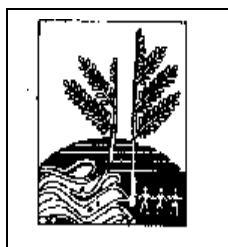


**Globalisation, Global Trend in Herbal Market,
and
The Impact Thereof on Medicinal Plants in Orissa**

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Note from the author

This paper was originally intended to verify if globalisation has had any adverse impact of Orissa's medicinal plant resources in the wild. When the research was initiated, absence of secondary information and lack of adequate reference materials on this subject(pertaining to Orissa) created a major problem in the analysis. However, the struggle encouraged the author to make the analysis/compilation comprehensive enough, so that others would not face the same problem.

I take this opportunity to thank all those who have contributed to this effort in one way or the other. Some of the conclusions of this analysis might not hold good after a decade or more, but there is hardly any hope of overcoming in the near future the qualitatively adverse impact of globalisation on our resources, culture and livelihood. Hope, this work will encourage social workers, policy makers and other capable stake-holders to intervene appropriately so that we do not end up in a situation like that of the Greek king Midas.

Bikash Rath

Executive summary

During the last decade, popularity of alternative medicine increased significantly world wide with noticeable trends in the United States in particular. This in turn accelerated the global trade of herbal raw materials and herbal products, and created high scope for the Afro-Asian as well as Latin American countries, which are the major suppliers of herbal raw materials in the world. The heterogeneity in the trade regulations in different countries could have caused a differential impact on the global trade and transactions, but globalisation, by its uniform policy, helped to some extent to overcome the impact of this heterogeneity.

The global trade of medicinal- and related plant materials was estimated to be of the approx. value 62 billion US\$ in 2001. China has been successful in acquiring the single largest share in this export market because of its well-designed national policy on the traditional Chinese medicine. Ginseng is the major item of the Chinese export.

Despite contradictory claims regarding India's share in the world market of medicinal plants, one thing is very clear that ideally it should have the second largest share, but the country lags far behind China owing to its unorganised trade system and inadequate policy. The Government of India has however been quite active since 2000 to overcome this problem, and has adopted many measures to give a boost to the export of medicinal plants. A National Medicinal Plant Board has been constituted to facilitate the conservation, propagation and marketing of important medicinal plants, and its state-level counterparts are also operating to implement this mandate at the level of individual states.

So far the value of export is concerned, both India and China have the same problem that most of their export is in the form of low-value added products which lowers the price. However, speaking ethically the current trend is against our age-old tradition of glorification of medicinal plants. Market has become the ultimate goal now, and self-reliance in local health care through the conservation & propagation of medicinal plants is of secondary importance. Hence, many people cultivate medicinal plants not for their consumption but for some use else-where. Of course, even during the British period people used to cultivate poppy, etc. for the end use else-where, but at that time such cases were rather isolated; but now, thanks to the market-oriented policy of the government, this is going to become a national phenomenon. The case of safed-musli is an example. And since it is the market which decides which plant is to be cultivated or propagated, the role of local health care traditions becomes marginal in the conservation of medicinal plants and hence many traditionally important plants are actually ignored. Globalisation is essentially market-centric, and this market-oriented approach is ultimately derogatory to India's rich and powerful tradition of local health care. And the sufferers of its impact would be the lower income group in particular, though the middle class would also be affected.

Overexploitation has been one of the impacts of market forces, which in turn has made many plant species endangered. Although this phenomenon has been noticed well before globalisation started, the global trend in herbal trade has helped to spread it further.

Extremely unorganised trading, natural absence of several species of demand in the wild, and bad harvesting/marketing practices are some of the major factors which have helped to more or less neutralise the quantitative impact of the global trend in herbal trade on the medicinal plants of Orissa. However, cases of overexploitation are there. Of late, commercial cultivation of some species is becoming a craze for some people who are lured by the market forces, but cases of failure are not rare. On the other hand, qualitative impact of the global trend has been noticed.

1. Introduction:

Medicinal plants assumed commercial significance since millennia, but it is only during the last few decades that this significance has increased remarkably with the growing production as well as popularity of herbal drugs, herbal cosmetics and nutraceuticals. The recent trend has simultaneously led to a heavy pressure on the medicinal plant resources of the country due to increased unsustainable exploitation of the same, and it is in this context that an assessment of the impact of globalisation on such plants/resources has been very pertinent as there is an apprehension that globalisation would lead to the overexploitation of country's resources(including medicinal plants).

2. Research hypothesis:

The study was conducted with an impression that globalisation had accelerated overexploitation of valuable medicinal plants in the state(Orissa).

3. Study methodology:

As adequate secondary references seemed lacking on our research topic, hence certain parameters were selected for an analysis of the impact. For instance, an adverse impact of globalisation can be judged from a substantial increase in export of crude plant drugs to western countries during the last decade. Similarly, status of cultivated crops(medicinal) can also serve as an indicator of the nature of commercial interest in medicinal plants.

The study was planned to be based on inferences to be drawn on inputs available from traders, Ayurvedic drug manufacturers and other stakeholders; as well as from relevant publications like newspaper reports, articles, trends in import/export, etc. Accordingly, stakeholders like traders were interacted with in and outside Orissa; and export-import data was purchased from the Director General of Commercial Intelligence & Statistics, Kolkata for the years 1987-88 to 2003-04.

4. Study period:

The study was initiated in June 2004 and was completed in July 2005.

5. Results and discussions:

5.1 Globalisation: the concept and the apprehension:

Globalisation basically attempts at establishing more or less a uniform order in the world pertaining to trade and economic activities. The endeavour to swiftly enforce such a kind of effort has been facilitated from various directions and in various forms, by some international agencies like the World Bank and International Monetary Fund. Treaties like the General Agreement on Trade and Tariff (GATT) have become the legal means through which this is implemented.

Globalisation has created opportunity for the marketing of several products from the developing and underdeveloped countries, in the western countries. For instance, China's textile business has been increased substantially in the international market.

However, the apprehension in the third world countries regarding the consequences of globalisation is based on the fact that the concept of globalisation was basically put forward by the rich and developed countries of the west in the interest of their own market economy and political strategy. Free market and free trade were supposed to be the two key slogans of this globalisation movement; and the developed countries were supposed to be the major beneficiaries as they intended to take advantage of the relaxations in the regime of different developing as well as under-developed countries so as to exploit the markets and resources of such countries in their interest. In fact, globalisation has been seen and felt as a strategy of recolonising the third world countries.

Commercialisation and commodification of not only the resources, but also the value systems related to them, have been the ultimate outcome of globalisation. For instance, the country can now be ready to sell some of its resources, which were earlier not supposed to be saleable given their strategic-, socio-cultural-, or any other importance, if an alluring price is offered for the same. Such a price is normally offered by multinational/trans-national companies (MNCs/TNCs) as their currency has a greater purchase value than ours.

As regards medicinal plants in particular, the impact was supposed to have all or any of the following forms:

- Increase in export/import of raw drugs
- Increase in the domestic and international business of traditional medicines manufactured from the raw drugs.
- Significant increase in research on the bio-chemical and clinical performances/properties of med. plants.
- Significant increase in patenting of herbal products.
- Boost to the phytochemical industry.

5.2 Global trend of herbal market:

Herbals drugs, unless they are adequately standardised in the allopathic way, are almost without any scope of getting prescribed in the western countries. On the other hand, in the developing as well as underdeveloped countries, where the norms are not so strict and also the modern system is yet to completely dominate over the traditional systems, the scope of their marketing is better.

Whenever the global trend of the herbal market is discussed, although in the first place it seems to be concerned about the quantitative increase or decrease in the demand and supply status of herbal materials; the actual emphasis is on the value of trading. It is in this latter context that the role of western countries becomes important as the value of trading becomes significantly higher with respect to the marketing in these countries.

During the past decades, western people have increased their interest in herbal medicines for a safer and natural health care. At the same time, western scientists have intensified their research on the medicinal properties of the plants of developing and third world countries so as to develop more effective and safer drugs for diseases of greater concern. In fact, more than 60% of the new anti-cancer drugs approved since 1983 were derived from plants (source: presentations in WOCMAP III¹, 2003). Hence, the countries in Asia, Africa and Latin America see greater scope in earning valuable foreign exchange through export of their plant wealth to the western countries.

Although lack of standardisation in the allopathic way creates difficulty for the herbal drugs in getting a govt nod in the west, the hope lies in the OTCs. OTC or Over the Counter drugs can be purchased without doctor's prescription, and hence these items have a comparatively better scope of marketing. Following are some of the top ranking OTCs used in the west:

Table-1

Common name	Scientific name	Use	Business in million US\$
Psyllium(Isapgul)	<i>Plantago ovata</i>	laxative	250
Ginkgo	<i>Ginkgo biloba</i>	memory-enhancer	138
St. John-Worts	<i>Hypericum perforatum</i>	anti-depression	121
Garlic	<i>Allium sativum</i>	hypolipidemic	84
Aloe	<i>Aloe spp.</i>	stimulant, laxative, cosmetic	52
Peppermint	<i>Mentha piperita</i>	anti-tussive	40
Saw-palmetta	<i>Serenoa repens</i>	prostrate hyperplasia	30
Ginseng	<i>Panax spp.</i>	adaptogenic	12
Gotukola	<i>Centella asiatica</i>	blood circulation	12
Black cohosh	<i>Cimicifuga racemosa</i>	menopause, and pre-menstrual syndromes	10
Kawa	<i>Piper methysticum</i>	anti-depressant	8
Milk thistle	<i>Silybum marianum</i>	liver protection	8
Valerian	<i>Valeriana officinalis</i>	calmative	8

[Singh J. *et al* 2001 quoted in training material(p.174) distributed by CIMAP, Lucknow at Cuttack during the Skill-cum-Technology Up-gradation Programme on medicinal and aromatic plants, organised in January 2004]

World-wide consumption pattern of medicinal plants has noticed some remarkable changes towards the latter half of the last century, thanks to the highly disturbed and/or artificial life-style. The latest pattern is based on the consumption pertaining to two major categories of end-use, as under:

¹ World Congress on Medicinal and Aromatic Plants for Human Welfare, held at Chiangmai, Thailand

Table-2

Category	
<i>Genuine/critical healthcare</i>	<i>Superficial/non-critical health-care</i>
Anti-cancer drugs	Herbal tea and laxative
Anti-diabetic drugs	Sexual potency enhancers (aphrodisiac)
Anti-hypertension drugs	Cosmetics
Cardiac drugs	Food supplements
Drugs for diseases like Parkinson's	Memory-enhancers

The global exports of medicinal plants was **US\$ 759** million in the year **2001**. China stood as the world's No.1 exporter of medicinal herbs with an export value of **US\$ 200** million in the same year (EXIM bank of India 2003, *Export Potential of Indian Medicinal Plants and Products*, pp.11-12)².

In terms of the value of export-import, Hong Kong(17%) plus mainland China(4%) had the largest share(21%) in the import market followed by US(14%) and Japan(10%) in 2001 (EXIM Bank of India 2003, *op.cit.*,p.60).

Leading markets for herbal products in Europe are Germany followed by France, UK and Italy. Germany has the largest herbal extraction industry in Europe. US is the major market for essential oils and herbal tea (Tarun Nagpal, presentation at ICMHHP³,2004).

While 80% of the world population still uses traditional medicines, in the developed countries the interest in alternative medicines has increased by 60% since 1989. In the US, consumer use of herbal products was less than 5% in 1991 which increased to about 50% in 2004(presentation at International Conference on Medicinal Herbs and Herbal Products: Livelihoods and Trade Options, 26-27 March'04). WHO estimated the world market for herbal medicines and herbal products is worth US\$62 billion and would hit US\$ 5 trillion by 2050. The market is growing @7% per annum (*The Times of India*, 7-4-2000).

The pharmaceutical industry is growing @12% per annum(US\$364 billion in 2001) while the personal care(cosmetics) industry is growing at more than 6%(US\$108 billion in 2001). The flavours and fragrance industry was valued at US\$18 billion in 2001 as against US\$7 billion during the same year(Tarun Nagpal, *op.cit.*).

² Consistency has not been found in the estimates of turnover and transactions given by different authors in different publications/reports. In some cases, the value of export of medicinal plants has been found to be different than that of the herbal trade. Even some of the figures furnished/quoted in the EXIM Bank publications are quite contradictory and confusing. For instance, the assessments about the share of India and China in the global export market of herbs are not matching with those projected in exhibit-4.1(vide *Export Potential of Indian Medicinal Plants and Products*, pp.58-60). Similarly, Richter's HerbLetter of 30-4-2002 quoted a news which said that China exported US\$558 million worth traditional TCM in 2001, but the details thereon were contradictory.

³ International Conference on Medicinal Herbs and Herbal Products: Livelihoods and Trade Options, held at New Delhi during 26-27 March'04

However, WHO has issued certain guidelines to promote traditional medicines that may ultimately create problem for exporting countries like China and India. In its traditional medicine strategy:2004-05 the organisation has advocated for regulations and other arrangements (like public awareness programmes) so as to ensure safe utilisation of the traditional medicines(*Down to Earth*, July 31, 2004; p.36). Many of the traditional herbs do not conform to the perceptions and norms of the western countries as the latter correspond to a different system(allopathy) and concept. The mismatch then may create problem for the exporters. If however the advice is implemented in a coordinated manner so as to avoid any kind of mismatch, then the objective of providing safer drugs to the people may be fulfilled.

While the European Union indicated in 2001 that it would like to make the entry of traditional herbal products into EU easier, the norms seem rather contradictory. For entry into EU, the products are required to be in traditional use for atleast 30 years, and in the EU itself for about 15 years. Any traditional product already in use in any EU country for atleast 15 years seems often unrealistic(except in a few cases) particularly when it originates from some Asian or African country((EXIM Bank of India 2003, *op.cit.*, p.85).

The Chinese seem to have taken the maximum advantage of the global trend of herbal products, thanks to their govt policy. The Chinese govt not only integrated traditional Chinese medicine(TCM) with the allopathic system, but also took specific measures so that the countries indigenous medicines can not only benefit the country financially, but provide maximum possible benefit to the country's people with respect to their health care. It is according to the latter policy that 1.3 million bare-foot doctors were trained in the basics of TCM(presentation ICMHHP).

China started implementing the GMP policy in TCM by early '90s, which greatly helped in the export market. The Chinese govt has adopted the 'five 'P' ' policy, i.e., GAP(good agricultural practices), GMP(good manufacturing practices), GLP(good laboratory practices), GCP(good clinical practices), and GSP(good selling practices).Cultivation has been encouraged adequately as a result of which 450000 hectares were under medicinal plants cultivation in 2001(EXIM Bank of India 2003, *op.cit.*, pp.29,57).

Ginseng is the major medicinal raw drug in Chinese exports. Over 50% of these exports are low-value added basic ingredients (EXIM Bank of India 2003, *op.cit.*,p.12).

Because of the govt policy, TCM has been able establish itself so well in the western market that in some countries like The Netherlands, medical assurance companies reimburse expenses on TCM but not on other systems of alternative medicine like Ayurveda(source: Indian Herbs Co., The Netherlands).

It is not that the Chinese system has never suffered any set back in the global market. In 2004, the US banned all dietary supplements containing the Chinese herb *Ephedra* as it increases the risk of hearth attacks in some people(*Down to Earth*, July 31, 2004; p.36).

And the stand against herbal products has been found in several other cases. St. John's Wort, which used to be the top five selling herbal products in the US and was the number one anti-

depressant drug in Germany till recently, was declared, after some studies, not only to be less effective than popularly believed earlier, but also to weaken the anti-cancer drugs. Although there are counter-arguments refuting such claims, still the impact of the confusion thus created cannot be ignored. Garlic, ginkgo and ginseng have been found to interfere with blood clotting and hence patients undergoing surgical procedures are cautioned against their use. Kawa has been found to have adverse effects on liver, which led to the introduction of kawa-free dietary supplements(source: Richter's HerbLetter,30-4-2002)

5.3 The Indian scenario:

In India, traditional systems of medicine have recognised and used over 7500 species of medicinal plants out of which Ayurveda uses about 1769 species. It has been found that whereas during the Vedic period, uses of approx. 289 medicinal plant species were documented, by 1500 BC to 500 AD this number rose to 650(approx.), and by 1900 AD, to 1814 (*The Hindu Health Folio*, Oct.2000; pp.7,14-15).

As per an estimate of 2002, demand of medicinal raw drugs in the country is **2.72 lakh tons** as against supply of **1.20 tons** (Source: Dr.J.P.Singh, OFDC⁴). The top ranking medicinal plants, in terms of their demand status are as under:

Table-3

<i>Common/trade name</i>	<i>Scientific name</i>	<i>Demand in ton(by 2004-05)</i>
Amla	<i>Emblica officinalis</i>	41782.9
Satavari	<i>Asparagus racemosus</i>	16658.5
Senna(sunamukhi)	<i>Cassia angustifolia</i>	11677.3
Ashok	<i>Saraca asoka</i>	10724.2
Aswagandha	<i>Withania somnifera</i>	9127.5
Bel	<i>Aegle marmelos</i>	7084.5
Brahmi	<i>Bacopa monnieri</i>	6621.8
Pippali	<i>Piper longum</i>	6280.4
Tulsi	<i>Ocimum sanctum</i>	5402.9
Vatsanabh	<i>Aconitum ferox</i>	3426.8
Bhuiamla	<i>Phyllanthus amarus</i>	2985.3
Guduchi	<i>Tinospora cordifolia</i>	2932.6
Guggul	<i>Commiphora wightii</i>	2548.9
Kalmegh	<i>Andrographis paniculata</i>	2197.3
Makoy(Lunilunika)	<i>Solanum nigrum</i>	2192.2
Daruhaldi	<i>Berberis aristata</i>	1829.4
Kuth	<i>Saussuria lappa</i>	1826.3
Jastimadhu	<i>Glycyrrhiza glabra</i>	1359.8
Chirayita(Himalayan)	<i>Swertia chiraita</i>	1284.7
Chandan	<i>Santalum album</i>	1073.1

(Source: National Medicinal Plant Board⁵)

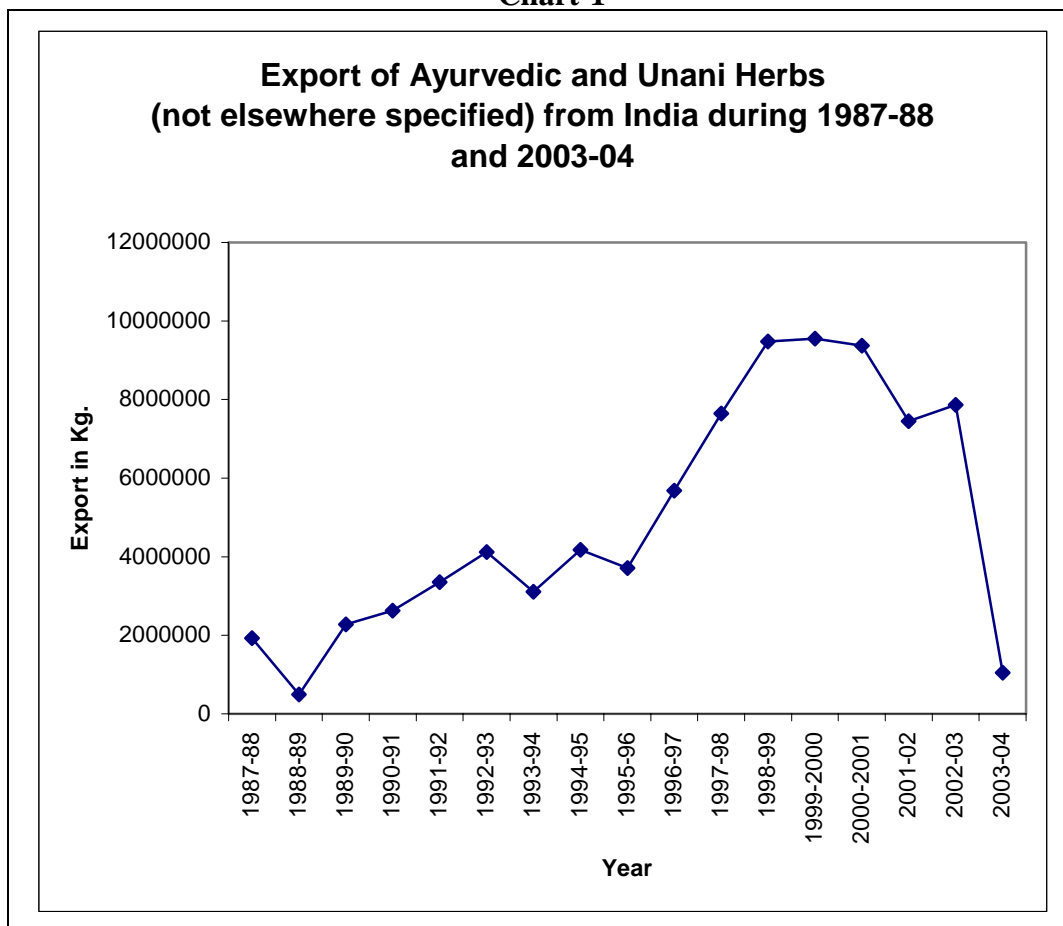
⁴ Orissa Forest Development Corporation, an undertaking of the Orissa Government

⁵ This projection is however controversial, and is acceptable in the absence of any more reliable option.

Export of our valuable resources to foreign countries, particularly the western countries, is supposed to be a major means through which globalisation or the global trend can affect us. On the other hand, there are other means also for exercising control over our resources by the western corporate sector. It may so happen that some of our own resources lose importance in the market by some propaganda against their efficacy. Similarly, it may also happen that we ignore our resources and give priority to those from outside but promoted by market forces. Hence, the adverse impact may either cause overexploitation, or underexploitation. Ginseng and Viagra, drugs(crude/synthetic) from other countries, seem to have accelerated the marketing of aswagandha and safed musli; and the local equivalent satavari remained ignored under this fog of glamorous marketing, for several years in Orissa.

Medicinal raw materials are exported from India under two categories: specified and unspecified. The following chart shows the trend in the export of Ayurvedic and Unani herbs under the unspecified category:

Chart-1



[based on data available from Director General of Commercial Intelligence & Statistics(DGCIS), Kolkata]

The above chart shows that the status in 1987-88 was more or less restored in 1989-90, and since then an increasing trend of export continued for about 10 years i.e., upto 1998-99. Hence, it is not that such a trend suddenly emerged out of nothing in 1990s. However, as evident, the increase during 1995-96 and 1997-98 is remarkable.

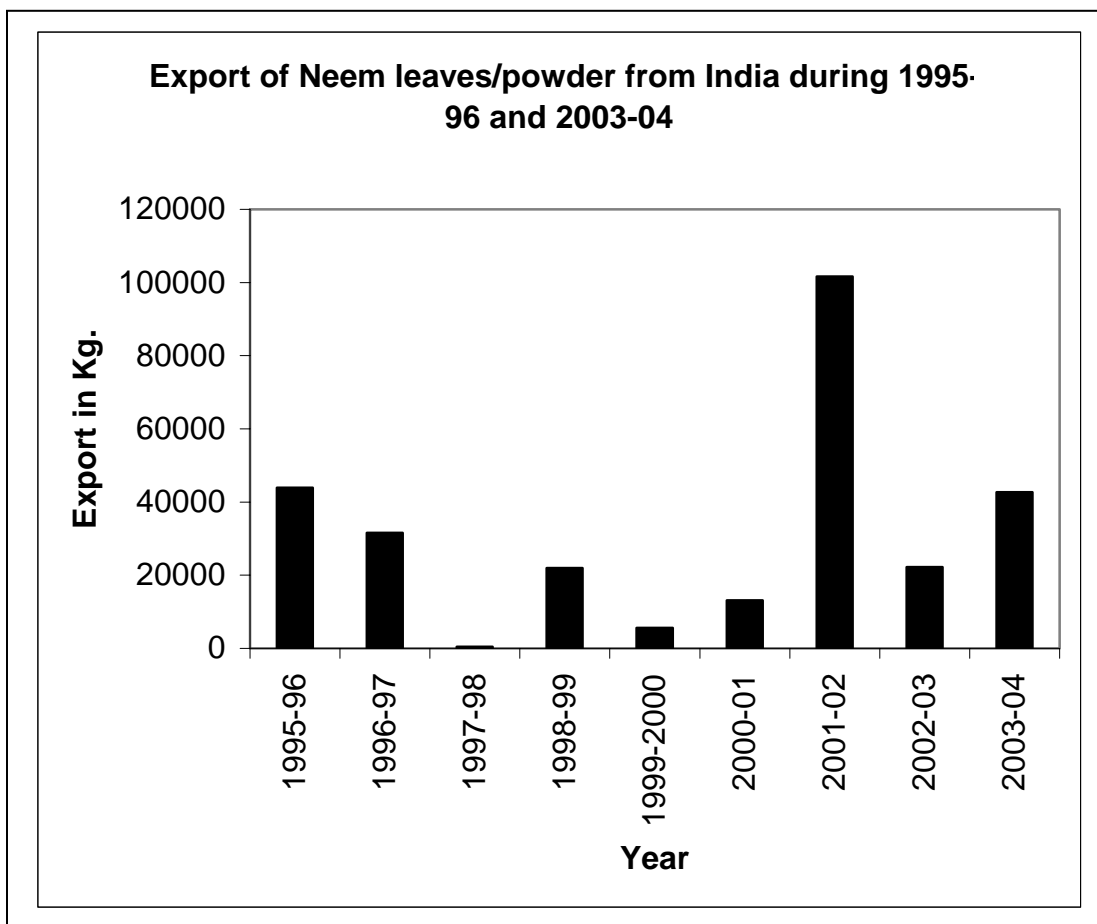
On the other hand, a careful study of the trend in case of certain specified products(which are available in Orissa though it does not necessarily mean that Orissa has been the major contributor of these products) indicates that the global trend does not have the same kind of impact always and in all cases. Rather, the impact is demand-specific, time-specific, and species-specific.

For instance, there was no report on the export of R.S. roots between 1987-88 and 1992-93⁶. In 1993-94, only 110 kg of the same was exported (to Europe), which increased to 3937 kg(exported to Europe) in 1995-96; the year 1994-95 being unreported. No export was reported for next two years, and in 1998-99 only 188 kg was exported (to Europe). The quantity increased substantially in the following year(1999-2000) when 9026 kg was exported to Europe again. The next year remained unreported, and in 2001-02 the quantity exported was 6000 kg, but this time to Nepal. 2002-03 was an unreported year, and in 2003-04, 142000 kg was exported to middle east (based on DGCIS data). This suggests that the neither the trend of export remained constant, nor was the export remained confined to western countries always.

The trend of Neem leaves has remained very erratic during 1995-96 and 2003-04, earlier years(upto 1987-88) being unreported. These leaves have been exported to US, Europe, Australia and Asian countries. In 1995-96 the quantity was 43903 kg which was reduced almost by 99%(465 kg) during 1997-98. Chart-2 reflects the trend during the above-mentioned years:

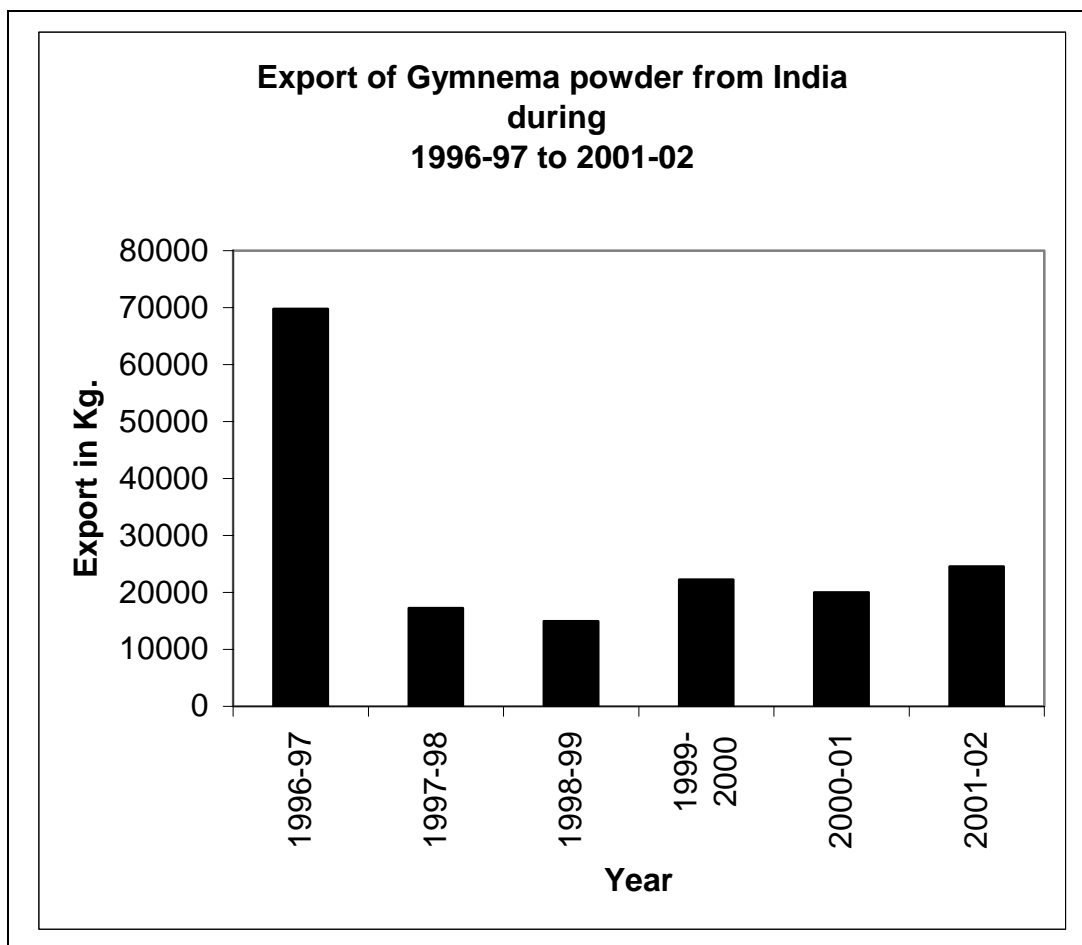
⁶ Although the DGCIS data suggests this, Tewari has recorded that in 1986-97 and 1987-88, the export of R.S.roots amounted to 55885 kg. and 434867 kg. respectively (Tewari D.N. 1994, *Tropical Forest Produce*, pp.280-281).

Chart-2



In case of *Gymnema sylvestre*(gudmari), an anti-diabetic crude drug, the trend does not look very promising, as seen in chart-3:

Chart-3



It may be mentioned here that *Gymnema sylvestre* is supposed to be a vulnerable plant in Orissa, and the leaf powder has been exported to US, Europe, Japan and middle-east.

Sweat-flag rhizome, otherwise known as 'bacha'(*Acorus calamus*) which has memory-enhancer properties⁷ and several other advantages, has been exported reportedly from 1997-98 to countries like Italy, France, Singapore, Sri Lanka and Malaysia. Between 1997-98 and 2003-04 the total quantity of export was 20735 kg(based on DGCIS data).

Nux-vomica seeds are plentifully available in Orissa. These seeds have been exported to US, Japan, China, Italy, Mexico, France, Iran and Bangladesh. In 1988-89, about 14885 kg was exported. 1989-90 and 1990-91 remained as unreported years followed by export of only 500 kg in 1991-92. The next year was unreported again followed by export of 20360 kg in 1993-94. Next five years remained unreported, and since 1999-2000 only a regular export could have been ensured as per the following table:

⁷ The formulations 'Mega-mind plus' and 'Memory plus', which were popularised in the market about a decade ago, contained bacha as a major ingredient.

Table-4

Year	Quantity exported in Kg	Countries
1999-2000	39900	China, Italy
2000-01	18000	Mexico
2001-02	20000	France
2002-03	3900	US, Iran
2003-04	32085	Bangladesh

(based on DGCIS data)

Between 1988-89 and 2003-04, the share of western countries remained 46.1% in the total exported quantity of nux-vom seeds.

The share of western countries(including Australia) in the items exported from India has not been very substantial in many cases. For instance, in case of Ayurvedic and Unani herbs this share was limited to only 13.67% and 18.44% in 1987-88 and 2003-04 respectively. In case of R.S. roots, it was only 8.22% in the total quantity exported between 1993-94 and 2003-04; and in case of sweat-flag rhizome, only 28.9% (during 1997-98 and 2003-04). Although in few cases the share might have been considerably higher(like, in case of nux-vom seeds, 46.1%), that does not necessarily mean that our resources were utilised largely by westerners because the non-resident Indians established in other countries have often been among the major consumers of these products.

However, in terms of the value of export the interpretation may be quite different as the western countries pay a much higher price than their African or Asian counterparts so far the exchange rates are concerned. And it is for this reason that North America(especially USA) accounts for over 50% of our exports(EXIM Bank of India 2003, *op.cit.*, p.11). A market-oriented approach estimates the trends of medicinal plant business in terms of the cash value, but that does not necessarily clarify on the conservation status of med. plants as prices may vary substantially from country to country and from year to year for the same quantity and same item. Unfortunately, the former kind of analysis is more preferred.

The volume and value of medicinal plants exported from India were 32882.8 tons and Rs.2159.518 million in 1996-97, which rose to 37976.3 tons and Rs.2377.952 million in 1998-99, but reduced to 36617 tons and Rs.1764.799 million in 1999-2000(Rawat A.K.S. 2004, *Adulteration & Substitution of Herbal Drugs in Indian Market*, presentation at ICMHHP). The export was further valued at US\$ 133.28 million(as against US\$ 112.46 million in 2000-01) in 2001-02. The conventional growth rate has been assumed at 15%(EXIM Bank of India 2003, *op.cit.*, pp.11-58). Still, India is yet to be in a position to compete with countries like China. It was estimated that when China's transaction was Rs.2500 crores and that of Thailand was Rs.1000 crores, India could achieve a figure of Rs.436 crores only(source: presentation at the seminar on med. and aromatic plants held at Orissa University of Agriculture & Technology during 11 to 12 January'05). Malpractices by exporters, and lack of value addition, etc. may be responsible for this lower rate of achievement in the export sector of medicinal plants, but at the same time it also means that the domestic market in India consumes the major part of the

production, and that the threat to the availability of some wild species is reduced till their export increases substantially.

Speaking species-wise, the trend has witnessed some major changes during past 30 years. For instance, during 1974-75, crude opium topped the list of exported items followed by psyllium husk, kuth, zeodvary roots and senna leaves/pods(Botanical Survey of India 2000, *Flora of India*, Introductory volume, part II, p.350); but during 2001-02 psyllium husk(50.55 million US\$) topped the list followed by opium(16.82 million US\$), cambodge extract, other extracts, and henna powder(EXIM Bank of India 2003, *op.cit.*, p.67) in terms of the value of export. However, speaking quantity-wise, psyllium husk(25581.75 ton) topped the list followed by senna leaves/pods(8237.85 ton), not-elsewhere-specified Ayurvedic and Unani drugs(7451.64 ton),henna powder(6732.89 ton) during 2001-02 (EXIM Bank of India 2003, *op.cit.*, p.67).

Export of value-added and finished products started decades ago, but their volume was negligible. For instance, VICCO Laboratories has been marketing its herbal toothpaste Vajradanti, in the US for more than 25 years. Similarly, the Himalaya Drug Company is known in the US since many years for its product Liv-52(Dharmananda S. 2003, *The Ayurvedic Medicine Industry in India*, online paper). However, as said earlier, the volume of such export was negligible; and although the situation has improved during the last decade, still about 73% of our exports(medicinal plants) were in the form of crude drugs and extracts, the rest being in the finished form. It is expected that with more and more emphasis on exporting finished products, the situation will improve further (EXIM Bank of India 2003, *op.cit.*, p.58).

However, finished products face certain constraints in the importing countries. Even in domestic marketing also one or more of such problems may be faced. Some instances are given below:

- Some of the western products may find our products as competitive, and when the competition is about to create marketing problem for the former, a conspiracy may work behind to defame the herbal product that came from the Asian/African country. There may be a mismatch pertaining to the regulations, which may also create problem. Recently, US doctors called for mandatory testing of all imported Ayurvedic drugs after they found potentially toxic amounts of heavy metals(like mercury) in some of them, but hardly any of them took into consideration that Ayurveda uses not only plant parts, but also minerals and metals like gold, silver, mercury, and arsenic etc. in specific formulations. In fact, the US regulatory standards correspond to the allopathic products(*The New Indian Express*, 18-12-04, p.7), and hence the mismatch.
- The western market and society is accustomed of standardised products. If our products lack standards, then their marketing would be difficult. A recent study in India found that in 9 out of the 10 branded products based on aswagandha, the concentration of aswagandha at a certain withanolide(alkaloid) level was much lower than expected(*Down to Earth*, March 31, 2004, p.15). Of course this may be due to variation in the chemical quality in different cultivation/collection areas, but even in that case the efficacy of the product can be questioned.

Many of the so-called Ayurvedic products have reportedly had adverse effects in some cases as, unlike the true and original methodology of Ayurveda which believed in patient-specific treatments, the modern pharma companies have tried to market their products as disease-specific, or generic as found in case of Allopathic drugs. Besides, practitioners having inadequate training/experience are also to be blamed in some cases.

- Recently the US media blamed one of our sacred drugs guggul as a 'dirty herb' because it was found that consumption of Gugulipid for reduction of cholesterol level also reduced the efficacy of allopathic drugs. What actually happened was that Gugulipid is a chemical extracted from guggul and has been found effective as an anti-cholesterol agent; but in US it has been sold also as an OTC drug leading to its consumption without medical guidance/supervision, and hence the problem. Ayurveda gives importance to guggul for the treatment of arthritis, whereas the US experience was confined to one of its derivatives used for a different purpose. Unfortunately, instead of considering all these factors, the US media blamed guggul directly(*Down to Earth*, Nov. 15, 2004; p.22)
- Many herbal products are being traded in the name of Ayurveda whereas neither they conform to the Ayurvedic pharmacopoeia, nor are they based on the traditional Ayurvedic method of preparation. These are creating bad names for our traditional systems. Even the Central Council for Research in Ayurveda and Siddha claimed to have developed an anti-malarial Ayurvedic drug AYUSH-64, but the drug was actually based not on Ayurvedic system of manufacturing, but on the modern system.

The latest impact of these factors is the ban imposed by the Canadian government on 'unapproved' Ayurvedic drugs from India, on the plea of hazardous heavy metal concentration in them. On July 14, the Canadian health agency's website said that although use of metals for medicinal purpose had been recognised in Ayurveda, improper manufacturing practices might dangerously increase the concentration of heavy metals in the final products. The agency banned products manufactured by Dabur, Zandu, Himalaya and Hamdard, etc. although some of these products(like Dabur's 'Shilajit' which is actually a natural rock extract) are claimed by their manufacturers to be free from metals. The manufacturers said they did not directly export these products to Canada, and that they would take measures like policy advocacy on this issue. However, the ban is not applicable for those Ayurvedic products which have been authorised for sale in Canada(*The Economic Times*,20-7-05, p.1).

5.3.1 Bio-piracy

Adverse impact through bio-piracy has been believed to be another threat to our country. Bio-piracy simply means 'our knowledge, their strength', i.e., based on clues available from our age-old traditions, western(may be elsewhere) scientists have succeeded in developing certain drugs from our natural products(like *neem* and *haldi*) and have claimed patent rights over the same without acknowledging our contribution to their research, and hence without acknowledging our share in intellectual property rights over the same. India lost rights over several such products during the last two decades, and after much struggle(both at govt and non-govt level) has succeeded in getting patent rights over few such products revoked.

Identification and separation of active principles responsible for the medicinal efficacy of any particular species is the first step which may (or may not) lead to bio-piracy. This phase is not of recent origin. For instance, isolation of strychnine from *Strychnos nux-vomica* was done as early as 1818(*Natural Products Radiance*, January-February 2005, p.7). As the western scientists had the capacity as well as political(govt) support to carry out such research activities, hence the credit for most of these kind of discoveries went to them till India(and other underdeveloped countries) could develop their own capacity in this regard. The irony is that the Govt of India has always been lagging behind in ensuring an effective mechanism to check bio-piracy.

However, there are examples, in which our resources have assumed a new identity for us through such kind of research, i.e., through modern research certain uses(like medicinal) of some species have been developed which were earlier unknown to us. For instance, *Mappia foetida* (*Nothapodytes nimmoniana*) has never been recorded as a medicinal plant in India; but it became an item of export(in 1994?) after the extraction of Camptothecin, an anti-cancer drug. This plant has now become endangered in Karnataka, and vulnerable in Kerala and Tamilnadu (Ravikumar K. and Ved D. 2000, *100 Red-listed Medicinal Plants of Conservation Concern in South India*, pp.261-263). Such kind of developments have given a boost to similar research activities, both at govt and non-govt level, in the country.

Phytochemicals are an outcome of the above mentioned research activity. Extraction of phytochemical not only means value addition, but also helps in domestic as well as international trading as it reduces the volume of the source materials which would have been otherwise traded. Some important phytochemicals available in India are as under:

Table-5

Phytochemical	Source plant
Berberine	<i>Berberis lycium/asiatica</i>
Xanthotoxin	<i>Heracleum candicans</i>
Diosgenin and steroids	<i>Dioscorea deltoidea</i> <i>Trillium govanianum</i> <i>Costus speciosus</i> <i>Gloriosa superba</i> <i>Solanum spp.</i>
Ephedrine	<i>Ephedra gerardiana</i>
Santonin	<i>Artemisia breviflora</i>
Taxol	<i>Taxus baccata</i>
Quinine salts	<i>Cinchona ledgeriana</i>
Hyoscyamine and Atropine	<i>Hyoscyamus niger</i> <i>Datura metal</i> <i>Atropa acuminata</i> <i>Physochlaina praealta</i>
Rutin	<i>Fagopyrum esculentum/tataricum</i> <i>Sida cardifolia</i> <i>Sophora japonica</i>

(Source: EXIM⁸ Bank of India 1997, *Indian Medicinal Plants: A Sector Study*, Table-2.4)

⁸ Export Import

Reserpine(from *Rauvolfia* spp.) and certain other phytochemicals like Andrographolide(from *Andrographis paniculata*) and alkaloids of nux-vomica have also been important since many years. Several other products which are now considered to have commercial importance are as under:

- Podophyllotoxin(from *Podophyllum emodi*): anti-cancerous
- Curcumin(from *Curcuma longa*): anti-oxidant, anti-inflammatory
- Colchicine and Thio-Colchicoside (from *Gloriosa superba*): gout-supressant(etc.)
- Camptothecine: anti-cancerous
- Bergapten(*Ammi majus*): for treatment of psoriasis (source: www.amsar.com; www.indophyto.com)

The phytochemical industry is growing. However, phytochemical industries have been established in India atleast since 1960s (like, Amsar Ltd. and Alkaloids Corporation). In 1974, export of plant derivatives and active principles from India amounted to Rs.4.45 crores (Botanical Survey of India 2000, *Flora of India*, Introductory volume, part-II, p.350).

Growth of phytochemical trading does not always mean utilisation of more and more plants, because derivatives already in the market are worked on sometimes to get more proper and more useful forms. For instance, Sami Labs, a Bangalore-based company developed 'white' curcumin for external use in cosmetics(www.monsterindia.com/samilabsin).

Pharmacopoeial extracts are also traded besides phytochemicals. Unlike phytochemicals, these are not derivatives or active principles, but general plant extracts. Belladonna extracts, Rauvolfia extracts, Aconite extracts, Guggul extract, and Ginger extract are among the traded pharmacopoeal extracts.

Today India is the second largest exporter of herbal products/drugs in the world, its market share is only 1 to 2%(Thanuja B.M. 2004, *Herbs and limbs*, The New Indian Express, 19-4-04); and export share, $\pm 10\%$ (vide EXIM Bank of India 2003, *op.cit.*, pp.58-59).

5.3.2 Domestic market

In 1947 the Indian herbal industries had an annual turnover of over 50 crores which has increased to about 4200 crores in 2004. Out of 4200 crores, 880 crores i.e., 20.95% come from export (Darshan Sankar in ICMHHP) and hence about 79% of the turnover is confined to the domestic market.

Plant-based herbal preparations are sold usually in three ways, as under:

- Classical: These are entirely based on the method and formulation suggested in classical Ayurvedic scriptures, and there is nothing new about them.
- Proprietary: These are generally based on classical formulations, but modified in one or more ways for specific purposes by the proprietor or manufacturer.
- Patent: These are the products for which patent rights have been formally acquired.

The domestic herbal and personal health care market in India is estimated at Rs.2500 to 3000 crores(to exclude taxes, etc.), growing @15-20% per annum. Dabur is the largest herbal products company having 69% share in this market, followed by Baidyanath(about 11%), Zandu and Himani(each 7.5%) at the end of 2002⁹. Chyavanprash is the dominating herbal product. The Ayurvedic products industry is valued at US\$1000 million, and our export of Ayurvedic products¹⁰ at about US\$100 million, per year(Thanjua 2004, *op.cit.*).

Despite an estimated growth rate of 20% per annum(late 1990s), the demand of traditional style(for ex., classical) Ayurvedic medicines in both the domestic- and international market is said to be limited(Dharmananda S., *op.cit.*). Hence, many entrepreneurs stress either on producing standardised/patent medicines, or conversion of traditional products into more acceptable forms. Hence, plants are marketed in extract form; or isabgul is processed to refinement and flavouring, or a tooth-paste equivalent of *dant-manjan*(tooth powder) is produced.

Diseases for which the herbal medicines are in heavy demand include digestive/stomach disorders, cold & cough, diabetes, jaundice, arthritis, asthma, piles and psoriasis, etc.. Certain Ayurvedic products, or patented herbal formulations have been claimed to be much more effective in diseases like piles and psoriasis than their Allopathic counterparts, that too without any side effects. A company has even started exporting its patented product on piles to Russia.

Skincare cosmetics and hair oils have recorded more or less 10% growth rate per annum. While the general trend in the cosmetic industry suggests a growth rate of approx. 15%, in case of purely herbal cosmetics this growth rate is 20-25%.

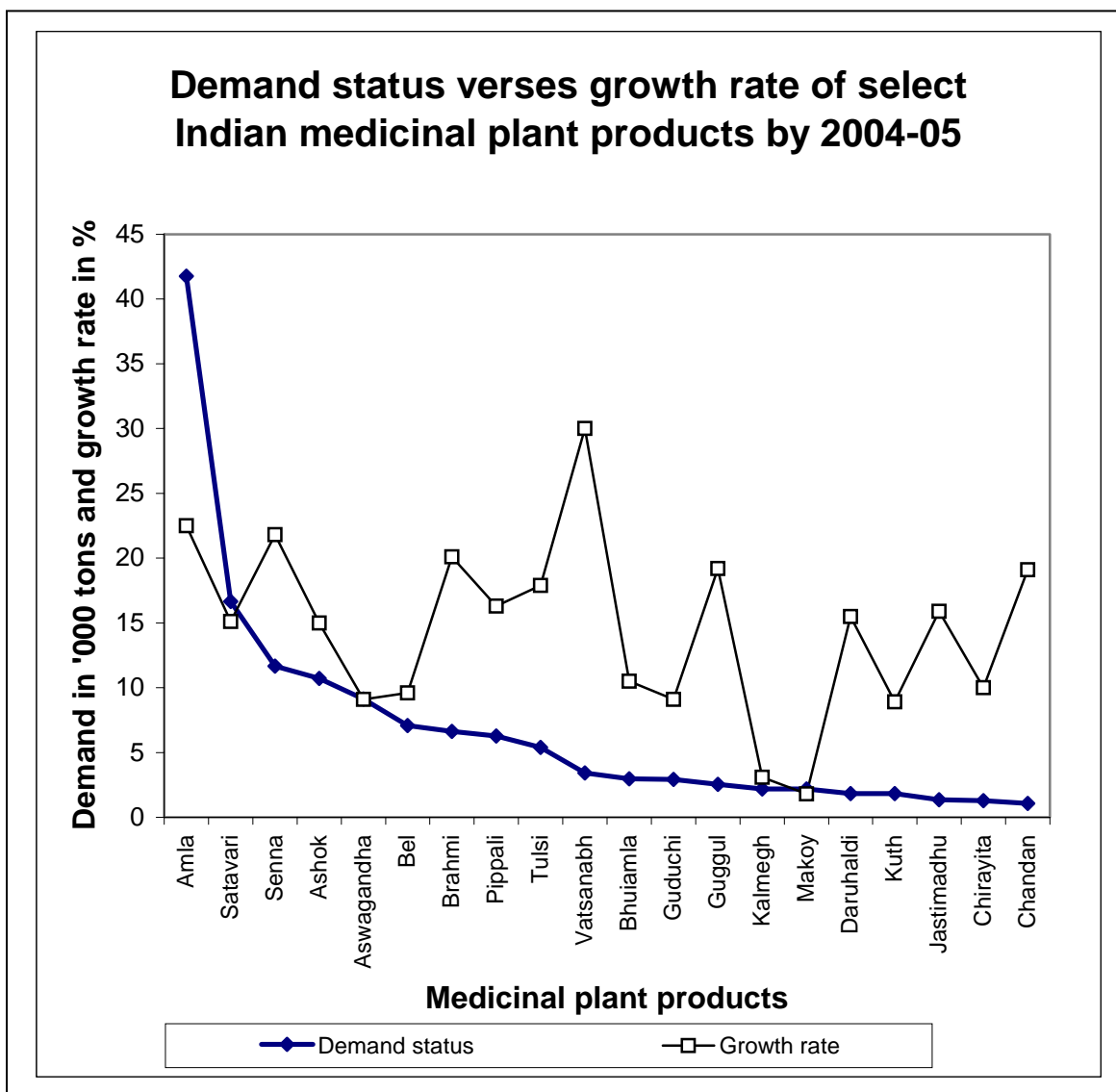
Among food supplements, Chyavanprash, Janam ghutti, Triphala powder, and aphrodisiacs are in high demand(OXFAM GB 2004, *Medicinal Plants and their supply chain*, pp.7-8).

The domestic market being the largest consumer of Indian herbs, the status of top 20 herbs in demand seems to reflect basically the increasing trend in the demand/production of traditional products or products based on traditional formulations. For instance, amla is the key ingredient in chyavanprash and several other important formulations. Similarly, the demand of satavari is not of recent origin. However, as the chart-4 would illustrate, the demand pattern may experience substantial changes over the years owing to several factors(like, discovery of some more important property of a plant, or dominance of new range of products in the market); and what seems to be the topmost in demand may not have the same position regarding its growth rate in demand. For instance, amla seems to be highest in demand, but vatsanav apparently has the highest growth rate, as compared to the status in 2001-02(for details, vide annexure-1):

⁹ Sources do not clearly mention if the % of share relates to chyavanprash only or to all ayurvedic products.

¹⁰ Ayurvedic products need not necessarily mean herbal products and/or medicinal plants. Usually, Ayurvedic products mean finished products based one natural ingredients like med. plants, minerals, etc...A herbal product can be an allopathic one also, particularly when it is manufactured under the modern allopathic system.

Chart-4



(based on data available at the National Medicinal Plants Board's website as viewed in June'05)

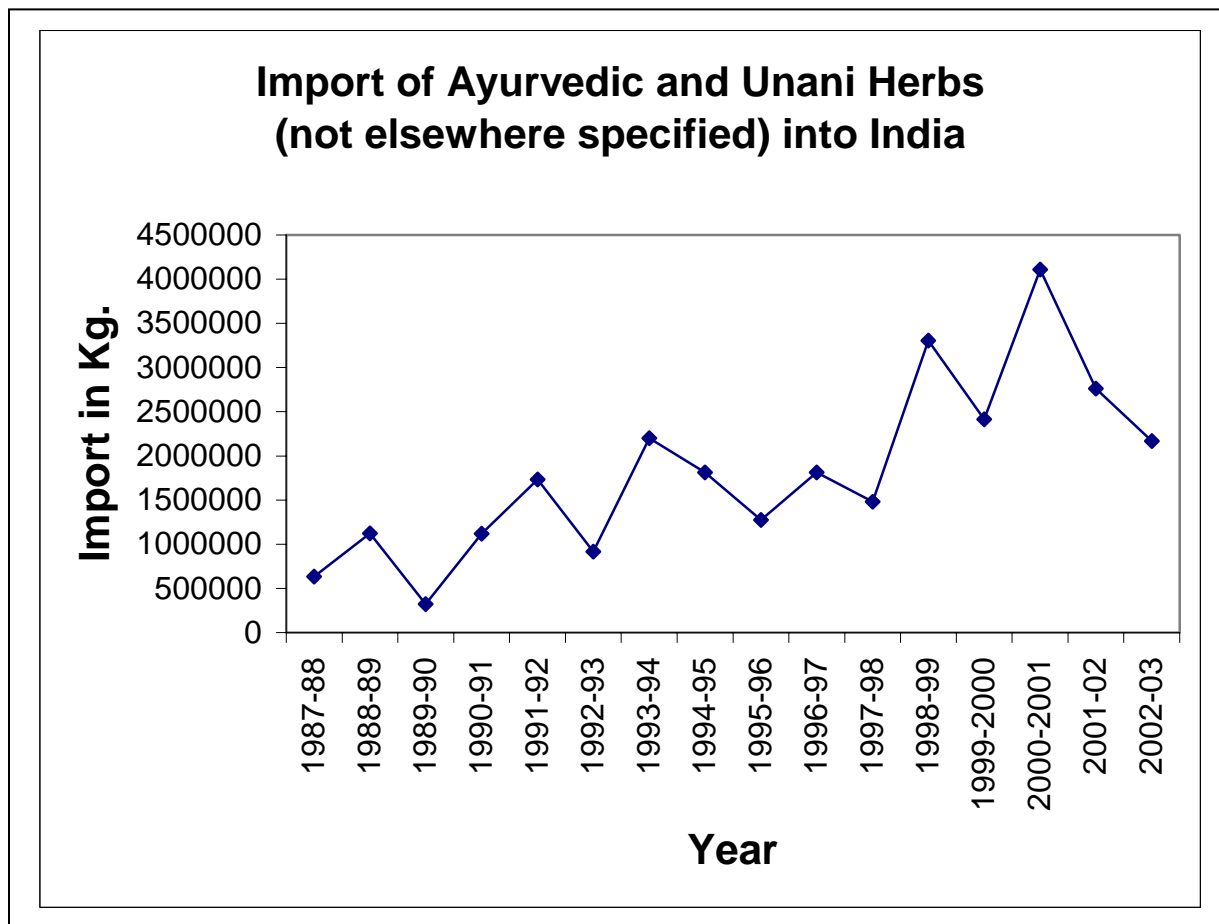
5.3.3 Import status

Out of the 880 species traded in the country, about 42 species of medicinal plants are imported from other countries. These include Jastimadhu(*Glycyrrhiza glabra*, otherwise known as Licorice roots), pseudo-ginseng(*Panax pseudoginseng*), and Behman(*Salvia baematodes*). Of these imported species 28 are used in Ayurveda and 20 in Unani. Some are partially processed in India and exported as extracts (EXIM Bank of India 2003, pp.27-28).

Some items are imported because of their non-availability here while some others are imported for their quality. For instance, jastimadhu coming from central Asian countries like Iran is said to be the best. Some products are both exported and imported. For instance, about 1400 kg of RS roots were imported from China during 1987-88(source: DGCIS data).

The following chart would indicate that despite fluctuations in the quantity of import, the average tendency has recorded an increase in the import of herbal ingredients, as in the case of Ayurvedic and Unani herbs(not elsewhere specified):

Chart-5



5.3.4 Trend of overexploitation

Overexploitation has always been facilitated by an increase in demand and/or price. This has been seen in case of various species, but the trend has been often species-specific. For instance, in 1966-67, the quantity of belladonna collected from wild was 81 quintals which was reduced to only 4 quintals in 1974-75. Similarly, exploitation/utilisation of *Vinca rosea* for export is not a recent phenomenon, but it has started since mid-1960s(Botanical Survey of India 2003, *op.cit.*, pp.351-352).

The export of Ayurvedic and Unani herbs in 1974-75 amounted to 117.8 tons(Botanical Survey of India, *op.cit.*,p.352) which increased to 1146.7 tons in 2003-04, which may at first suggest a tremendous increase in the pressure on the resources; but at ground level this may or may not be true depending on the species. For instance, in 1987-88, myrobalans other than amla, i.e., harida, etc. were exported(for tanning purpose) to the tune of 278.17 tons which increased to 370.852

tons in 2002-03; but the fact is that a lot of the harida and bahada produced in the country still go waste due to want of takers. Hence, in this particular case increase in export would indicate increase in the scope of optimum utilisation of the resource. On the other hand, the opposite has happened in case of amla. In 1987-88, the quantity exported for tanning purpose was 304.659 ton which was reduced to 107.201 ton in 1992-93; but in 2002-03 the quantity was 254.417 ton(based on DGCIS data). The substantial reduction in 1992-93 does not actually mean that the wild plants of amla were benefited from this because heavy internal demand and other factors caused large scale cutting of amla trees for convenience in collection of the fruit

5.3.5 Impact of globalisation on the medicinal plant resources

An unconfirmed report said that after the patenting of neem by an western company, some people in India thought that their neem trees would no longer belong to them; and this rumour resulted in the cutting of several neem trees in some parts of West Bengal(*The Odisha Bhasker*, 7-4-05, p.6). On the other hand, over-exploitation both for domestic and export market has made species like *Taxus baccata*, and *Swertia chirayita* critically endangered in the north-east(source: Mukesh Jain). According to one estimate, 120 economically useful plants in India are endangered, 35 of which are medicinal plants(Dharmananda S., *op.cit.*).

However, Darshan Shankar, the Executive Director of Bangalore-based FRLHT(Foundation for Revitalisation of Local Heath Traditions), a leading non-govt organisation working in the medicinal plants sector across the country, does not see any noticeable impact of globalisation on Indian medicinal plants particularly because our share in the export market is so marginal. Even the Himalayan Drug Company, the largest exporter of finished herbal products, could achieve an export turnover of only Rs. 50-60 crores as compared to its total turnover of about Rs. 300 crores (*per comm.*).

Although in terms of the quantity of export, and the number of species exported the impact of the global trend and globalisation may not be very remarkable in India, in qualitative terms there is certainly a major change with respect to the use pattern. Dr. Hari John, an international health consultant based at Chennai, points out at this impact in the following statement:

" xxx the question is: is it possible to take people's health traditions, refine it and give it back to them?

We know that the rural poor lack even the most basic of facilities. xxx If we are to take this knowledge, refine it and propagate it, whom will it benefit? We can be sure even this resource will be lost to them. More likely, it will benefit the so-called researchers who may get doctorates or international recognition. Also, surely there will be commercialisation of people's knowledge which will benefit the middle classes xxxx. This threat has now increased manifold due to globalisation, WTO, IMF, free trade, and so on.xxx We need to constantly keep in mind as to whom this development of local health traditions is going to benefit. We need to keep constant vigil so that the poor do not get ripped off again."(*The Hindu Health Folio*, Oct.2000, pp.10-11)

Our value system has been severely affected by the current trend of market-driven life style. Chyavanprash, a sacred medicine, has now become a play ball in the hand of market forces who have not only used it for their financial benefit, but also have made several modifications in the original formulation in their commercial interest ultimately making it a dietary supplement. Natural shampoo-producing items like *shikakai* and *ritha* have disappeared from the use pattern at local level, and have instead entered in their costlier and value-added forms in herbal shampoos. The name and fame of chemical viagra was used to promote *safed musli*. The current trend is gradually making people more and more dependent on the corporate sector, and direct use of basic ingredients and/or domestic level processing is fast losing ground so far personal/community health care is concerned. This way, the poor people are likely to suffer most.

Wild collection of medicinal plants has been estimated to generate about 40 million mandays of employment in the country, per annum(*The Times of India*, Eastern India Special, 11-5-2000), but the share of the primary collectors in the total turnover of herbal market is about 0.0001% (presentation at ICMHHP). In this situation, this poor section has been affected by the trend in the market and has started depending on the corporate sector for various products like shampoos and medicines, etc. and hence is likely to suffer the financial implications of this dependency. Further, change in utilisation pattern has increased the risk of indigenous knowledge base.

Global trend and livelihood options

In March 2004, OXFAM GB organised an international conference at New Delhi to focus on the livelihood and trade opportunities in the context of the global trend in herbal sector. OXFAM GB has been working on a project that could ensure better income at primary collectors' level through adequate utilisation of the opportunities in the herbal products sector. The objective is to enhance the share of the primary collector from 0.0001% to a substantial one, in the total turnover. It was discussed at the conference that this could be possible through promotion of organised trading by community-owned enterprises(COE). However, the share of COEs in the total number of manufacturing units(herbal products) of the country is only 0.001%, and unless this is increased to atleast 5%, little can be achieved.

CCD, a Madurai-based NGO has promoted Gram Mooligai(GMCL), a company owned by the self-help groups of primary collectors. GMCL has been doing significant work in the field of ensuring better income to the primary collectors of medicinal plants through adequate utilisation of market opportunities. As a part of this endeavour, the company succeeded in exporting about 100 kg of amla powder to a Holland-based company Indian Herbs, in 2003-04. This powder was to be used overseas to manufacture tablets of amla for easy use by the customers (*per comm...*, A.F.Lievart, Indian Herbs Co.).

Even though the middle class is not supposed to suffer the adverse impacts of the current trend to the extent which the poor class is supposed to, still health care is fast becoming superficial for it, with or without its knowledge, in the sense that their choice of products is controlled by the market forces. Money and market have created a bar between the people and their resources, and

the case is like that of a cow which loses her instinct to decide which grass to eat, and feeds on what is given to her as the 'best grass'.

While the corporate sector has adopted the strategy of high-profit marketing of the basic ingredients through glamorised value addition, the customer is not always free from the risk of adverse effects resulting from the value added products, particularly in case of products branded as 'herbal' but manufactured under the cosmetic license. There is no statutory norm as to at what percentage of herbal ingredients a product can be declared 'herbal', and the advantage of this lacuna is well taken by the manufacturers.

The impact of global trend at policy level has been quite remarkable in certain ways. 29 plant species were banned for export under the Foreign Trade and Regulation Act,1992 so as to check their overexploitation in the wild for export purposes; and the list contained some medicinal plants like *R.serpentina*, *Podophyllum hexandrum*, *Aconitum* spp., *Nardostachys grandiflora*(Jatamansi), *Swertia chiraita*, and *Saussurea costus*(Kuth)(OFDC 2003, *Marketing of NTFP and Medicinal Plants in Orissa*, p.14).

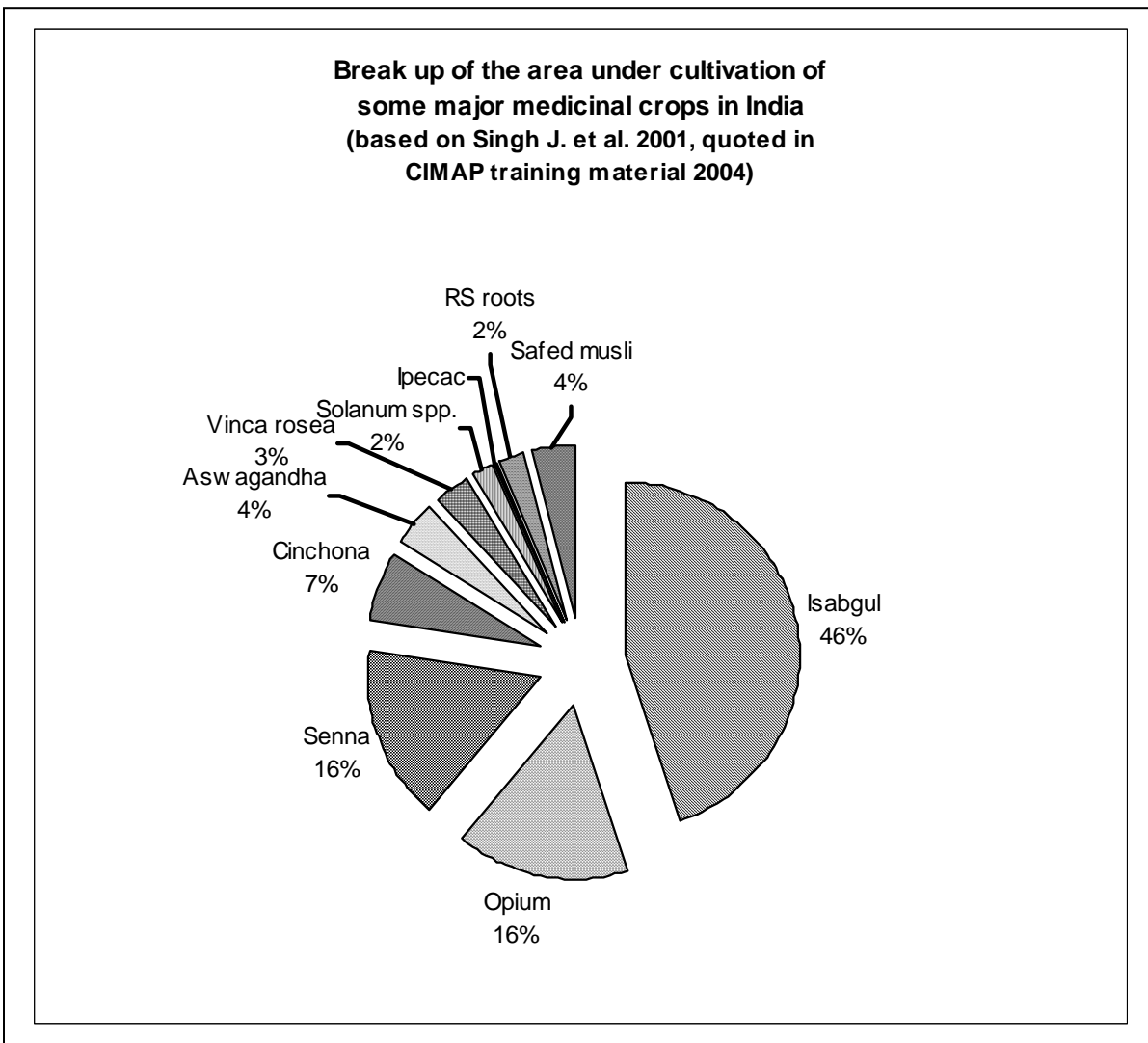
As per the CITES(Convention of International Trade in Threatened Species) treaty, 11 plant species have been restricted in India for foreign trade and these include medicinal plants like *R.serpentina*, *N.grandiflora*, *Dioscorea deltoidea*, *Picrorhiza kurrooa*, etc. (EXIM Bank of India 2003, *op.cit.*, p.80). Further, the Biodiversity Act, 2002 has several provisions so as to ensure that the countries bio-resources are not exposed to the risk of undue commercial exploitation.

Species restricted under Foreign Trade Regulation Act can be exported provided it is certified by the Forest Department that these have not been collected from the wild, but are products of cultivation. In case of CITES list of species, a CITES permission is required. However, these legal provisions can not always effect the prohibition on illegal exports because traders take the advantage of various lacunae to continue their business. For instance, *R.serpentina* can be exported in the name of *R. tetraphylla* as the customs staff are not able to distinguish between the two.

While some people have reportedly adopted the strategy of escaping the restrictions of the above Act by going for cultivation of one of more such plant species(like *R.serpentina*) either just in pen & paper, or on a very limited scale so that the certificate can be actually utilised for exporting wild collections, market demand has actually facilitated large scale cultivation of many medicinal species, either restricted or unrestricted, since many years. For instance, Cinchona has been cultivated for more than 100 years. Area under cultivation of isabgul reportedly increased from about 22000 hectares in 1996-97 to about 55000 hectares by 2000-01, and that of senna leaves from about 4000 hectares to about 20000 hectares during the same period(EXIM Bank of India 1997, *Indian Medicinal Plants: A Sector Study*, p.16; CIMAP training material 2004, *op.cit.*, p.175). In early 1980s, area under amla cultivation was reportedly 3000 hectares, which increased to about 25000 hectares in 2000, and 50000 hectares by 2004 (presentation on *Prospect of Amla and Bael Cultivation in Orissa*, state level seminar on recent developments & future strategies for cultivation of medicinal & aromatic plants, OUAT, Bhubaneswar, 11-12 January 2005).Mentha is cultivated over 120000 hectares, and aswagandha over 4000

hectares(Pandey et al, *Medicinal Plants in Satpura Plateau of Madhya Pradesh: Current Status and Future Prospects*, The Indian Forester, July 2005, pp.880-881). As a whole, the total area under cultivation of medicinal plants in the country was estimated to be more than 122600 hectare in 2000-01(CIMAP training material 2004, *op.cit.*, p.175) as per the following break-up:

Chart-6



Not only private entrepreneurs, but in some cases the government sector has also undertaken commercial cultivation of medicinal plants. For instance, in West Bengal, the state govt has farms for Cinchona and Ipecac(source: Mataprasad Mishra). Similarly, cultivation of poppy(source of opium) is under govt control (Botanical Survey of India 2003, *op.cit.*, p.351). However, the govt endeavour is not always profit-making as the heavy establishment cost makes the price of the produce significantly higher than the price offered by private cultivators, as it happened reportedly in case of the West Bengal govt's Cinchona and Ipecac cultivation. Further, decreasing demand can also become a major problem as it happened in case of Cinchona when

malaria was controlled and also quinine(produced from Cinchona) was replaced by synthetic substitutes(Botanical Survey of India 2003, *op.cit.*, p.350).

The Govt of India has constituted the National Medicinal Plant Board in 2001 so as to promote the commercial cultivation of important medicinal plants. The Board generally works through the state-level Medicinal Plant Boards so far approval of projects is concerned. 32 plant species have been prioritised by the Board, to be promoted for cultivation although cultivation of any other medicinal plant is also encouraged.

NABARD(National Bank for Agriculture and Rural Development) is also providing financial assistance for cultivation of medicinal plants. SIDBI(Small Industries Development Bank of India) is providing financial assistance for setting processing units.

The task force on the conservation and sustainable use of medicinal plants held a meeting at New Delhi in May 2000, and advocated for the following:

- Creation of 200 medicinal plant conservation areas, preferably in 'Protected Areas'(like sanctuaries). Identification and conservation of the endangered species, and creation of three gene banks to store the germplasm of all medicinal plants.
- Creation of 200 Vanaspati Vans in degraded forest areas for intensive productions of plants for quality products, and employment to 50 lakh people, particularly women. Tribals should share the benefit.
- Sustainable harvesting in a million hectares of forest areas rich in medicinal plants, preferably under the Joint Forest Management programme.
- The 25 most-demanded species to be grown on farms. Set up drug-testing laboratories for products.

The task force envisaged a grand strategic plan that could increase the export turnover of herbal products(raw and processed) to Rs.10000 crores by 2010 (*The Times of India*,11-5-2000).

Years ago the then Union health minister Rajnarayan is said to have effected major policy level changes so as to check the dominating trend of the Allopathic system and revive the Indian systems of medicine(ISM). However, the next major change probably came around 2000 when the Union Govt opened the ISM department under the Ministry of Health, and took several other measures like setting up the National Medicinal Plant Board.

India has been importing several raw drugs since centuries, but recently an inclination has been noticed towards the Chinese drugs(raw). This is because the Chinese products are supposed to be 'perfect' in quality, free from adulteration, and also cheaper sometimes. For instance, *sunthi* from China, known as 'China sonth', was earlier marketed basically in the northern parts of India; but it entered the Kolkata market about 2 or 3 years ago, and is now reaching markets further south(source: Mataprasad Mishra).

The Govt of India had earlier attempted to ensure qualitative production and marketing of herbal products in 1964, but it was not that much effective due to several lacunae. In 1997, the concept of GMP was promoted by the Ministry of Health & Family Welfare which expected that all

manufacturing units of ISM would use authentic raw materials free from any contamination or adulteration, and that the finished product would also be of acceptable quality. Now, it has become mandatory that without GMP no manufacturing unit will be allowed to produce and market its products. However, traditional practitioners who prepare medicines not for sale in the market but for the use of their patients, are exempted from this provision(EXIM Bank of India 2003, op.cit., pp.55-57).

Although GMP has been made mandatory, it is difficult to implement this concept perfectly. On one hand, the pharmacopoeias published by the govt are silent about several issues like microbial or toxicological tests; and on the other hand, manufacturers face various problems while ensuring the authenticity of their raw materials.

The EXIM policy of the govt is sometimes blamed to have facilitated unfair practices in the market. For instance, since import of dalchini(bark of *Cinnamomum zeylanicum*) was restricted from Malayasia, hence bark of some of other species of *Cinnamomum* was sold as its duplicate. Further, dalchini produced in Myanmar, which was smuggled through Manipur, was traded in the name of Assam dalchini.

Sometimes, international factors benefit India. For instance, a substantial drop in the production of nutmeg(jaiphal or *Myristica fragrans*) in Indonesia and Grenada helped nutmeg prices remain high in India where it is cultivated(in south India). The situation was supposed to enable India to obtain a greater market share, in 2002(source: Richter's HerbLetter,30-4-2002).

5.4 The Orissa situation:

Although the Govt of Orissa has recorded the availability of 135 medicinal plant(wild) species in the state(*The Sambad*, 11-3-02); out of the total 2727 plant species identified so far in Orissa, about 1200(44%) are in use for medicinal purposes(*The Samaj*, 11-2-02).

Out of about 620 medicinal plants in trade in India, about 100(16.12%) are found in Orissa(*The Samaj*, 11-2-02); and out of the top 20 medicinal plant species in trade in the country, about 10 are found in Orissa.

Almost all the medicinal plant resources of Orissa are collected from the wild, either from forests, or from waste lands. Few like koilekha are collected from other areas like paddy fields, fences, etc..

Attempt has been very recently made to cultivate some species on commercial basis, but the contribution from cultivation is negligible.

5.4.1 Domestic market:

Plant products of medicinal use are consumed in the state by Ayurvedic pharmacies, individual Ayurvedic/herbal practitioners, and the common people. Pharmacies are the major consumers as they are engaged in large scale production of herbal medicines. In 1975, the number of license-holder Ayurvedic pharmacies was only 20 which has now increased by 10 times or more

although the number of active pharmacies is said to be limited to ± 70 (source: Dr. Rajkishore Barik and Dr. Bankabihari Behera).

Sale of herbal raw materials was professionally done by a particular community known as 'putuli bania', literally meaning traders with small sacks. These people often used to do their business at weekly markets and not on a daily basis, and hence each time they would come with a number of small sacks containing different medicinal plant materials. They are still active in some parts of northern Orissa, but their profession is dwindling in other areas. Unlike the vaidyas, who are physicians first and primary collectors of medicinal plants next; the putuli banias are sellers first, but they also practice medicine to some extent. Also, they are more close to the primary collectors of forest produce than many regular retailers/wholesalers. Their profession is however dominated by permanent retailers and wholesalers.

One estimate puts the annual transaction of medicinal and aromatic plants in Orissa at Rs.10 crores (source: presentation at the seminar on medicinal and aromatic plants held at OUAT during January 11 and 12, 2005). This suggests that the transaction in Orissa is within 2 to 3 % of the national transaction valued at approx. Rs.440 crores(?) by 2003¹¹. However, being an extremely unorganised market, a considerable part of the actual transactions might have gone underreported.

Lack of value addition and innocence of the primary collectors are among the major factors of the lower value of the transaction of our products. A recent study done for an international agency found that about 3500 tons of herbal raw materials are collected annually in the state which is but 40 to 50% of the actual potential; and out of these 3500 tons, about 3000 tons are supplied to other states (particularly, wholesale markets of Raipur, Dhamtari, Kolkata, etc.) and 50% of the same returns to Orissa with an added value and higher price. The volume that remains in Orissa for domestic consumption partly (10-15%) goes waste due to want of proper marketing, and partly marketed at a much cheaper price. Among the major items marketed are kochila seeds, myrobalans, bhuineem, and bhuinkakharu, etc..

Demand status of herbal raw materials in the state is yet to be properly assessed. The Govt of Orissa has reportedly conducted a survey of Ayurvedic pharmacies of the state for this purpose, but the analysis is yet to become public. In the absence of the same, results of a similar survey conducted by the Bhubaneswar-based organisation Regional Centre for Development Cooperation (RCDC) appear reliable at least to suggest the pattern of demand. Analysis of the results of the RCDC survey of approx. 40 important Ayurvedic pharmacies of the state in 2003-04 reveals the following top twenty items in demand:

¹¹ Srivastav S., Conservator of Forest, Berhampur circle, quoted in Salaphula, March'05.

Table-6

<i>Item</i>	<i>Approx. annual consumption in ton</i>
Guluchi(stem/whole plant)	330
Aswagandha(roots)	229
Satavari	227
Amla	160
Harida	132
Neem(bark, leaves, fruits, etc.)	117
Isabgul	112.5
Pudina(whole plant)	110.4
Gokhura(whole plant)	84.4
Bahada	72
Sunthi	64.9
Basanga	60.6
Pippali	59.1
Golmaricha	55.2
Indajaba(bark/seed)	48.5
Jastimadhu	46.2
Nagarmutha(roots)	45.4
Pengu(seed)	45
Sunamukhi	44
Nilgiri(Eucalyptus leaves/oil)	42.7

(based on the data provided by RCDC)

The above table indicates that almost all the items of demand are traditional, i.e., required for the preparation of traditional medicines(or their modified forms). Non-traditional items like safed-musli are used by few(16% of the pharmacies under survey), and the survey found annual consumption of safed-musli to be approx. 6400 tons¹² as against its 4000 tons of its traditional counterpart kali-musli(talamuli).

Among the 310 species of consumption identified during the RCDC survey, 30% are used in fruit/seed form, 20% in root form, 15% in the form of whole plant, 12% as bark, and rest as stem/wood, flowers and gum resins. Total annual consumption was estimated to be around 3755 tons(source: RCDC).

The production scenario is however not far from satisfactory. Items like sunamukhi, aswagandha and isabgul are not available in the wild; and their production from cultivation is either nil or negligible. About 50% of the top twenty items have substantial presence in wild in the state, but their output potentiality is either not fully harnessed, or is not sufficient to meet the demand¹³.

¹² Mr. Patnaik, the chairperson of Orissa Nature Care Council, however thinks that the domestic market of Orissa can consume about 200 kg of dry safed-musli. It may be mentioned here that the RCDC survey, which is proposed to undergo another phase this year, has its own limitations; and may not reflect the actual situation in all the cases. Placing an order for 10 kg of safed-musli may not be possible for a small pharmacy-owner since the price of this item is quite high.

¹³ This may in some cases be a localised phenomenon because in some areas the consuming pharmacies use to ensure their raw material supply mostly through the engagement of local primary collectors, and hence do not try to

For instance, the 1999 assessment¹⁴ of the Forest Department suggests a potentiality of myrobalans(amla, harida, bahada) at more than 2000 tons. Even if we assume 30 to 40% reduction in this potentiality given the reports of indiscriminate cutting of amla and other trees, etc. by the primary collectors for their convenience, still the current potentiality seems to be much higher than the projected volume of consumption. Neem, nilgiri and several other species like indrajaba, dhatuki and bhuineem also seem to have a potential much higher the volume of consumption, so far the fruits/seeds and leaves are concerned. The average annual production of genduli gum between 1992-93 and 1997-98 was more than 345 tons(based on *Orissa Forest 1999*,p.30) whereas the projected consumption rate is 15 tons. On the other hand, ensuring the supply of 22 tons of bhuin-aonla or 34.8 tons of brahmi(*Centella asiatica*) may be quite difficult.

The RCDC survey indicated that about 12.19%¹⁵ of the consumed items are procured from other states. Some of these items are available in wild in Orissa(like, lodh bark, nageswar flower, kochila,jhuna, vacha,etc.);but the local supplies being often found inconsistent in quality, inadequate in quantity and irregular in nature, pharmacies rather prefer to procure them from more reliable sources in other states.

The demand sometimes comes with surprising effects. For instance, Bhagaban Patnaik of Sunamuhin(Nayagarh district) never expected that somebody would approach him for the roots of what('pedipedica') he knew as an useless weed in his backyard. A herbal medicine manufacturer procured from him about 20 kg of pedipedica roots @Rs.30/kg and Patnaik's net profit in this business was about Rs.500(*per comm.*). Similarly, requisition for supply of about 150 trips of bhuin-kadamb seeds have been reported from the state in the recent past(source: S.K.Das). These surprises are caused for two reasons; first, some items, otherwise ignored, are almost suddenly recognised for some special property; and second, interstate traders remain ignorant about the production potential of certain items in Orissa for a long time and one day, they come to know about the same. However, such kinds of surprise are neither regular nor widespread.

India's annual turnover in the pharmaceutical sector is said to be about Rs.25000 crores, out of which that of Ayurvedic/herbal products is estimated at Rs.500 crores, i.e., 2%. In Orissa, the turnover of pharmaceutical products has been estimated at approx. Rs.600 crores(2.4%) out of which that of Ayurvedic products is about Rs.30 crores, and that of homeopathic products about Rs.10 crores(source: General Secretary, Utkal Chemist and Druggist Association). These estimates are however valid basically for standardised formulations sold in the market, not usually for those items which are sold directly to the patients by the physicians. Further, most of the Ayurvedic products sold in the Orissa market are manufactured outside(hence, Dabur has about 35% share in the Orissa market), and are of OTC category.

The growth rate in the sale of Ayurvedic products in the state is believed to have increased from 2% to 5% during the last few years. G.R.Dash, an Ayurvedic product manufacturer and proprietor of BG Pharmaceuticals, believes that the turnover of Ayurvedic products in the state

get the supply from other forest areas of the state. This has caused differential impact on the availability of several items in the wild and the same item may be endangered in one area but abundant in somewhere else.

¹⁴ Source: Division-wise potentiality of M.F.P. items as on 1-4-99.

¹⁵ To include items like isabgul and pudina, etc. this % would be higher(more than 18%).

has increased more or less by 50% since 1990¹⁶. However, he says that marketing of the products is sometimes very difficult particularly for small companies because of the following reasons:

- Small companies are expected to give their products for sale to distributors on credit basis which is difficult for them due to lack of capital.
- Companies which extensively use advertisements in the electronic media, etc. to promote their products, tend to take over others.

More they sought, greater is the gain

BG Pharmaceuticals has inherited the tradition of late Kaviraj Somanath Dash of Jagatsinghpur district, a famous Ayurvedic physician of his time. The company has three patented products: LIVEN(for liver problems); PILOSAP(for piles) and ZYMOSAP(for constipation and stomach problems), and is planning to have two more products in future, one for bronchitis and the other for blood allergy. About 8 years ago, clinical tests proved PILOSAP to be the best herbal product for piles cure in India; and in 1993 the company's turnover from this product was Rs.11 lakh; now the sale has come down to 7-8 lakh rupees because of want of capital. The supercyclone of 1999 caused substantial financial loss to the company and insurance companies are yet to compensate this loss adequately. Despite claims of the govt, the response from banks and other concerned agencies has not been satisfactory. Hence, the company has not been able to harness its potentiality properly. On the other hand, a company from outside has been able to achieve a sale of Rs.1 crore for its product PYKURE(used for piles) by the last financial year. PYKURE is being exported to Russia, and the proprietor of BG Pharmaceuticals is confident that had he been given all kinds of assistance, then his product PILOSAP could have achieved a sale figure of Rs.5 crores by now including exports.

BG phama's ZYMOSAP also seems to be a good product, but people are more aware about its substitutes like KAYAMCHURNA because of advertisement strategy. The company also used this strategy and succeeded in increasing the demand of its product, but lack of capital creates problem in production(source: G.R.Dash). It is ironical that a company, which happens to be the one of the first Ayurvedic companies of the state to get a GMP certificate, can not utilise its potential due to want of financial assistance.

Manoranjan Sahu of Kunarmunda(Sundargarh district) runs a small pharmacy(Sam Phramceutical), named after his late father-in-law and clergyman cardinal Samuel. Among his four products, the major one is an oil(trade name: CARRON oil) claimed to be very effective in burns(even in third-degree burns) and ulcers. This oil is based on a formulation received by Samuel from some American priest, and uses three ingredients among which linseed oil is the dominant one. Ironically, linseed has been cultivated in Orissa since long, but Sahu has to procure this oil from Kolkata where the price fluctuates beyond his control. However, the most unfortunate thing is that he has to struggle for marketing of his product as branded products, though less effective, tend to marginalize this local product. He is however very much sure that his CARRON oil is extremely effective, without any side effect, in burn-care and that too at a lower cost than the allopathic alternatives. An added advantage of his oil is that it can restore the original skin colour after cure, unlike common allopathic products(*per comm.*).

¹⁶ The RCDC survey found that important Ayurvedic pharmacies registered a growth in their sales varying from 5 to 30% during the last several decades. This suggests that the substantial hike in demand may not equally benefit individual pharmacies. A reason thereof seems to be the demand of OTC products marketed by national-level companies like Dabur.

Following are some examples which show the impact of market forces on medicinal plant resources of the state:

5.4.a Northern Orissa

In the Shimilipal-Keonjhar belt *Rauvolfia serpentina* was abundant once upon a time, but overexploitation during last 20-30 years has made it scarce there. Heavy market demand inspired Bismay Kumar Dalei, an young entrepreneur, to go for cultivation of this species. Finding that the required quantity of good planting material was not available, he employed local tribals to collect RS roots from the wild, and then used the same to raise a nursery. From one kg root, about 70-80 plantlets were produced. He took wastelands on lease, and planted RS in about 8 acres. In the first phase of the harvest, he has sold about 4.5 quintals of dry roots to Baidyanath Ayurved, a leading Ayurvedic pharmaceutical company of the country. The company has asked him to supply as much as he can, and now there are other parties who have a similar offer. Dalei believes that the net profit per acre may be about Rs. 70000 to 80000(priced at about Rs.110/ kg of dry roots). In addition to the income from roots, the seeds have also good market value being sold at about Rs.3000/kg (per acre yield, 12-15 kg). Dalei's success has inspired some other people to go for RS cultivation. In fact, he has been advanced for 2 lakh plantlets.

In Shimilipal forest, the available raw materials of use are Ashok bark, mochas(gum of *Bombax ceiba*), myrobalans, anantamul, chitamul(white), bhuinkakharu(white), dhatuki flower, nageswar flower, arjun bark, indrajab, and dashamula(excluding gokhura and salaparni); but these can meet only about 20% of the requirement of some of the important local pharmacies so far the variety of items is concerned. Even indrajab is procured from out-side(traders) because the local primary collectors normally do not find the offered price affordable.

The khadia tribals are the dominating tribe in Shimilipal so far the collection of medicinal plants are concerned. They either supply on the basis of prior order from the consumers, or sell their collection at weekly markets. As they often supply at negotiable prices, the customers benefit more from their labour than the khadias themselves.

During the last decade, the number of Ayurvedic pharmacies has increased in the district resulting in a substantial increase in the local demand of several items. The proprietor of a local pharmaceutical company says that this had led to about 50% hike in the prices of some of these items. For instance, the price of dry harida has increased from Rs.3 in the past to Rs.5 now. However, it seems that neither this hike is uniform in all areas of the region, nor does this uniformly benefit the primary collectors since negotiations vary at individual level.

While there are certain items like harida, bahada and dhatuki the production potential of which is not utilised fully,the population of amla trees has been severely affected in Shimilipal due to indiscriminate cutting by the primary collectors for easy collection of the fruit. Huge extraction of saptaparni bark in the area is also a matter of concern. The nageswar flower of this area is supposed to be best in quality, but the current potentiality is estimated to be only 2 quintals(dry), or 10-15 kg in the pollen form. Price of the dry flower is approx. Rs.50/kg as against Rs.100/kg of pollen.

Rauvolfia serpentina

Roots of *Rauvolfia serpentina*, popularly known in Orissa as *patal garud*, have been used traditionally for the treatment of snake bite. In 1930s, the founder of Himalaya Drug Company got interested in this crude drug after he saw in Burma people using it(through oral administration) to pacify restless elephants. After his return to India he facilitated clinical testing of RS roots, and this study established the fact that it could be successfully used in reducing hypertension and mental irritation/anxiety. Himalaya was the first company in the world to launch, in 1934, a modern anti-hypertension drug *Serpina* manufactured from RS roots(www.himalayahealthcare.com/innovation/serpina.htm, viewed on 24-2-05).

Further research led to the discovery of alkaloids like reserpine which were found to be very effective. These alkaloids worked satisfactorily as a natural tranquilliser/sedative. Such conclusions of modern research led to the commercial consumption of RS roots in the manufacturing of anti-hypertension drugs. However, efficacy of these roots in the treatment of snake-bite is not recognised though scientists tend to explain that having sedative effect, it might help save the life of a patient(bitten by snake) who could have lost his life more due to heart failure(caused by fear and anxiety) than snake venom¹.

It must be noted that RS roots are used alongwith other ingredients like black pepper to treat snake-bite. It is not clear whether modern research has even verified the efficacy of this mixture. Researchers like Pankaj Oudhia are of view that reinvestigation of the medicinal properties of RS roots with reference to the effectively in snake- and dog bites is necessary(Oudhia Pankaj 2003, *My experiences and interactions with growers and traders of medicinal herbs with special reference to Chhattisgarh*, online paper).

Orissa has been the leading supplier of RS roots for more than 50 years. The zamindar of Badakhemundi Estate(Ganjam) used to get a good revenue from this source as his forest lands had plenty of RS plants(*per comm.*, Raja Manikeswari Dev). Mataprasad Mishra, who has been associated with the wholesale business of crude drugs in the Kolkata market since last 40 years, says that the average annual sale of RS roots in the Kolkata market is about 50 tons almost the whole of which used to come from Orissa till a few years back. Now the Orissa supply is limited to 10 to 20 tons only; and while wild roots come from north-east, harvest from cultivation has also started coming to the market.

South-western hill forests of the state in the districts of Rayagada, Koraput, and Kalahandi; as well as some areas in the northern districts like the Mayurbhanj-Keonjhar belt have been the major areas wherefrom wild collection of RS roots has been rampant.

Rauvolfia serpentina has been enlisted as a vulnerable species in the state many decades ago. For some years the govt did not allow private leases for its exploitation, and placed it under the monopoly of a govt agency TDCC(Tribal Development Cooperative Corporation). While TDCC procured RS roots from the primary collectors, a parallel trade(not recognised by law) was always in vogue. The monopoly of TDCC was legally withdrawn in 1997, but a major policy change came in March 2000 when RS roots were enlisted as lease-barred item so far private exploitation was concerned. However, TDCC being a govt agency, was allowed lease for the same in the Rayagada Forest Divn. during 2002-03, which still continues; but the procurement could be possible only during 2004-05 as in 2002-03 the season was over by the time the work order came, and in 2003-04 there was hardly any availability. About two quintals of dry(actually semi-dried) roots were procured during 2004-05(by March'05) and sold to a local trader of Muniguda (*per comm.*, TDCC).

Reserpine is no more preferred because of its side effects, however the roots or their extract as a whole have lesser side effects(Koul et al. 2005, *Pitfalls in Journey from Traditional to Modern Medicine*, Natural Products Radiance, January-February '05, p.8). Hence, demand of RS roots for reserpine seems to be affected; but so far the users of root extract are concerned, there seems to be hardly any adverse impact on the demand.

Out of the total 1076 plant species identified in Shimilipal, about 552(51.30%) are considered to be medicinal, and 70 of them are used extensively. However, overexploitation has caused

scarcity of species like gajapippali, gudmari, sweta-kaincha, chitaparu(red), bhuichampa, ram-dantun, and mruta-sanjeevani etc.(Subuddhi D. 2002, Shimilipalara Oushadhiya Brukshyalata, *The Samaj*, 11-12-02, p.4; *The Dharitri*, 30-12-02, p.5).According to Sukumar Bhol, an experienced putuli bania of the area, items like ganthiana, agnijad and guluchi are now procured with difficulty due to overexploitation for supply to other states(*per comm.*). Ashok trees were abundant in certain pockets like the Ashoknala area near Podadiha, but extensive & unscientific bark extraction has threatened their population. On the other hand, some of these species occurred sporadically due to natural reasons, as a result of which the commercial demand could affect the distribution quicker.

Arrowroot has been one of the major valued added(processed) forest products of Shimilipal since a long time. Rhizomes of certain species of *Curcuma* are processed by the khadias to yield a starch which is sold in the dry, powder(or granular) form. The taste is slightly bitter, but it is supposed to have good medicinal value. Known as paluo, many use it as a food supplement.

In the neighbouring district of Balasore, another species, *Marantha arundinacea*, is cultivated for arrowroot. Starch from tubers is extracted to be used as arrowroot, but the tubers are also consumed directly as a vegetable. In this arrowroot, the bitterness of *Curcuma* arrowroot is almost absent; and hence the scope of utilisation is much greater; but the price of the *Marantha* arrowroot being lower, that of the *Curcuma* arrowroot has remained more or less constant for more than a decade so as to avoid its substitution in the market by the *Marantha* one. Hence, the competition has adversely affected the primary collectors of *Curcuma*.

The only pharmaceutical company of Orissa having an export record is situated at Balasore. This is a homeopathic pharmacy named Everest Homeo. The company started production in 1968 and has been exporting homeopathic medicines to Nepal since 1973-74. The export order came because of some personal contacts, and the company's commitment towards quality production has helped it to retain its popularity among the users.

Everest Homeo produces 300 mother tinctures, 22 formulations, and 12 biochemic products. Not less than 150 varieties of herbs are used as raw materials among which the largest quantity(2.5 quintals/annum) is that of Alfalfa, an imported material. The top ranking(based on quantity of consumption) raw materials are:

- Alfalfa
- Ashok
- Hydrocotyle(thalkudi)
- *Justicia adhatoda*(basang leaves)
- *Chelidonium majus*
- *Echinacea angustifolia*
- *Berberis vulgaris*

Several items like *Chelidonium majus* and *Aconitum napelus* are either directly or indirectly imported from countries like US, and from Europe.

The requirement of Ashok bark in Everest Homeo is about 1 quintal per annum, that of bhuineem being 1.5 quintals and of RS roots, about 75 kg. However, almost all these materials which could have otherwise been procured from Orissa, are actually procured from Kolkata because the suppliers in Orissa have not been found reliable so far consistency in their supply and quality of raw materials is concerned. Kochila seeds are required @50 to 60 kg per annum, but supply from local sources was rejected due to lack of quality. When informed about the local cultivation of RS roots in the Kupari area, the proprietor of the company expressed some interest in purchasing from the concerned cultivator, but the latter, when contacted by this author, did not show much interest for a deal because the company's requirement is quite small compared to his production capacity, and hence he preferred bulk-buyers.

5.4.b Southern Orissa

M/S. Kotni Narayanmurthi, based at Berhampur, is the most renowned and most important wholesaler/retailer of herbal raw materials in the southern Orissa. There are at least two more big traders like it in the Badabazar area of Berhampur, the wholesale market for raw drugs in the region.

On the basis of the quantity(average) sold annually from the Badabazar area, items of heavy demand can be ranked as under:

Table-7

<i>Item</i>	<i>Average annual sale</i>
Banajuani	10 ton
Bibang	5 ton
Arjun bark	5 ton
Ashok bark	5 ton
Aswagandha	3 ton
Patalgarud	2 ton
Bhuinkakharu(white)	2 ton
Nageswar renu	1 ton
Jastimadhu	1 ton
Phanaphana	1 ton
Chiraita(Himalayan)	200 kg

(Source: M/S. Kotni Narayanmurthi, Berhampur)

However, local supplies are unable to meet this demand. For instance, banajuani is not available sufficiently. Hence, import from other states is inevitable in many cases for these wholesalers.

The proprietor says that he has not noticed any significant change in the pattern and demand of herbal ingredients in this region during last 10/15 years. Among the few remarkable things he could count, extraordinary hike in the demand as well as market price of nirmala(katak) seeds, otherwise known as cleaning nuts, is a major one. These seeds have traditionally used for domestic purification of turbid water; but now a new use has come out. As the seeds resemble betel nut, they are now used as cheaper substitutes of betel nut. This new use has increased the price from Rs.30-35/kg to Rs.70-80 per kg.

The proprietor of M/S. Kotni Narayanmurthi now plans for taking the advantage of govt schemes and going for commercial cultivation of certain items of high demand like aswagandha.

Utkal Chemical Aushadhalay is a reputed manufacturer of traditional Ayurvedic medicine. Based at Aska and established by Kaviraj Krushnachandra Tripathy, this company sells its products chiefly through its own branch offices at different towns of the state.

About 20% of the raw material consumed by UCA comes from the local supplies, particularly from some primary collectors of Kalasandhapur village(near Aska) who collect required herbs from the local wastelands/forests and supply the same to UCA almost in the raw state. Rest of the materials(herbs) are either produced from wholesalers of Berhampur, or directly from suppliers from South India(Chennai).

Following table shows the approx. annual consumption/demand of some important raw materials at UCA:

Table-8

<i>Raw material</i>	<i>Requirement/consumption in kg</i>
Dasamula ¹⁷	1500 (@150 kg for individual items)
Ashok bark	200
Nageswar renu	80
Somraji seed	50
Baibidang	50

(Source: Sri P.K.Tripathy)

UCA does not use RS roots since it has no product based on the same. Similarly, *safed musli* is also not used.

The present proprietor of the company says that there has not been any significant problem in ensuring the raw material supply, particularly because most are procured from wholesalers. However, in one or two cases some problem has been faced. Like, Nageswar renu(pollen) was previously coming from Talcher area, but since last five years supply from this source has stopped.

Although supply of raw materials has not been significantly affected, hike in raw material prices has certainly affected the business. During last 10 years prices at Chennai has increased almost by 100%. At the same time, the company has but a limited scope for a proportionate hike in prices of its products because it faces tough competition with not only local competitors like Utkal Ayurvedic Pharmacy, but also with big national and multinational companies like Dabur. At this critical stage, the compulsion to adopt GMP has intensified the trouble although the company has confidence that it can sustain the pressure.

Some of the raw material requirements of Utkal Ayurvedic Pharamacy are as under:

¹⁷ 10 ingredients which include bela, gambhari, phanaphana,agibathu,pateli,salaparni,krushnaparni,bruhati,ankaranti and gokhara.

Table-9

<i>Raw material</i>	<i>Requirement/consumption in kg</i>
Buddhadarak	1-2
Guduchi	500-600
Somraji seed	10-20
Baibidang	50-60

(Source: Sri B. Das)

Gopal Rath, head, Dravyaguna Deptt., Ayurvedic College, Ankushpur(Berhampur) feels that the following species have become comparatively scarce in the region, basically due to unsustainable exploitation:

mashania, pateli, phanaphana, ashok, gandhana, kantakari(etc.)

Duita Naik, a scheduled caste woman of Kalasandhapur(Aska) who has been supplying various raw drugs to the Ayurvedic pharmacies of Aska and Kavisuryanagar, etc., confirms that certain items like satavari, brahmi, bhrungaraj, neem bark and keruan have become scarce in the area both due to unsustainable exploitation and agricultural uses of jungle- and waste lands. Guduchi, which was available in the nearby areas about 15 years ago, has now become very scarce owing to destruction of habitat. However, she revealed that short supply of raw materials to the pharmacies did not always mean actual scarcity in the field since the primary collectors tend to divert their supply to those pharmacies who offered them a suitable price(*per comm.*).

South Orissa, more particularly the Koraput district, pioneered in the cultivation of medicinal plants because since many years the local people of Koraput-Padua belt have resorted to commercial cultivation of *pippala*, a species of piper whose roots are traded. This cultivation is said to have started in 1984-85(*per comm.*, Dr. Sabyasachi Rath) and facilitated by some Andhra people because in the neighbouring districts of Andhra Pradesh people used to cultivate pippala before the same started in Orissa. Tuni near Vishakhapatnam is the main trading centre for this crude drug. Dr. Sabyasachi Rath, a scientist who has been facilitating the commercial cultivation of medicinal plants in the undivided Koraput district, believes that currently about 30 hectares are under this cultivation in the Koraput district. However, control from AP over the market price has made this cultivation quite vulnerable to loss. High market price lured many local people to go for its cultivation, but few years back the price fell down significantly. The situation has not improved much since then, and those who are self-sufficient in planting materials have been able to sustain the impact of this collapse in market price¹⁸.

Rayagada is a major centre for the trade of RS roots. A leading NTFP trader(name withheld) of the region says that although the current potential of the district is limited to 5 to 6 tons(dry) only, actual trading takes place for 10 to 20 tons(raw or semi-dried) and this extra quantity is ensured from the neighbouring districts like Koraput. He says that about 15/20 years ago, the supply from this region amounted to 10 to 12 tons(dry) which has now reduced to 3-4 tons only(weigh loss is more or less 65%).

¹⁸ Used in the treatment of upper respiratory tract infections and digestive disorders, etc. this plant is also available in the wild, but forest collection is almost absent probably because the cost of production is not affordable.

Rayagada district is said to have the potentiality of producing about 5 to 6 tons of banajeera(dry) per annum, but actual trading is limited to 3-4 tons only. For baibidang, the potentiality is about 50 tons(dry), but actual trading takes place for 50 to 100 tons. The potentiality of amla(raw) is about 100 tons and almost an equal quantity is traded (discussion with M.V.Ramana).

5.4.c Western Orissa

If the resources in Shimilipal have been affected because of the proximity of the area to the Kolkata market, resources in western Orissa(particularly, some districts like Kalahandi and Bolangir,etc.) have been affected because of their proximity to the wholesale markets of Chhattisgarh.

Gandhamardan hills, Sunabeda plateau, and forests of Thuamul-Rampur are some of the hotspots where medicinal plant resources are abundant in western Orissa. Gandhamardan hills of western Orissa have been famous for their rich medicinal plant resources since centuries. Out of the total 450 species of plants found here, about 250(55.55%) have been identified as medicinal plants (*The Samaj*, 11-2-02).

In 2000, a newspaper reported about several medicinal/herbal NTFPs being supplied from inter-state boarder areas of Orissa, MP (Chhattisgarh) and Bihar (Jharkhand) particularly for export purposes. It said that some American companies had been facilitating such kind of collection and supply, and that this had increased the apprehension of losing patent rights over many of our own resources, to the western companies/scientists. This report paid specific attention to the resources of Gandhamardan, suggesting that the trend in the boarder areas had poised a threat to the biodiversity of Gandhamardan, and enlisted the following species supposed to be more vulnerable under such circumstances:

Harida, sahada, gudmari, arakh, nagodari, chiraita(bhuineem), hadapodi, bada kaniara, dudura, akarkara, sarpagandha, satyanashi, mruta-sanjeevani, and ghrutakumari, etc.(*The Samaj*, Sambalpur edition, 12-6-2000).

The report said that there had been a boost to the supply of several NTFPs of medicinal and other importance during the last 5-6 years. It also mentioned how the poor primary collectors of these items had remained ignorant about the conspiracy behind this kind of collection for which they are but marginally paid.

Dr.R.N.Pradhan, head of the Deptt. of Botany at Bargarh Panchayat College has been associated with various botanical surveys in the region. He however does not feel that there is anything extraordinary going on in Gandhamardan. Although he does not rule out the possibility of smuggling and illegal activities in the Gandhamardan forest, trading of medicinal items in the area appears to him to be quite 'normal' (like collection of amla) in this area as in many other parts of the state(*per comm.*).

On the other hand, reports say that while a survey (by late botanist Panigrahi) about 40 years ago identified about 319 species of medicinal plants in the Gandhamardan hills, current experiences suggest that only 115 species are available now in this area (*The Prajatantra*, 28-6-03, p.6).

S.K.Das of Sabuja Viplab is sure that unsustainable commercial exploitation has actually affected some species. For instance, tutia, identified by some people as *Colchicum luteum*(?)¹⁹ was difficult to trace out in the Kalahandi forests because the tubers were exploited. Sikakai was another species whose population was endangered due to unsustainable exploitation. Das believes that in some parts of western Orissa, *Gloriosa superba* is already endangered, and satavari is threatened.

Sabuja Viplab: The pioneer in medicinal plant cultivation

Sabuja Viplab is a Bolangir-based non-govt organisation which holds the credit for officially (unlike the case of pippala mul cultivation in the south where promotion was done informally and on the basis of mutual contacts at individual level) promoting, probably for the first time, medicinal plant cultivation on commercial basis in private lands. In 1997-98, the organisation started this endeavour by promoting cultivation of aswagandha and bruhati in approx. 32 acres and 100 acres of land respectively. The cultivators were the local people who were supposed to be benefited from this initiative when the traditional crops no more seemed much reliable. Like many entrepreneurs of western Orissa, the initiative of Sabuja Viplab was inspired basically by developments (commercial farming of several med. species) in the neighbouring state of Chhattisgarh/Madhya Pradesh which borders western Orissa and receives regular supplies of herbal raw material therefrom. The effort was gradually followed by experiments with some other species like gudmari, and bacha (source: S.K.Das). Fortunately, the organisation chose not to emphasise on safed musli. Although the initiative experienced ups and downs, still it inspired many people to take up commercial cultivation of medicinal plants.

Herbal Health and Gandhamardan Herbals are the sister concerns of Sabuja Viplab engaged in the marketing of products. Their initiatives are claimed to have benefited the primary collectors who could get a better price.

About 150 km from Harishankar is Karlajodi, a village near the Bargarh town where resides Satyaban Khamari. A teacher by profession, Khamari is better known as an expert on local medicinal plant resources. The nearest forest area is the Barapahad R.F. where items like satavari, indrajaba, banajeera, baibidang, talamuli and ganthiana are abundantly available.

¹⁹ Although this species is in demand, flora books do not mention its occurrence in the state. Hence, it is yet to be ascertained whether the species exploited in the same name is actually that or something else. A trader of Bamra has informed the author that he would soon be in a position to collect this species from the local forest. On the other hand, a senior taxonomist is of the view that some other species might have been collected in the name of *Colchicum luteum*. In fact, *C.luteum* is basically found (and threatened due to unsustainable exploitation) in the Himalayan area and yields an alkaloid colchicine which is very effective in acute gout and several other diseases. It is adulterated with *Allium sativum* and *Narcissus tazetta* (CSIR 2001, The Wealth of India First Supplementary Series, Vol.2, pp.151-52).

Patalgarud, kochila and ashok are almost absent in this forest not because of any overexploitation, but due to some natural reasons. In fact, commercial collection of any item of medicinal importance is not known there. Offer from traders for large scale collection of baibidang, banajeera and indrajaba is also unknown.

However, two or three items like Bhuinkakharu and amla are said to be vulnerable there. Bhuinkakharu, which was earlier available in abundance, has now become comparatively scarce reportedly because the local people have collected it extensively for feeding their cattle/cows as it is believed to increase, as a tonic, the milk-producing capacity in cows. Amla trees, as in other parts of the state, have been cut for easy collection of the fruit, which has affected both the distribution of amla plants and their production capacity.

Khamari was approached by some people only for two items, viz., Bhramaramari and white palas gum. However, these items are not available in the area.

He has planned to go for cultivation of some medicinal plants, more particularly safed musli. The land is ready, but due to uncertainties regarding market, etc. he is yet to start the actual cultivation(as on 5-3-05).

Far away towards the Jharkhand boarder, there is a commercial cultivation of *Vinca rosea* near Bhalulata in the Sundargarh district. The cultivation is on lands taken on lease basis from farmers who otherwise found their land not suitable for paddy cultivation either because the soil quality and/or irrigation was a problem, or paddy had a lower sale value.

Vinca rosea

The currently valid name of this species is *Catharanthus roseus*; known in Orissa as *sadabihari* or *ainshakati*. The plant has white, red, or mixed-colour (red and white) flowers. The total alkaloid content is highest in the root bark, followed by roots, leaves, and flowers. On an average, pink-flowered variety contains higher alkaloid content than the white-flowered variety. Important alkaloids are vinblastine and vincristine, etc., which are found effective against various types of cancer like leukaemia. Interestingly, these species contain alkaloids like serpentine, ajmalicine, and reserpine which are present in *Rauvolfia serpentina*, but the concentration of the first two alkaloids is greater in *C.roseus* than in *R.serpentina* (CSIR 1992, *The Wealth of India*, Vol.3, p.391).

India has been exporting *V.rosea* parts to several countries since many years. In 1987-88 the exported quantity was only 875 kg (to Mexico), but in 2003-04 the quantity was 7235624 kg of which the share of western countries was more than 77% (based on DGCIS data).

Suresh Khemani, a Jaraikela-based businessman has started cultivation of this species over about 27 acres of land near Bhalulata. He has both white and red varieties, but the red one is dominating. A Kolkata-based company, which has supplied the seeds, is also supposed to arrange for the marketing of the harvest; and it has offered Rs.12-20 and Rs.6-7, per kg, for the flowers/leaves and stems respectively. Khemani expects financial loss in the first crop, but hopes the second crop will be harvested on 'no loss, no profit' basis, and that the third crop will earn him profit. Interestingly, his cultivation site was recently visited by a French team which was interested in importing the harvest. The team informed him that in contrast to the price offered for his crop here in India, the price in France is significantly higher (even if landing cost is included). It also said that to make the cultivation commercially viable one should cultivate the crop in at least 2000 acres.

Khemani also cultivates safed musli in about 5 acres of land in the Nuagaon block of the district. He now plans to go for amla, aswagandha (and jatropa) (*per comm.*).

5.4.d Eastern Orissa

Rana's store is a major retail and wholesale counter for raw drugs at Cuttack. The proprietor says that demand of almost all the raw materials has increased during the past decade. However, according to the proprietor of Baidya Store, a major trader of herbal ingredients, items of maximum demand include myrobalans, sunamukhi leaves, aswagandha roots, and jatamanshi (*per comm.*).

In Nayagarh district, there is a farm recently established at Kendua where medicinal plants like ashok, arjun, mahanimba, sami, harida, amla, bahada, chhatiana, safed musli, pashanbhedi, aswagandha, sarpagandha and bacha have been planted. The proprietor M/S. Banani Herbal Cooperative Ltd. has recently advertised that interested parties can contact it for planting

materials for species like safed musli, pashanbhedi, aswagandha, sarpagandha, and also for bio-fertilisers and bio-pesticides(*The Samaj*, pp. 5,9; 15-3-05).

Many people have reportedly taken attempts for cultivation of medicinal plants around the Chowdwar area near Cuttack. The most renown of them is the Gitanjali Herbal Garden at Matshyapur (Radhakishorepur) where safed musli and amla have been planted. Some other entrepreneurs have attempted for pashanbhedi, etc.. In fact, a farm was established about 3 years ago in the area where aswagandha, bhuineem, ayapana, and bhringaraj were reportedly cultivated and a liver-drug was manufactured from these raw materials; but the unit was almost suddenly closed due to unknown reasons about 1.5 years back(source: R.N.Pati).

Jyotirmoyee Mahila Samiti(JMS), an NGO with based at Gualsingh near Kendrapara, thought of attempting commercial cultivation of medicinal plants basically for its own sustenance so that when external funding is not available, income from this source could help the organisation continue its activities. Vishalya karani, a traditionally well-known plant the leaf-juice of which is applied on cuts, was naturally available at one of the field sites of JMS; and a Hyderabad-based company expressed interest to procure the same after visiting the place. Now JMS wants to try safed musli, aloe vera and jatropa. It may be mentioned here that after aswagandha and safed musli, planting material suppliers are promoting jatropa on a large scale because the Government of India is facilitating jatropa cultivation in view of the demand of bio-diesel from its seeds. DaimlerChrysler, manufacturer of Mercedes-Benz cars and experimental-user of biodiesel, while announcing recently that it would fund farmers' cooperatives for biodiesel, has said that the cultivation of jatropa would be promoted both in Orissa and Gujarat although the extraction(oil) unit would be based only in Gujarat(*The Times of India*, 20-7-05,p.14).However, JMS plans to use also jatropa's medicinal properties. For instance, the stem-juice can be treated with ghee to prepare an oil for effective application (external) on bone fractures and related pains²⁰.

²⁰ Locally known as baigaba, stem-juice of some jatropa plants are traditionally known to cure dental/gum problems.

The 'local' aswagandha

Barapalli is a small village near Tangi(Khurdha). When the aged village vaidya confidently told this author that he regularly used to collect aswagandha from his village area, the matter appeared curious as aswagandha has never been reported from the wild in Orissa. The suspicion turned true when the plant source was actually seen in the field. It was a completely different species locally known also as *torania-mula*, and the roots thereof were actually substituted for aswagandha in the name of the latter.

Commercial cultivation of aswagandha seems to have started from western Orissa in 1990s. However, either due to water logging or inadequate care(particularly during the seedling stage), many entrepreneurs experienced failure in this cultivation.

Bhagaban Patnaik and some of his co-villagers of Sunamuhin(Nayagarh district) had a different experience. An agrotech company lured them for aswagandha cultivation with a buy-back arrangement(@Rs.60/kg of roots without grading) and advised them to use 5 kg seeds per acre for cultivation. Needless to say, the seeds were to be procured from that company itself. In good faith, Patnaik and his friends paid as high as Rs.1100/kg (approx.) of seeds and started the cultivation process in 2004 without knowing that the company received from them more than 10 times of the actual price of the seeds. The total area under cultivation was about 10 acres. After harvesting, the agrotech company did not turn up to buy back the produce. Then they approached a reputed pharmacy of Boirani(Aska) where they got to know that the roots were of very a low quality and that they would be paid maximum @Rs.20/kg for the same. Disheartened, they returned to their place and approached a pharmacy of their region, which agreed to pay them @Rs.70/kg, and also assured to purchase all of their harvest in future. Now they are determined to go for the second phase of cultivation of aswagandha, and have arranged for reliable planting materials from reliable source(*per comm.*, Bhagaban Patnaik and Kishore Patnaik).

Kashinath Mishra of Kuchinda is promoting the cultivation of aswagandha and other species with assurances of marketing support. He claims to have introduced quality seeds of aswagandha in Orissa in 2002 when he procured 50 kg seeds from Neemuch(Madhya Pradesh). The seeds were used in about 10 acres of land, but the success rate was negligible due to unfavourable climatic conditions. He gained from this experience, and was able to sell about 3 quintal seeds in 2003(*per comm.*). @5 kg seeds/acre, this would mean cultivation in 60 acres of land.

5.5 Export potential and practices:

The DGCIS data does not mention from which state the herbs were collected/supplied for export. No other authentic data is available to examine the export linkages of Orissa's herbal production. In fact, registers of the Export Promotion Council of the Govt of Orissa do not mention any such kind of export during the last several years. Hence, certain inferences have been drawn on the basis of interaction with exporters of Kolkata, as discussed under:

Some major trading agencies of Kolkata like M/S. Morex(India) and M/S. Excel Drugs, who have been supplying herbal raw materials to various Ayurvedic drug manufacturers of India, said very clearly that they had not observed any remarkable/distinct impact of globalisation on the exploitation and supply of crude drugs in/from Orissa. That they have not experienced any sea change in the demand and supply position of herbal ingredients available in Orissa(and some other states like Chhattisgarh) suggests that globalisation is yet to make any significant/visible impact on these resources of the state. The following table presents an outline of some of the major herbs procured(not necessarily for export purpose always) by these trading agencies from Orissa:

Table-10

Name of the item	Experience of the companies				Remarks
	Morex(India)		Excel Drugs		
	Average annual purchase from Orissa	Rate of purchase /kg	Average annual purchase from Orissa	Rate of purchase /kg	
Ashok bark	30-40 tons	Rs.10	_____	_____	Purchase rate remained almost constant throughout last few years
Sunari bark	4-5 tons	Rs.9.30	_____	_____	Purchase rate remained almost constant throughout last few years
Amla	10 tons (seedless)	Rs.30	_____	_____	Rate increased from Rs.20(last year) due to short supply
Harida	10-15 tons (seedless)	Rs. 8 (seedless)	30-40 tons (seeded)	Rs.4 (seeded)	Rate decreased from Rs.12(last year) for the seedless variety
Bahada	_____	_____	30-40 tons (seeded)	Rs.1.60 (seeded)	No significant fluctuation in rate observed

Sikakai	1 ton	Rs.20	_____	_____	Rate decreased from Rs.35(last year)
R.S.roots	1-2 tons	Rs.90	_____	_____	Rate increased from Rs.70(last year)
Indrajaba	_____	_____	4-5 tons	Rs.70	Rate increased from Rs.35(last year) due to short supply

(Source: M/S. Morex(India) and M/S. Excel Drugs, Kolkata)

The 1999 assessment of the Forest Department suggests a potentiality of 630.23 quintals for indrajaba i.e., about 63 tons. What Excel Drugs procures annually is less than 10% of this potential. Even if we assume that 50% of the potential is harnessed, the question of overexploitation seems to be unreasonable.

During 1980-81 and 1988-89, the average annual production of indrajaba in Orissa was about 71 quintals (7.1 tons, if unrecorded years are excluded) which reached an unexpectedly low figure of 0.87 tons during 1992-93 and 1994-95 (based on *A Decade of Forestry in Orissa:1981-90*, p.79 and *Orissa Forests 1999*, p.29). Indrajaba faces crop failure sometimes, but assessment by the Forest Department in 1999 indicates that the potentiality is quite high otherwise. In fact, in 1989-90 a production of 223 quintals(22.3 tons) was recorded as against only 10 quintals(1 ton) in 1982-83 (*A Decade of Forestry in Orissa:1981-90*, p.79).

The said assessment suggests a potentiality of atleast²¹ 2934 quintals(293.4 tons) for Sunari bark. In 1981-82, the total recorded production of this bark in Orissa was 4369.13 quintals. In 1997-98, a production of 76.2 tons was recorded (*A Decade of Forestry in Orissa:1981-90*, p.80 and *Orissa Forests 1999*, p.30). Although commercial harvesting of all kinds of tree bark has now been banned since 2000, still illegal trading of Sunari- and some other kinds of bark have not been stopped although the Kolkata traders have clarified that their procurement of Sunari bark can but be little compared to its potentiality because if demand is there, the supply can be much higher than what they now procure normally.

The situation of Ashok bark however seems to be critical not because of globalisation but because its consumption in Indian Systems of Medicine has been traditionally quite high. Ashokarista, the popular Ayurvedic preparation hailed for its contribution in women's health, is based on this bark. During the past, a lot of the supply of this bark has taken place from the Shimilipal region of Mayurbhanj district and unsustainable/unscientific exploitation created such a situation that primary collectors even tried for adulteration by using Sal bark, as this author was informed three years back. Although the resource has been badly affected, the procurement price has remained more or less constant over the past 10 years or so due to lack of compensatory increase in the demand/market price of the same.

The case of *Rauvolfia serpentina*(Patalgarud) roots tells a quite different story. It was recognised as a major crude drug for export long before globalisation started, and the unsustainable supply caused a depletion of the resource as in the Saharpada area of Keonjhar district. Since last few

²¹ Because figures are available only for two Forest Divisions

years its export has been banned by the Govt of India and even the Orissa Govt declared it as a lease-barred item in March 2000. Still the commercial exploitation and supply of R.S. roots has not stopped simply because the domestic demand is still promising²² and ban on export has rather resulted in a decrease in its market/procurement price.

Our resource, their export

Market intelligence of RCDC reveals that there are agencies in Kerala who purchase traditional Ayurvedic medicines like dasamularishta and ashokarista, etc. from pharmacies of Orissa (and other states) and then export the same to some countries just by replacing the label on the bottles. When informed about this, some of the supplier pharmacies however appeared careless as they did not express their willingness to themselves try for direct export of their products from Orissa.

R.S roots, nagarmutha oil, etc. are few examples, which might have been exported without having any direct linkage between the importer and the primary supplier. Bhuin-kadamb seeds are also used to extract oil for export.

Some of the senna leaves produced in the western Orissa are also said to be procured by exporters from Tutikorin in south India, but that is doubtful because exporters at Tutikorin are able to get these leaves at a much lower price than that in Orissa, and the Orissa farmer has a scope of selling his product at a much higher rate in the local market itself (source: Pradeep Kumar).

S.K.Das of Sabuja Viplab had explored the possibility of direct export from Orissa, and had found *Gloriosa superba* quite suitable for this purpose. This plant, though medicinally important, is of interest to many westerners rather as an ornamental plant because of its beautiful flower, and the maximum cost of production could have been Rs.5 in Orissa as against the price in Europe @8-10 US\$, per tuber. However, due to some of his limitations he could not pursue this (*per comm.*).

Many entrepreneurs find the inter-state trading (particularly, supply from Orissa to other states) financially risky because ensuring the payment at the end of the consignee is difficult. All can not afford credit for a long time. Such bitter experiences further discourage for any initiative for export.

5.6 Threatened resource:

Following plants having some medicinal use, either in the state or elsewhere, have been enlisted for their threat status since long:

²² In an exceptional case, the authorities approved of the exploitation and business of the root in the Rayagada-Koraput region so that women primary collectors (self-help group members) could be benefited from its market demand. The DFO, Rayagada was not in favour of this, but the final decision allowed the commercial collection on the condition of sustainability. However, the ground reality was that overexploitation just could not be prevented due to several reasons.

Table-11

Species	Threat status	Available areas	Medicinal use
<i>R. serpentina</i>	Vulnerable(? ²³)	hill forests of Koraput, Rayagada, Keonjhar and some other districts	Anti-hypertension drug
<i>Gloriosa superba</i>	Vulnerable	sporadic in open forests and shrubs	poisonous tuber used as a type of <i>mahura</i> by Ayurvedic practitioners
<i>Balanophora polyandra</i>	Endangered	Mahendragiri; Bhatodih(Keonjhar)	In the treatment of asthma and cough
<i>Tylophora fasciculata</i> (sahasrabhedhi)	rare	Karlapat, Malyagiri, Gandhamardan, etc.	Roots used as substitute for Ipecac and as febrifuge; leaves useful in treatment of ulcers/wounds.
<i>Tylophora rotundifolia</i> (badhyamri, gopipeta)	rare	Occasional in Sal forests	
<i>Psoralia corylifolia</i> (bakuchi)	Rare	Waste lands near cultivated areas	Seeds used in the treatment of skin diseases like leucoderma
<i>Pittosporum floribundum</i> (devasandha)	Rare	Occasional in hill forests	Bark has medicinal uses
<i>Cerbera odollam</i> (paniamba)	Vulnerable	Bhitarkanika	Bark purgative; poisonous fruit used as a cure for hydrophobia(Kirtikar K.and Basu B. 1999 reprint, <i>Indian Medicinal Plants</i> , p.1553)
<i>Schefflera venulosa</i> (takua, jari)	Rare	Ganjam	Roots taken with rice to cure dropsy

(various sources quoted in Vasundhara 2005, *Threat Status of Plants of Conservation Concern in Orissa*)

The above table suggests that of the eight species, four were threatened due to anthropogenic reasons. However, the situation during the last few decades has changed a lot. *R. serpentina* now seems to be endangered or critically endangered in the wild, in several localities. *Litsea glutinosa*(jayasandha or garuda-govinda) is a species that needs to be added to the list as due to unsustainable exploitation of its bark for some non-medicinal use(as a raw material in agarbatti

²³ or endangered ?

industry), distribution of the plant has been severely affected. The distribution of several other species like Lal-chitamula(*Plumbago indica?*) and phanaphana(*Oroxylon indicum*) is also questionable.

A survey conducted by the Proctological Society of India, a Puri-based NGO headed by Dr. Chaturbhuj Bhuyan indicated the following species facing gradual extinction:

- Hansalata
- Pana-aairi
- Nilakantha-kedara
- Khandaphula
- Keu
- Dayana
- Araguna
- Odashamari
- Bidang
- Samarkand
- Bakuchi
- Banahaladi
- Danti
- Pengu (etc.)(*The Samay*, 12-2-02)

Dr.B.N.Mohapatra, Head, Deptt. of Dravyaguna, Bolangir Ayurvedic College concludes from his recent experiences in the field that besides *R. serpentina* and *G. superba*, the following species have become threatened due to anthropogenic reasons:

- Lodha
- Pengu
- Bidang
- Nageswar
- Ashok (*per comm..*)

According to him several other species like chitrak or chitamula(both red and white) are likely to be threatened in the future due the extensive use(*per comm..*).

5.7 Status of commercial cultivation:

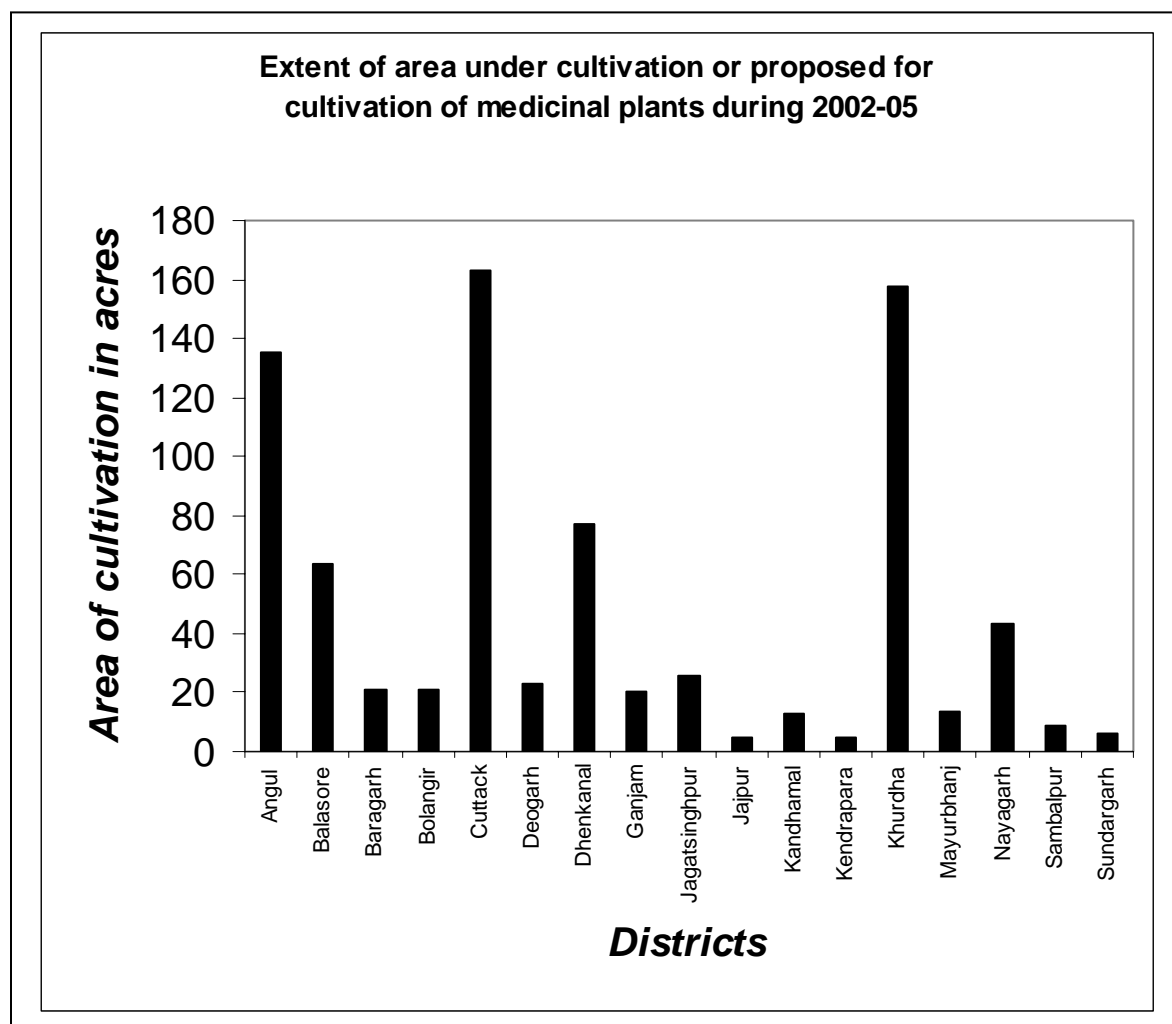
Mohapatra believes that global demand of herbal raw materials has facilitated organisation of workshops and seminars on the cultivation, conservation, processing and marketing of medicinal plants in India and Orissa. According to him, the market is favourable for commercial cultivation of the following species:

- Danti
- Jyotishmati
- Brahmanjhatia
- Rudanti

- Bidang and bai-bidang
- Lahalanguia(*G.superba*)
- Gudmari
- Jeevanti
- Nageswar
- Chitamul
- Ashok
- Lodh
- Kutaj
- Sarpagandha

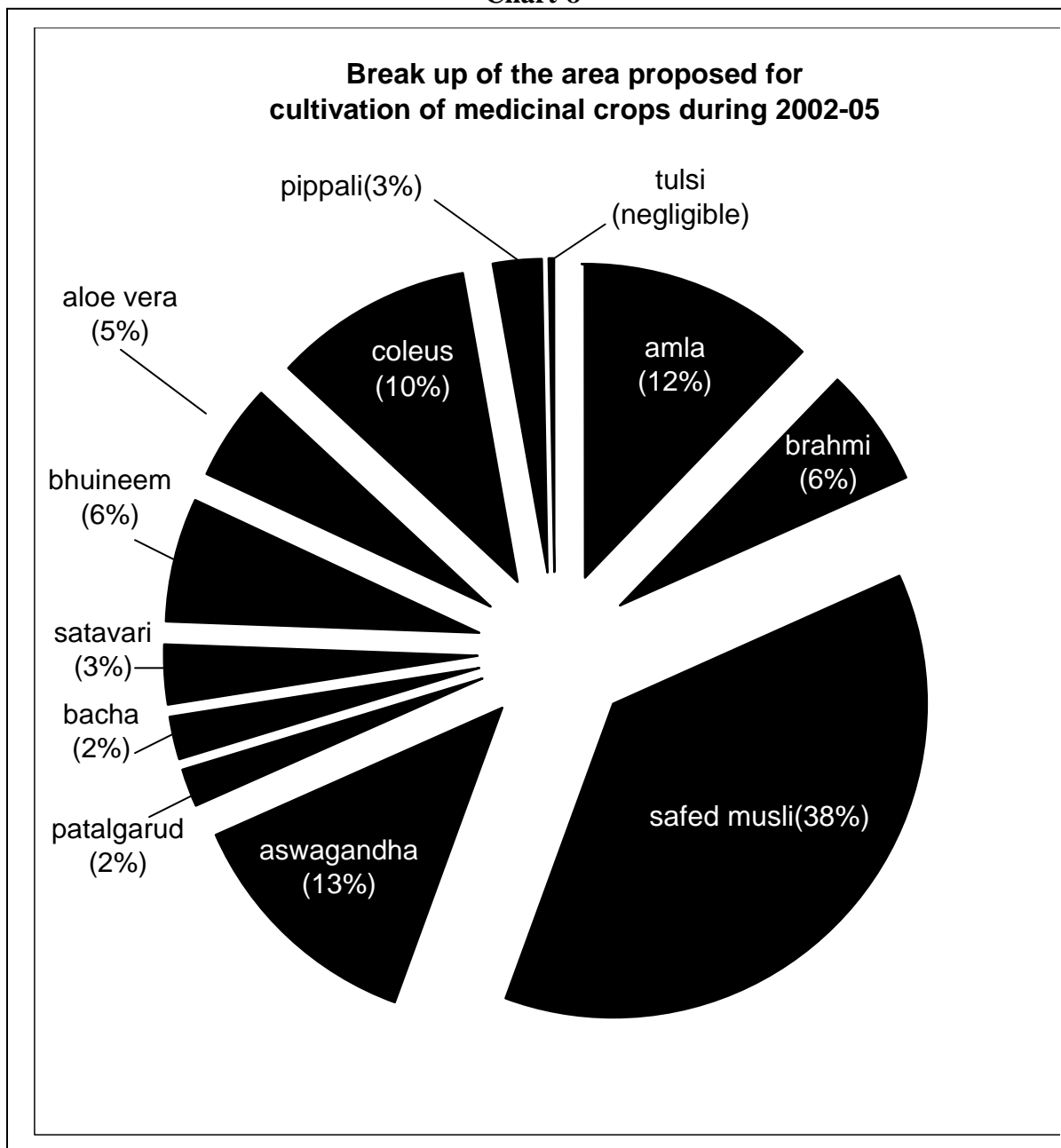
As per the records of the State Medicinal Plant Board, following status(for details, vide annexure-2) is available regarding the cultivation(or, proposed cultivation in some cases) of different medicinal plants in the state based on the applications received for financial assistance from the Board:

Chart-7



(source data by courtesy: Sri A.K.Patnaik, State Medicinal Plant Board)

Chart-8



(source data by courtesy: Sri A.K.Patnaik, State Medicinal Plant Board)

The projections in chart-8 have the following limitations:

- It does not include areas under cultivation of medicinal crops where the farmers are pursuing their programme independent of the State Medicinal Plant Board.
- It does not even include such areas mentioned in the SMPB list but for which species-wise crop area has not been specifically mentioned.
- Only those districts mentioned in the SMPB list have been indicated.

- Although species-wise crop areas have been projected, it is quite possible that some of them may be overlapping in the field, particularly in case of intercrops.

As evident from the above charts, the area under(or proposed to be under) cultivation of med. plants is highest in Cuttack and Khurdha districts, followed by Angul and some other coastal districts. Safed musli covers largest crop area, followed by aswagandha and coleus.

The SMPB data suggests that the area under cultivation of medicinal crops in the state would be more than 600 acres. Santosh Kumar Das of Sabuja Viplab confirms from his rich experiences in the field that cultivation of med. crops has been attempted atleast in 200 acres of which the largest area lies in the Cuttack-Dhenkanal belt, followed by about 50 acres in Bolangir district, about 30 acres in Mayurbhanj-Balasore region, about 20-30 acres in the Sambalpur district, and about 7-8 acres in the Kalahandi district. According to him, about 30% of these area is/was covered by safed musli, the rest being under other miscellaneous crops.

Although coastal districts like Cuttack seem to have the maximum area under medicinal crops, some people/agencies believe that western Orissa would be the centre of medicinal plant cultivation in the state in near future(*The Odisha Bhaskar*, 9-5-05). Orissa Nature Care Council Pvt. Ltd., which has been promoting plantation crops of various kinds in the state since 2003 and sees western Orissa as the future centre of medicinal crops, has been a pioneer in the private sector to promote medicinal crops. The company sells planting materials to farmers on buy-back basis, and has been more successful in districts like Sambalpur and Koraput in its promotional activities. It claims to have already promoted cultivation of medicinal crops in over 100 acres of land in the state, out of which about 40% is under safed musli and the rest under other species like aswagandha, amla, and coleus, etc.. The company aims at expanding this acreage to 200 in the near future(source: Ravindra Nath Patnaik, Chairperson,ONCC).

Some other agro-tech companies are also active like ONCC. Hrishi Agro Vision claims to have entered into agreement for cultivation of med. crops in about 48 areas of western Orissa(*The Samaj*,17-6-05, p.7, Sambalpur edition). Central Herbal Agro Marketing Federation of India, a Chhattisgarh-based company, has announced to take up plantation of crops like stevia in about 500 acres of the state(*India First*, 25 June-1 July, 2005; p.14).

However, fraud on the part of many agro-tech companies(planting material suppliers and promoters of med. crops) has been a major concern not only in Orissa, but also some other states. Even buy-back arrangements are not always satisfactory. Farmers have been lured on the plea of getting huge profits within a short period of time, and after they fail to market their harvest at the assured price, hardly anybody comes to their rescue. Promoters basically aim at selling their planting materials, and marketing of the farmers' produce is but of secondary importance to them. Unfortunately, the state government has not taken any satisfactory step to save people from such kind of frauds.

The Emami group of companies had taken up commercial cultivation of amla in about 39 acres of land at Rasulpur & Hulupatana near Balasore(source: Jiten Chowdhury). The group runs a paper mill near Balasore, but the harvest from the cultivation was supposed to be supplied to their cosmetic products division. Baidyanath, one of the top-leading Ayurvedic pharmaceutical

companies of India, has announced that it would try to double its business network in Orissa and would cultivate medicinal crops in 200 acres of land in the state under its business-expansion programme (*The Samaj*,23-2-05). However, cases like this are different since here the end-user promotes cultivation of the items consumed in its factory. Priyabrata Dwibedi, an Ayurvedic doctor by profession who runs his own pharmacy named Garden Ayurvedic Pharmacy, has cultivated about 21 species in about 5 acres of land near Deogarh, for consumption in his pharmacy. Earlier, he procured many of the raw materials from Kolkata, etc., but now since he saves a lot by producing some of the raw materials in his farm, his net profit has increased substantially. He even attempted to cultivate some of the Himalayan species like chirayita, jatamanshi, and jastimadhu; but it was a failure due to unfavourable climatic conditions(*per comm..*).

As one can judge from the appraisal of the cultivation status of med. plants in Orissa, the initiatives behind such cultivation have been market-driven from the beginning. Although, some attempts have been non-commercial also; but such cases are exceptions. Hence, conservation and even local utilisation have no priority in most cases of commercial cultivation. At the same time, there are several species, which despite their global demand, have not attracted attention of cultivators in India or Orissa. For instance, spirulina, from which the food-supplement capsule 'Sunova spirulina' is manufactured, is hardly in notice of anybody in the state. Spirulina is an algae and is regarded as a complete food for man because of its richness in nutrients. It contains 50 to 70 % protein, and is claimed to be capable of curing arthritis, and preventing old age. Being zero-cholesterol and toxicity-free in nature, it is supposed to assume high priority in the future world. However, no body seems to go for its farming in Orissa. Even awareness-building is extremely rare in this regard. More or less same is the case of Isabgul. However, some species are not attempted for cultivation because of either lack of cultivation technology or unfavourable climatic conditions.

Bhoisahi: changing times

Dia is a village nearer to Nirakarpur(Khurdha). Bhoisahi is a hamlet of Dia where more than 40 households of traditional Ayurvedic practitioners(kaviraj) reside. This hamlet is exceptional in the sense that almost all the HHs, have or used to have the same profession(kaviraji). They belong to the *karan* caste(upper caste), and used to have considerable land-holding. Major sources of income were two: agriculture(50%) and kaviraji (50%). The adult males were the earning members, and they used to travel to not only remote areas in the distant districts of the state, but also to other states for providing their expertise to the people and this earned them both fame and money as their relationship with their patients was more than commercial. Expertise in certain treatments was an added advantage for both parties because while the kavirajs earned fame and money because of that, the patients were benefited by getting successful treatment at a significantly lower cost. For instance, for piles a patient may have to spend about Rs.10000 in the allopathic system without any guarantee of permanent cure, whereas the Bhoisahi kavirajs can ensure permanent cure at the cost of Rs. 1500 to 2500 only.

Gradually things changed. With more and more modern hospitals opening here and there, dependency of the people on allopathy increased; and the kaviraji profession was affected by this. Although the kind of personal relationship these vaidyas had maintained with their patients, helped them a lot in this situation; still the business was affected substantially. To compensate the loss, many of them had to sell their agricultural lands. Some opted for other options like getting employed somewhere. As a result, out of about 45 HHs only 20 are now actually practicing kaviraji and from this source they get 75 to 90% of their income.

The change has been conspicuous within last two decades. On one hand they have to struggle against the changing trends, and on the other hand dominating market giants like Dabur have poised another threat to the sale of their products. Hence, they have very limited scope for compensating their losses through a proportionate hike in the product price. While they expect 30 to 40 % net profit, actual profit is often limited to 20 to 30%. Production has remained more or less the same, and if the average turnover has increased from Rs.6-7 lakhs to Rs.10 lakhs, then that is chiefly because of the inflation. Average annual income per HH(practicing) ranges from Rs.40000 to 60000, which has increased as compared to that 10/15 years back; but at the same time income from agriculture has decreased after the lands were sold.

Although their production of medicines is essentially traditional and based on Ayurvedic texts, these Vaidyas do not normally produce several Ayurvedic preparations like *aasaba* and *arista*. Chyavanprash, *methi-modaka* and *anla-khanda* are among their highest sold products. Sale of chyavanprash has recorded a remarkable growth during the last 15 years as the production(village total) has increased from about 3 quintals to 5-7 quintals now.

Most of the raw materials are purchased from the market. Rasna, aswagandha, shatavari, bhuinkakharu, honey and ghee are some of the top ranking raw materials of their demand/use.

5.4.2 Impact of the global trend:

- Overexploitation:

Nagarmutha(*Cyperus scariosus*)²⁴ is a long grass found under marshy conditions in the wild. The roots, known to traders as 'soucher' in their dry form, yield an essential oil which has demand in cosmetic- and agarbati industries. The roots themselves are directly used in several medicinal applications like treatment of cough, fever, epilepsy, etc.(*Banoushadhi*,Jan.-Feb. 2001,pp.10-17).

The Forest Department estimated a potentiality of only one quintal of nagarmutha roots in the Athamallik Forest Division, estimation for other Divisions being not available. However, during the last few years traders from Kanaus(important centre for the production and trading of essential oils in India) reportedly used to procure annually more or less 100 truckloads²⁵ of these roots from various places of Orissa(mostly from western Orissa). The volume of procurement suddenly increased by approx. 10 times during 2004-05 reportedly due to a substantial increase in the demand of nagarmutha oil in the international market, about 85% of the this oil being exported. Market intelligence of RCDC confirms the supply of about 500 truckloads from Orissa during this period whereas consultant and trade-facilitator S.K.Das presumes this to be around 1000 truckloads. Although the procurement was basically confined to western districts of the state, few places of coastal Orissa, like Erasama area, are also said to have been included in the area of collection this time. Das believes that within next five years, the trade is going to spread extensively in coastal Orissa also(*per. comm.*.. S.K.Das and Manoranjan Mohanty).

Such a large-scale extraction of the nagarmutha roots not only poses a threat to the existence of this species, but also increases the risk of soil erosion and its consequences because this grass is found along river banks and stream sides, and acts as a good soil binder. While the primary collectors and traders seem to ignore these risks, Sabjua Viplab plans to promote its cultivation in the state first in about 2 acres of land on an experimental basis, and also to set up a distillation unit for the extraction of its essential oil.

Some of the other species which are likely to be affected in near future due to unsustainable exploitation are *Diospyros montana*(bishakendu) and *Ventilago madraspatana*(pichuli or keunti). Their properties are said to be useful in chemotherapy and in the treatment of venereal diseases (source:S.K.Das).

- Bio-piracy(?):

While some species (or parts thereof) are exploited or commercially required in large quantities, a distinguished group of few people have been seen at several places of the state, asking for only the specimen of any of the following species:

²⁴ more or less similar properties are found in mutha or *C.rotundus*, a related species; and hence this species is also supposed to be affected during the commercial extraction of nagarmutha.

²⁵ each truck load about 6.5 tons

1. Bhramaramari(a legendary species the timber of which are supposed to be highly effective in leprosy and epilepsy, etc.)
2. Kalahaldi('black turmeric')
3. Luha-kanda(a tuber)
4. Dhala palas(gum of white-flowered *Butea parviflora*?)

While demand of bhramaramari is traditional, that of other species is supposed to be mostly of recent origin. Interestingly enough, the buyers have been found ready to pay a good sum simply for the specimen of some of these species. As all these species are supposed to be very rare²⁶ and extra-ordinary, some experts apprehend that this buyer-group might have a linkage with those involved in bio-piracy of our genetic material(source: S.K.Das).

Lal-bhuinkakharu

Pueraria tuberosa produces sizeable tubers that are sold as bhuinkakharu or patalkumra(literally meaning, the pumpkin underground). This tuber is creamish-white inside, and is widely available in the forests. However, some people including vaidyas have been searching a reddish(*lal*) variety of this tuber, and few of them are prepared to offer as high as one lakh rupees either for the tuber or its plant(for propagation). While local users believe that the reddish variety is more rich in its medicinal properties than the 'white' one, few other people seem to be interested in supplying the same to other states, may be for some phytochemical extraction.

Two young men of Khandapara were lured by some buyers from Bhubaneswar to arrange some pieces of lal-bhuinkakharu against an offer of Rs.1 lakh per piece(or, Rs.20000/kg). They went to the Phulbani area, camped there for some time, and engaged, with the help of a local trader, some tribal men to search for this tuber in the dense forest. The endeavour yielded about five pieces among which atleast one or two seemed to qualitatively meet the requirements of the buyer. However, when the buyer went to examine the tubers, the one he found of use was finally rejected due to the cuts produced at the time of digging. The boys who were lured, lost about Rs.20000 due to non-disposal of the tubers(source: Mrutyunjaya Panda and Bashistha Mishra).

The exact nature of the so-called lal-bhuinkakharu is yet to be known. *Ipomoea mauritiana(digitata)* is another species whose tubers are also known as bhuinkakharu. It is not clear if the lal-bhuinkakharu belongs to any of these two species. Some people reportedly used to camp near the Indo-Nepal boarder for collection of this distinguished tuber which is said to be comparatively abundant in that Himalayan area.

²⁶ For instance, kalahaldi, otherwise known as nilakantha-kedara, has been identified as *Curcuma caesia*; the tuber of which is traditionally used in the treatment of cough, fever, diarrhoea, etc.(Khamari S. 2000, *Brukshyalatara Chamatkarita*, pp.36-37). Flora books do not report its occurrence in Orissa.

- Increased patenting:

Strategy for establishment in the market is not a new thing in Orissa. Even during the pre-independence period, a trend of increasing the business of herbal products though self-styled advertisements had been seen in the state. For instance, M/S. B.S.Rao and Brothers published in 1939 an extensive advertisement in the Oriya newspaper *Deshakatha* regarding their discovery of the legendary Bhramaramari plant as well as the availability of four different types of medicines based on this plant for the treatment of dreaded diseases like leprosy and cancer(Rath B., *New Light on Bhramaramari: A Controversial Medicinal Plant of India*, paper presented at 'World Congress on Medicinal Plants for Human Welfare' held at Chiangmai, Thailand in February'03).. They also claimed to have patented their medicine.

Kaviraj Krushnachandra Mohanty of Dia(Bhoisahi) village near Nirakarpur(Khurdha) is said to have added a new dimension to patenting of Ayurvedic products. He found that the body resistance to chloroquine in malaria patients could be overcome by adding some herbal ingredients to it. Hence, he attempted for patenting what can be called a herbo-allopathic product(recharged chloroquine); but due to lack of facilities this was not possible in his lifetime. Now his grandson Jaminikanta Mohanty, himself a pharmacist by profession, wants to patent this formula under the name Dhanwantari chloroquine; but before doing so he wants to follow the pre-requisites like clinical trials, etc.(*per comm.*).

However, the term patenting has often been used loosely to imply to what is known as proprietary medicine. Local Ayurvedic drug manufacturers, who actually want to 'patent' their products, find that the process of obtaining a patent is not only very lengthy and time-consuming, but also quite expensive. They can not afford such a 'waste' of time and money, and hence satisfy themselves with proprietary medicines. They obtain trade mark for their proprietary product and hence no other manufacturer can use their brand name or product name. However, since they display the composition details on the label, there is a risk that somebody else may use the formulation to produce the same medicine though under a different trade name. To avoid this risk, the manufacturers often keep to themselves some of their manufacturing secrets.

Some other patent-seekers however do not seem just make few modifications in the traditional formulations, or create some new formulations just by combining two or more successful and/or high-valued herbs. Neither they are sincere about the proper clinical trials, nor do they have the insight of ancients to ensure that it is safe.

The Drugs Inspector (Ayurveda) appointed by Govt of Orissa failed to give us the number of proprietary medicines produced in the state. Priyabrata Dwibedi, an Ayurvedic doctor by profession who runs a pharmacy at Deogarh, believes that this number may be around 200 out of which maximum 10 to 15 may of truly innovative, the rest being just simple modifications. As an example of innovative modifications, he cites one of his products, 'Amrutchurna', a laxative like Kayamchurna. Unlike its counterparts, Amrutchurna is claimed to be free from a gripping effect in the body. Dwibedi says he has put seven year's labour to develop about 32 new formulations/products out which only four have so far been recognised as proprietary medicines.

The Green Life Movement of India, a Puri-based NGO has claimed to have developed 48 new herbal formulations effective in birth control as well as in the treatment of 33 chronic diseases(*The New Indian Express*, 20-5-02, p.5).

Obtaining patents or proprietorship may cause a substantial increase in the consumption of raw materials. For instance, Garden Ayurvedic Pharmacy of Deogarh, which used to confine its sales to the Deogarh district only, plans to expand business after getting proprietorship over some products because proprietary medicines can be formally marketed all over the country. Accordingly, the raw material consumption is estimated to increase by about 50%. Among the raw materials to be affected by this hike but produced in wild in the state are mochras, simlikanta and akarkara (*per comm.*, P.Dwivedi) though that does not necessarily mean that these will be actually procured from local sources.

Pioneering formulations

Deepak Bhattacharya, the founder of M/S. Oddisi Research Laboratory, a Bhubaneswar-based private research laboratory, has been working on developing drugs for the treatment of critical diseases like cancer, for about a decade. He has found anti-cancer properties in some medicinal plants available in the Gandhamardan area, and has developed an anti-cancer drug ATOX(Anti-tumor Orissa Experiment) which reportedly is working satisfactorily in the treatment of cancerous tumours(*The Samaj*,23-11-04).

Deepak Bhattacharya and Ramanath Panda succeeded in preparing another herbal medicine for the treatment of arthritis. The herbs used in this formulation are also said to have come from Gandhamardan. The new drug has been named ORIARA, an acronym for Orissa Research Indigenous Attempt for Rheumatoid Arthritis(*The Samaj*,22-12-01).

Bhattacharya has applied for patent on about 10 products out of which atleast 6 are plant based. He has used more or less 50 plant species (mostly local) for his products. His anti-malarial prescription OMARIA(Orissa Malaria Research Indigenous Attempt) has however been published instead of being patented, as he believes in a social responsibility(*per comm.*).

The Regional Plant Resource Centre succeeded in preparing a herbal drug from a wild tuber belonging to *Typhoneum trilobatum*, and this drug was claimed to be very effective in the treatment of filaria, arthritis and some other diseases(*The Samaj*, 4-9-01). However, due to certain non-scientific reasons this research is yet to get the final nod from the Govt of India.

▪ Policy-level changes:

In March 2000,the Govt of Orissa came out with a resolution on NTFPs which placed about more than 60 non-timber forest products under the control of Panchayats. The Panchayats are now empowered to regulate the trade in these items in their respective areas, and Forest Department's permission is not necessary for that. These items include several medicinal species like indrajaba, bhuiineem, dhatuki, paluo,nageswar flower, rasna, hansalata, and phanaphana fruit, etc.. However, medicinal roots(like RS roots) and barks have been declared lease-barred

items under this new policy although only govt agencies can be allowed for their collection provided sustainability is ensured.

While the NTFP policy of 2000 had no connection with the global trend, certain other policy-level changes were directly or indirectly influenced by the global and national situation vis-à-vis herbal products. The Govt of India, under the facilitation of international agencies like UNDP, had taken initiatives to give a boost to the medicinal plants sector. As per the national strategy, the Govt of Orissa established a State Medicinal Plant Board (SMPB) in 2003. Besides, the Orissa Forest Corporation has been asked to facilitate marketing of the medicinal herbs²⁷.

Vanaspati Vana Society (VVS), implemented also by the Forest Department, has different schemes. It has planned to conserve the medicinal plants of the Gandhamardan area. However, earlier experiences suggest that the govt has not been sincere in rightly implementing projects of such kind. For instance, creation of medicinal gardens at Saptashajya in Dhenkanal has been left uncompleted (*The Samay*, 12-1-03). Even a similar project proposed for the Gandhamardan area in 1989 has experienced the same fate (*The Sambad*, 2-12-01).

The Forest Department identified 10 out of the 69 medicinal plant species in the Hatikote RF of Baripada Forest Division, in a depleted condition and has taken up conservation measures for them in about 200 hectares of the RF (*The New Indian Express*, 3-6-03). A proposal has been submitted by the Department, to the Medicinal Plant Board for conservation of medicinal plants in about 500 hectares of Singharaj Reserve Forest adjoining the famous Mahendragiri hills (*The Pioneer*, 12-7-05).

Overall monitoring of the activities of the SMPB and VVS clearly suggest that since their responsibilities are basically supply-driven (i.e., these owe their origin to the huge funds provided under UNDP- and similar programmes) and not demand-driven, hence a lot of money has been or is being spent basically to achieve targets, and not to do something concrete. Sincerity is lacking among the authorities (except a few individuals) and as a result, many superficial activities have been taken up.

MS Swami Nathan Foundation has been able to get about 12 acres of land at Jeypore on lease, from the government at a nominal rate of Re.1 only, for establishing a research centre-cum-herbal garden for promoting conservation and utilisation of medicinal plants. Dedicating this Centre to the nation, the state chief minister had said that it would help in the improvement of livelihood conditions of the tribals. The land required by the Centre was originally valued at Rs.1.22 crores, but after the Foundation's request for a favourable deal, 99-year lease was granted at a nominal price. However, delay in actually transferring the land to the Foundation put the latter in a fix (*The Anupam Bharat*, 12-5-05, p.6).. This reflects the stand of the government at policy and implementation level.

²⁷ The Regional Research Laboratory, Bhubaneswar has long been working on propagation of medicinal and aromatic plants in Orissa. However, it could not succeed to encourage a large number of people to take up such kind of cultivation, though individuals have reportedly been influenced., particularly in case of aromatic plants. Some experts tend to almost ignore the contribution of RRL, Bhubaneswar in this area.

- *GMP policy:*

The deadline for applying for GMP certificate was January 2005. The Ayurvedic drug manufacturers of the state assembled at Bhubaneswar on 27th December'04 to form an association of their own so that this issue could be discussed immediately, because the apprehension was that out of more than 150 such manufacturing units only 8 to 10 would be able to meet the terms and conditions of this policy. GMP requires setting up certain facilities, etc. which in turn require considerable investment, and many units are not capable of that. The fear of many manufacturers is that this policy would suite big companies to dominate in the market as the small local units would not get license for selling their products due to want of GMP certificate. Still, by June'05 the number of GMP licensees were reportedly 22(source: State Drugs Inspector, Ayurveda). Non-compliers of the deadline have been given some more time in view of their limitations.

However, as observed elsewhere in the world, GMP license does not necessarily guarantee required standardisation of the medicine production in the Ayurvedic sector in the state. The reasons are many, like; sometimes the manufacturer can hardly afford ensuring quality raw material either because of the cost factor or because no other option is available. Chemical verification of the composition claimed is very difficult for the monitoring agencies as standards for the same are yet to be developed completely, hence the government has thought of another option whereby the manufacturers will be asked to give the method of verification of their product. Still, there are several loopholes in the whole system; and the highly competitive scenario seems to have rather facilitated the increase of malpractices or bad manufacturing practices because in several cases the manufacturers can not just afford a good manufacturing practice if it delays their production, consumes more money, and keeps the manufacturer lag behind other competitors.

- Conservation and propagation of med. plants:

Rauvolfia serpentina is probably the most noticeable medicinal plant of the state which has benefited from the promotion of commercial cultivation, because the stress on its collection from the wild seems to be reduced after cultivators successfully started supplying roots from their farms. Although several other wild species are yet to be benefited in a similar way, commercial cultivation of medicinal crops has given the farmers of the state, who were in a hopeless situation due to distress sale of their traditional crops like paddy, a new, attractive and respectful option for the utilisation of their fields.

- Thrust on livelihood improvement:

In 2004, UNDP officials held meetings with govt and non-govt agencies regarding the implementation of their project National Programme on Promoting Conservation of Medicinal Plants and Traditional Knowledge for Enhancing Health and Livelihood Security. SMPB was declared as the nodal agency for this project in Orissa. The way in which the discussion progressed and ended clearly revealed that implementation of the project itself was more

important than the actual objective as funds were to be disbursed within the stipulated time period.

The World Bank commissioned a study during 2003-04 by the Madurai-based NGO CCD so as to see if livelihood improvement would be possible through the utilisation of medicinal plants in some disadvantaged areas of the state like Bonai, Pal-lahra, Keonjhar. Findings of the study however suggested that community-based enterprises would not be viable on that basis in the present scenario.

A different approach

Sambandh is a non-government organisation working in the field of natural health care. It conducted survey in 8 villages under 3 panchayats of Cuttack district to understand the health problems of local poor. About 60% of the people in the survey villages were tribals, and the survey found anaemia, malaria, diarrhoea, jaundice, hyperacidity, and menstrual disorders as some of the major health problems in these villages. Then the organisation started training the locals on solving these problems with the help of medicinal plants, and helped them to have the necessary plant species in their home gardens. For instance, manjuati is for jaundice and gangashiuli is for malaria. A nursery was established in the premises of the local office of Sambandh, where several useful medicinal plant species are now available for sale basically for home gardens and local use (source: Dr.G.B.Sahu). Commercial cultivation has never been given a priority there, and self-reliance of the local poor is the prime focus of this scheme of medicinal plant propagation.

Sabuja Viplab followed a distinguished strategy to simultaneously save the social- and commercial interests. At Jharbandhli near Bolangir, the organisation opened a herbal health care hospital (with some of the modern facilities like pathology) where the patients, who often belong to the primary collectors' group, are required to pay in kind. A rate chart shows the cash value of different medicinal plant materials, and the patient has to deposit only the required quantity of his forest collection. This way, the primary collectors get benefited as they need not have to pay in cash; and at the same time, the organisation finds a way to sustain this effort (hospital) by selling the deposited forest products (source: S.K.Das).

Earlier, some vaidyas used to have their herbal gardens which was basically meant for their own use. However, some individuals/organisations are now establishing such gardens for the benefit of all. Sometimes medicinal plants are indirectly destroyed in an area by the destruction of their natural habitats through the processes of development, etc.; and herbal gardens create an asylum for many such species.

5.4.3 Factors responsible for neutralising the impact of globalisation:

- Out of the top 13 items of global demand (Table-1), Orissa has some potential only for the *Aloe spp.*, *Centella asiatica*, *Mentha piperita*, and garlic; but either the availability of these items is insufficient, or the quality is inadequate for export purpose. Further, most of these items are cultivated.

- Most of the valuable crude drugs of high demand are concentrated in the Himalayan and sub-Himalayan regions of north-eastern and north-western India where they are found in the wild. These include *Aconitum* spp., jatamansi, chirayita(not bhuineem), etc. . Some other items like senna and isobgul come from cultivation, from the southern and western parts of the country. Orissa has therefore almost no ranking in the list of the valuable and exportable herbs producing states. R.S roots produced in Orissa do have a good name in the national market, but their production is extremely limited and the commercial exploitation as well as export are banned. The govt has decided not to lease out any kind of wild roots or bark of medicinal importance, since March 2000. Hence, globalisation hardly has any scope to affect, through legal means, the herbal resources of the state unlike in some other parts of the country.
- Except for a few items like R.S. roots, crude drugs supplied from Orissa usually are not supposed to be of good quality particularly due to the bad harvesting practices and lack of adequate primary processing. bhuineem(kalmegh) is an example of this. The whole plant of this species is usually supplied from the state whereas purchasers give more importance to the leaves(which are the chief source of andrographoloid in the plant). The supplied material is either not dried properly or is partially devoid of its leaf content. Also, supply of the whole plant makes the material bulky. Stem-cuttings(with leaves) are more marketable, but the primary collectors seem least interested in this kind of processing even if they are paid a comparatively higher price for that.Hence, purchasers prefer bhuineem from other states. Some items are naturally of inferior quality due to agro-climatic factors. Hence, the state lags behind others like Chhattisgarh so far a qualitative as well as quantitative production/supply of herbs are concerned.
- The Orissa market is generally regarded by the outside purchasers to be extremely unorganised and unreliable.

5.4.5 Conclusion:

At the first glance, the global trend and globalisation seem to poise rather a constructive role in Orissa so far the medicinal plant resources are concerned because a state medicinal plants board is now working for the propagation and cultivation of valuable medicinal plants in the state, and more & more people are getting interested in the commercial cultivation of the species having good market demand. Further, in view of the growing threat of bio-piracy and extinction of some of the plant species, some attempts have been made to preserve the genetic material of some threatened/valuable species.

It is true that the population of some species have been severely affected due to over-exploitation for commercial purpose, but except in few cases that has hardly anything to do with globalisation as demand and price factors are either localised, or national, or limited to select foreign countries. For instance, the demand of Ashok bark is more at domestic level than at international level. Isolated cases where global factors²⁸ may be responsible, were not very prominent till

²⁸ Mere demand in one or two foreign countries should not imply to the global factors as the latter are more or less world-wide in their origin and capacity. If the global factors seem to be confined mostly to the western countries, then that is because of the standard of living, infrastructures available(for research, for ex.), as well as the policy of the government,etc. in those parts of the globe.

recently; but now the case of nagarmutha and bishakendu, etc. are gradually unfolding the impact of global factors.

The most unfortunate impact of the global trend is qualitative in the sense that now the priority is not conservation for local health care, but for greater utilisation of market opportunities. Hence, the popular trend is becoming to exploit, conserve, or propagate medicinal plants basically for market forces, not for self-reliance in health care. We cultivated paddy first for own consumption, and sold only the surplus; but now we want to cultivate safed musli first for others' consumption. Market forces procure our organic shikakai at a nominal price, and then we pay them a much higher rate for the shikakai-based shampoo which contains harmful chemicals. This way we fall prey to the corporate lust of market forces, and lose out strength while they grow financially.

Superficiality is probably the greatest contribution of globalisation. We use the opportunities of globalisation so as to progress materially and even psychologically, but the progress is a superficial one as it diverts us more and more from our own strength(both internal and external), and increases our dependency on market forces continuously. Medicinal plants were viewed in the Indian tradition as sensitive and sacred elements of nature, and commerce was never a priority in their utilisation till a century ago or so. However, the current trend teaches us to view them as purely material things, and treat like ordinary vegetables. This may end up in a situation where medicinal plants would behave mechanically, and their delicate and intricate relationship with the human body will be lost. Needless to say, in such cases their effect would be short-lived and limited. A time may come when they would no more be effective.

Organic cultivation is being promoted to avoid adverse impacts of artificial propagation of medicinal plants, but that is not enough. The stress should be on regaining our natural strength(mental and physical) and body-confidence. Otherwise, even dependency on medicinal plants may become like depending on artificial life support system.

Safed-musli

In Ayurveda, *Curculigo orchioides* has generally been identified as *musli*. Few years ago, an MP-based company popularised a species *Chlorophytum borivilianum* for its medicinal tubers, particularly as sexual-potency enhancer. These tubers are claimed to be capable of having an effect similar to that of viagra.

Chlorophytum borivilianum is the most preferred species for cultivation. Some other species of *Chlorophytum* are found in the hill forests of Orissa, like in the Gandhamardan area, etc.. However, the MP-based promoter and some other planting-material suppliers widely advertised that cultivation of this species would make the farmer a man of lakhs within a year or two. Although there is no authentic information in support of the claim that these tubers have been an essential ingredient in many traditional Ayurvedic formulations like chyavanprash, still an estimate was put forward that the demand in the country was 35000 tons as against a production of 5000 tons only, thus suggesting the high marketability of the product. This misled many people who did not understand the conspiracy of the planting-material suppliers, and started cultivating safed musli. Distress sale of paddy is one of the major factors which discouraged many cultivators to continue conventional farming and the advantage of this situation has been taken by the promoters of safed musli, etc.. Needless to say, many of them suffered loss either because the company which promised for buy-back, betrayed them or the market price was not that high as originally projected. At the same time, rampant collection of the wild species concerned the authorities as a result of which it was added to the priority list of plants recommended for cultivation, and this further added to the dilemma of the cultivators. It was estimated in 2000-01 that the total area under safed musli cultivation in the country was about 5000 hectares(Singh J.2001 quoted in the training material supplied by CIMAP in 2004).

In Orissa, several attempts have been made or are being made for the commercial cultivation of safed musli. Many entrepreneurs have taken interest in cultivation of medicinal plants because of this species only, and more than 80% of the area under cultivation of medicinal plants has been used for raising this crop in several cases. Safed musli is one of the best examples to show how market interests dominate over genuine local issues(like health care).

The market and demand for safed musli was actually created during the last two decades when some of its promoters successfully marketed these tubers as an aphrodisiac and tonic. In forests of Mayurbhanj and certain western districts, several species of *Chlorophytum* are available in the wild, and the local people of western Orissa better knew them for their nutritious leaves which they collected and ate during July after the sprouting of the plant during the rainy season. The leaves are known as *kanjer sag*. Traders from outside engaged the locals of Kalahandi district(Kalampur area of Thuamul-Rampur) for collection of these tubers as early as 1997-98 for supply to Gujrat(*per comm.* S.K. Das), and gradually the wild collection spread to other areas like Paikmal. It is supposed that about 1000 tons of the tuber are still exported annually, but often under the disguise of other species so as to avoid legal restrictions; and hence an official picture of the demand is difficult to get. New-age pharmacies have started using this item to add value to their production, and in Orissa about 200 kg can be sold annually to local pharmacies. SEMEGRA, a herbal competitor of VIAGRA, and produced by a medicine-man of Ganjam district, is also said to constitute safed musli(source:ONCC).

It has learnt that after the news spread about a research finding that satavari is much more effective than safed musli, traders started giving importance to the former as a result of which procurement of satavari from Orissa almost suddenly increased substantially, particularly from western Orissa.

Glossary

Agibathu	Premna corymbosa
Agnijad	Clausena excavata(?)
Alfalfa	Medicago sativa
Akarkara	Anacyclus pyrethrum
Amla	Phyllanthus emblica
Anantamul	Hemidesmus indicus
Ankaranti	Solanum virginianum
Antitussive	Relieving from cough
Araguna	Cycas circinalis
Arakh	Calostropis gigantea
Arjun	Terminalia arjuna
Ashok	Saraca asoca
Aswagandha	Withania somnifera
Atis	Aconitum ferox
Ayapan	Eupatorium triplinerve
Ayurveda	Traditional Hindu system of medicine
Bacha	Acorus calamus
Bada kaniara	Cascabela thevetia
Bahada	Terminalia bellirica
Baibidang	Emblia tsjeriam-cottam
Banahaldi	Curcuma aromatica
Banajuani	Apium graveolens
Bela/Bel	Aegle marmelos
Belladonna	Atropa acuminata
Bhrungaraj	Eclipta prostrata
Bhuiaonla	Phyllanthus fraternus
Bhuichampa	Kaempferia rotunda / Ochna obtusata
Bhuineem	Andrographis paniculata
Bhuin-kadamb	Sphaeranthus indicus
Bhumiamalaki	Phyllanthus fraternus
Bidang	Emblia ribes
Brahmanjhatia	Clerodendrum indicum
Brahmi	Bacopa monnieri(jalabrahmi)
Brahmi	Centella asiatica(thalkudi)
Bruhati	Solanum violaceum
Buddhadarak	Argyrea nervosa
Cambodge	resin obtained from Garcinia morella and some other species
Chhatiana	Alstonia scholaris
Chiraita	Swertia chirayita
Chitamul	Plumbago spp.
Chitaparu	Plumbago spp.
Cinchona	Cinchona officinalis
Danti	Baliospermum montanum
Daruharidra	Berberis aristata
Dayana	Occimum spp.

DFO	Divisional Forest Officer
Dhatuki	Woodfordia fruticosa
Dudura	Datura metel
Gajapippali	Scindapsus officinalis
Gambhari	Gmelina arborea
Gandhana	Premna latifolia
Gangashiuli	Nyctanthes arbor-tristis
Ganthiana	Cissus quadrangula
Genduli	Sterculina foetida
Ghrutakumari	Aloe barbadensis
Giloe	Tonospora cordifolia
Gokhara	Acanthospermum hispidum / Tribulus terrestris / Pedalium murex
Gudmari	Gymnema sylevstre
Guduchi	Tonospora cordifolia
Gugul	Commiphora mukul
Guluchi	Tonospora cordifolia
Haldi	Curcuma longa
Hansalata	Aristolochia india
Harida	Terminalia chebula
Henna	Cestrum nocturnum
Hyperplasia	overgrowth in body
ICMHHP	International Conference on Medicinal Herbs and Herbal Products:Livelihood Options
Indrajaba	Holarrhena pubescens
Ipecac	Cephaelis ipecacuanha
Jatamanshi	Nardostrachys jatamansi
Jeevanti	Desmotrichum fimbriatum / Trema orientalis
Jhuna	Sal resin
Jyotishmati	Cellastrus paniculata
Kalihari	Gloriosa superba
Kalmegh	Andrographis paniculata
Kantakari	Solanum virginianum
Keruan	Holarrhena pubescens
Kesar	Crocus sativus
Keu	Costus speciosus
Khandaphula	Gloriosa superba
Kochila	Strychnos nux-vomica
Koilekha	Hygrophila auriculata
Krushnaparni	Desmodium heterocarpon
Kutaj	Holarrhena pubescens
Kuth	Saussurea lappa
Kutki	Picrorhiza kurroa
Lodh	Symplocos racemosa
Lodha	Symplocos racemosa
Mahanimba	Melia azedarach
Makoy	Solanum nigrum
Manjuati	Lawsonia inermis
Mrutasanjeevani	Selaginella bryopteris
Mulethi	Glycyrrhiza glabra
Myrobalans	Harida, bahada, amla
NA	Not avilable

Nageswar	Mesua ferrea
Neem	Azadirachta indica
NGO	Non-govt organisation
Nilakantha kedara	Curcuma caesia
Nirmala	Strychnos potatorum
NTFP	Non-timber forest products
Odashamari	Argemone mexicana
OUAT	Orissa University of Agriculture and Technology
Palas	Butea spp.
Pana-aairi	Artemisia nilagirica
Pashanbhedi	Coleus amboinicus / Polycarpaea aurea
Patalgarud	Rauvolfia serpentina
Pateli	Barleria cristata
Patharchur	Coleus amboinicus
Pedipedica	Abutilon indicum
Pengu	Celastrus paniculata / Pavetta crassicaulis
Phanaphana	Oroxylon indicum
Pippali	Piper longum
Ramdatun	Smilax zeylanica
Rasna	Pluchea lanceolata
RS	Rauvolfia serpentina
Rudanti	Cressa cretica
Sahada	Streblus asper
Sal	Shorea robusta
Salaparni	Desmodium gangeticum
Sami	Prosopis cineraria
Saptaparni	Alstonia scholaris
Sarpagandha	Rauvolfia serpentina
Satavari	Asparagus racemosus
Satyanashi	Argemone mexicana
Senna	Cassia senna
Sikakai	Acacia sinuata
Simuli-kanta	Thorns of Bombax ceiba
Somraji	Centrantherus anthelminticum / Psoralea corylifolia
Sunamukhi	Cassia senna
Sweta-kaincha	Abrus precatorius(white-seeded)
Talamuli	Curculigo orchioides
Thalkudi	Centella asiatica
Tulsi	Ocimum spp.
Vaividang	Emblia tsjeriam-cottam
Vatsanabh	Aconitum ferox
Vishalyakarani	Tridax procumbens
Zeodvary/zedoary roots	Curcuma zedoaria

Annexure-1

Demand and growth rate of 32 prioritised medicinal plants of India

<u>Species</u>	<u>Demand in tonnes(2001-02)</u>	<u>Demand in tonnes(2004-05)</u>	<u>Annual growth rate(%)</u>
Amla	22729.5	41782.9	22.5
Ashok	7051.3	10724.2	15
Aswagandha	7028.7	9127.5	9.1
Atis	270.1	448.4	18.4
Bel	5381.2	7084.5	9.6
Bhumi amalaki	2212.6	2985.3	10.5
Brahmi	3822.5	6621.8	20.1
Chandan	635.2	1073.1	19.1
Chirata	965.2	1284.7	10
Daru haridra	1187.3	1829.4	15.5
Giloe	2258.3	2932.6	9.1
Gudmar	N.A.	N.A.	N.A.
Guggul	1505	2548.9	19.2
Isabgul	N.A.	N.A.	N.A.
Jatamansi	674.9	866.8	8.7
Kalihari	65.4	100.5	15.4
Kalmegh	2005	2197.3	3.1
Kesar	N.A.	N.A.	N.A.
Kokum	N.A.	N.A.	N.A.
Kuth	1411.1	1826.3	8.9
Kutki	220.3	317	12.9
Makoy	2077.9	2192.2	1.8
Mulethi	873.4	1359.8	15.9
Patharchur	37.8	60.8	17.2
Pippali	3992.5	6280.4	16.3
Safed musli	N.A.	N.A.	N.A.
Sarpagandha	423.6	588.7	11.6
Senna	6462.5	11677.3	21.8
Shatavari	10924.7	16658.5	15.1
Tulsi	3296.8	5402.9	17.9
Vatsanabh	322.3	3426.8	30
<u>Vaividang</u>	<u>N.A.</u>	<u>N.A.</u>	<u>N.A.</u>

(Source: National Medicinal Plant Board, Govt of India)

Annexure-2
District-wise status of the area (in acres) under (or proposed to be under) different medicinal crops under the financial assistance from SMPB, Orissa

District	Amla	Brahmi	Safed musli	Aswagandha	Patalgarud	Bacha	Satavari	Bhuineem	Aloe vera	Coleus	Pippali	Tulsi	Total
Angul		16	29	32.26		2		24		3			106.26
Balasore	27	1.5	20		5			2.5					56
Baragarh			14			3.5							17.5
Bolangir			21										21
Cuttack	16		47	5.8	1	5	2		6	27	6		115.8
Deogarh	3						3			4.25	7		13
Dhenkanal	10	5.5	3.25						25				48
Ganjam			10	4.3			3						17.3
Jagatsinghpur			3										14.5
Jajpur			4	0.5									4.5
Kandhamal	5	1		1				1		2			10
Kendrapara		1	1										4
Khurdha	7	10.1	49.07	24.2		2.44	1	10.5		9.04	2.5		124.05
Mayurbhanj			8	0.5	4.2		2						11
Nayagarh	2	1.8	10.1	9.8	0.5		3.8			6			33.5
Sambalpur	1.5		4			0.5						1	7
Sundargarh	3		3						31				6
Total	74.5	36.9	226.42	79.36	10.7	13.44	19.8	38	31	62.79	15.5	1	609.41

(Source: A.K.Patnaik, State Medicinal Plant Board, Orissa)