kumar.P.K, Velayudhan Nair, Lekshmi.N and Sarada Amma.L. (1998) "Arogyapacha. The Ginseng of Kani tribes of Agasthyar Hills for evergreen health and vitality" *Ancient Sciences of life*, 13-16.
- Raj, K.N (1974) 'Linkages in industrialisation and development strategy: some basic issues', Paper presented in UNDP.
- Raman.K, Ravi (1997), 'Intervention in the Western Ghats: An inquiry into the historical Processes of Loss of Biodiversity and community Sources of Livelihood' in Pushpangadan, Ravi.K.Santhosh edited ' Conservation and economic evaluation of bio-diversity – Vol. 2, Oxford &IBH Publishing Co.Pvt. Ltd.
- Rammohan, K.T (2000) *Kerala model labour and technological change: a view from rural production sites*, Centre for Studies in Social Sciences, Kolkata, Occasional Paper 172.
- Roy, Ellen and Holly Harris (1996), 'Concepts of indigenous knowledge in scientific and development studies literature –a critical assessment', East-West Environmental linkages Network Workshop 3, Canterbury 8-10, May.
- Shah, Sonia (2003), 'Globalisation of clinical research by the pharmaceutical industry', *international Journal of Health services*, Vol. 33, number 1, pages 29-36.
- Shanta, N (1994), 'Growth of firms in Indian Manufacturing Industry', Centre for Development Studies.
- SIDBI (2002) *WTO Related Study on Drugs and Pharmaceutical Industry*.

- Siddiquie, M.Z (1962). '*Medicine in Medieval India*' *Indian journal of History and Science* Vol: VII No.1
- Sreekumar, T (1999) '*Study of ayurveda in colleges and universities*', Arya Vaidyan, quarterly journal of Arya Vaidya Sala, Kottakkal.
- Subrahmanian, K.K and K.J. Joseph (1988), 'Electronics in Kerala's industrialisation' *Economic and Political Weekly*, No. 24
- Subrahmanian, KK (1990), '*Development Paradox in Kerala- analysis of Industrial Stagnation*', *Economic and Political Weekly*, September 15 pp .2053-2058.
- Subrahmanian, KK and P. Mohanan Pillai (1986), '*Kerala's industrial backwardness: exploration of alternative hypothesis*', *Economic and Political Weekly*, April 5.
- Subrahmanyam, K.K (1993), '*Regional Industrial Growth under economic liberalisation, a case study of selected issues with reference to Kerala*', Monak Publishers, New Delhi.
- Tharakan, P.K and Thomas Isaac (1984) *An Enquiry into the Historical Roots of Industrial Backwardness in Kerala: A study of Travancore region*, Working paper No.215, Centre for Development Studies, Thiruvananthapuram.
- Tharamangalam, Joseph,(1998), The Perils of Social Development Without Economic Growth: The Development Debacle of Kerala, India, *Bulletin of Concerned Asian Scholars*, Vol. 30 No.1
- Trewick, Margaret, (1993), 'Death and nurturance in Indian system of healing' in Charles Leslie and Allen young edited '*Paths to Asian medical knowledge*', Munshiram Manoharlal Publisher's limited, New Delhi.
- Unnikrishnan, E (2003), *Materia medica of the LHTs of Payyannur- Survey of herbal and non herbal materials collected for local raw drug markets and pharmaceutical industries from non forest lands*, Society for Environmental Education in Kerala for CDS-KRPLLD.
- Unnikrishnan, P.M (1997), '*An insight into Ayurveda's understanding of medicinal plants*', *Amruth*, 1(10)
- Varier, M.R (2002), '*The rediscovery of ayurveda- the story of Kottakkal Arya Vaidya Sala* ', Penguin books.
- Vedanand (1999) '*Emerging global markets in medicinal plant products: challenges and opportunities for Indian herbal drug industries*' in Madhav Karki and Radhika Johai edited 'the role of medicinal plants industry in fostering bio diversity conservation and rural development' MAPPA, IDRC.
- WHO '*Strategy for traditional medicine 2000-03*', Geneva, p.vi. (September, 2000)
- Wilder, R (2000) '*protection of traditional medicine*', ICRIER, working Paper No.66.

Centre for Development Studies

M.Phil Programme in Applied Economics 2002-04

Title of the study: 'Ayurvedic manufacturing industry of Kerala- study of its organised sector'

Name of the company						
Year of inception						
Annual turn over, 2002-03 (item wise if possible)						
No. of medicines/ products manufactured						
What are they?						
Major medicinal plants used (base- quantity used) and proportion to the total medicinal plant requirement	no	Name of the plant			Price/Kg	propor tion
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
What are the major source of the above told medicinal plants (respectively first five)	No	traders	collec tors	Govt. agenci es	contract	Own cult
	1					
	2					
	3					
	4					
	5					
If there are different source for the same medicinal plant approximate price variation for some item from different sources, with e.g.:						
Is there any raw material you are getting in semi finished form. What are they?						
What is the value addition per unit of output?						
Did industry ever feel that it is difficult to get some species? Which and when? (order according to the intensity of the problem)						
What reasons industry feel as the reason for raw material non availability						

How has industry coped with this scarcity? Various mechanisms adopted	1		
	2		
	3		
If vertical integration is there what is the percentage of investment that they spare?	Total additional investment in the year	Total invest for vertical integration	Percentage of second to the first
Has there been an abnormal escalation of prices? If yes in which and when and what can be the possible reasons?			

If company started taking steps to deal with problems, when it started?			
If the company has started cultivation it is	own	contract	both
If company has started cultivation,	Location		
	Total area		
	What are the medicinal plants		
Area reduced or increased under cultivation and why?			
Quantities of different species produced at present	Total quantity needed for the firm in an year	% available from the own garden	What are the other ways of procuring the same
	2		
	3		
	4		
If the cultivated item is procured from outside also why all the quantity is not procured from outside?(reasons)	1		
	2		
	3		

Quantities of the species that the firm get from outside (above told species in the order)	1
	2
	3
	4
	5
Is there any plan for the enhancement of the cultivation? Why?	
What are the constraints felt by the firm in cultivation?	
What has been the experience of cultivation vis-a-vis raw material supply?	
What are the factors influence for the species cultivation?	
Is the firm before cultivation has taken any cost analysis study?	
Does the government for collection from the forest areas ban any cultivated species, which the company used to use?	
Is industry also cultivating with research institutions? Then what are they?	
Any other government, non-government or private enterprises known to the company that are cultivating?	
Does the cultivation ensure the supply of FRW material?	

Related to the structure and marketing

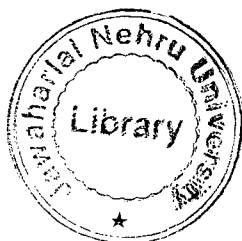
What are the ways which you are marketing the products	1					
	2					
	3					
Which seems to be more effective?						
What is the share of exports in your total turn over?						
What are the main export destinations and which country provides the highest share and the share in percentage?						
Skill composition of the workers		manag erial	techni cal	producti on	marketi ng	tot al
	Number					
	Wages					
Benefits flow, if any	1					
	2					
	3					
Statutory minimum wage followed	manager ial	technical	production	marketing		
What is your share on R&D? (on percentage of the total investment)						
What are the research initiatives that institution is currently encouraging						
What about the annual advertisement expenditure of the company to the total expenditure						
Do you think that there is an increase in the demand for the plant based medicine						
If there, in your opinion what may be the possible reasons for the demand hike?						
Do you think entry of multi national companies will hurt the growth of the growth of the existing companies? How?						
In your opinion what are the major challenges that industry that industry faces today?	1					
	2					
	3					

Value chain analysis

At present what is the most demanded product of the company		
What are the medicinal plants needed for the production of the same?		
Per unit cost of those medicinal plants	1	
	2	
	3	
Source of those medicinal plants		

Your perception (please make use of the additional paper attached)

- Please give your comments on the industry in Kerala:
- What do you think the major bottle necks of this industry?
- Export prospects and related problems...
- Product preferences of the consumer (cosmetics/curative)
- What do you expect Government policy to be?



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