

A future vision for natural dyeing in India*[summary]*

The paper examines past and present practices of natural dyeing in India, as reference points for future interventions by catalyst agencies, State, international, and local. The crucial point is that the continued survival and well-being of the forest as a resource for natural dyeing is dependent on the close integration of local user communities with the forest.

The history of indigo, the most important of Indian natural dyes, illustrates how a traditional dyeing practice, once it enters the commercial domain, can be appropriated and eventually destroyed by powerful commercial interests who can command the monetary resources to develop and deploy science and technology for their purpose.

The paper finally examines the role of the State, past and present, and other governmental and non-governmental agencies, in their relation to natural dyeing practices, and suggests policy and methodology for future interventions.

A future vision for natural dyeing in India

How does nature produce colours? What is the chemistry of the plant, the soil, the water and the air that brings forth the reds of leaves before they fall, of scarlet and purple berries, the incandescent orange of persimmon, of the orange itself, and everywhere the myriad shades of green, no two alike? It's a mystery, but human beings' longing to capture the colours of nature in spun, woven and knotted textiles is as old as textile making itself. Colours on wool, still fresh today, are found in a carpet of the 5th century BC from the frozen tombs of Siberia, in the ancient silks of China, the brocades of Turkey and the famed cotton muslins and 'pintados' exported from centuries from India. The bounty of nature combined with the skill of the dyers produced from earliest times upto the mid nineteenth century, vast quantities of painted, printed and dyed textiles for use and trade. In India, it was the brilliant and permanent dyeing of the most difficult of all fibres to dye, cotton, which was the skill in which this country in ancient times was unrivalled.

Then came chemical colours, invented in Europe by the pioneers of chemical science William Perkins in England and Adolph Baeyer in Germany, and within a short time these chemical colours, though they were visually harsher, displaced everywhere the centuries-old traditions of natural dyeing. With the traditions went the treasury of knowledge and skill painstakingly accumulated through constant practice and incremental addition over generations from master to apprentice, father to son.

Now, after a break of over a century from the time when vegetable colours were the only way of dyeing textiles, the consequences of that break are becoming evident: the devastation of nature, and consequently the looming threat to life itself on the planet. Just as the preservation of dyeing skills over long centuries was a process, made up of the lived experience of the practitioners, their relationship to nature, their way of gaining and

storing knowledge, their reverence for certain things and their abhorrence of others, similarly its destruction in a short period over one century was another process, unleashed by a new science, chemistry, that analyzed and atomized the elements of naturally occurring dyes, to replace them through engineered laboratory processes. The juxtaposition of these two could serve as a metaphor for a choice between the processes of peace and non-violence on the one hand, and on the other of violence and war. We, who write and read such papers as this one, are the inheritors of both traditions: as passive objects of a colonizing culture and today in turn active collaborators in the colonization and destruction of our own rural areas, of our natural resources, and of our traditional occupations. Each process has different time scales: to establish a tradition of peace may take several lifetimes: to destroy it, only a matter of months.

The writing of this paper is an aid to a collective enquiry into the mysteries and processes of natural dyeing, particularly plant-based rather than mineral or animal dyestuffs, producing fast colours on textile fibres among artisanal communities on the Indian sub-continent*. For the same reason we exclude dyeing traditions of other places than the Indian sub-continent, and within that, we'll confine ourselves to dyes and processes to be used by professional dyers dyeing for the market, rather than the equally fascinating traditions of the fleeting colours used in ritual or festive dyeing which people do for their own use. There is enough to learn within these limits. The basics: which plant produces what colour? have been well-researched and documented, both in local oral traditions and in systematic experimentation by the colonial powers in a series of monographs produced around the end of the 19th century[see bibliography]. What concerns us more is how to contemporize processes, so that in today's circumstances brilliance, fastness and consistency can be achieved, with adequate returns to the dyers. Many of the traditional processes for achieving the brilliance and variety of colours that we see in museums have been lost through the disappearance of living traditions, others are irrelevant or unviable due to changed conditions of water usage or the disappearance of forests.

Natural dyeing using vegetable materials on textile fibres consists of first extracting the colouring matter from the dye material, and then creating a bond between the colouring matter and the fibre to be dyed. Textile fibres of animal origin, such as wool or silk take the colouring matter quite easily, cotton, on the other hand needs a complex series of pre-treatments before it absorbs any dye except indigo, with which it bonds naturally. The Indian genius in natural dyeing lay in their mastery of the pre-treatment of cotton, enabling the production of bright, fast, and washable fabrics which were a byword in ancient times: St Jerome, in the 4th century AD, is said to have remarked "Wisdom is as enduring as the dyes of India"

The most commonly used material in Indian dyeing is *harda*, the fruit and leaf galls of *Terminalia chebula*, known as Myrobalan. While the dried seed pods, which have a high tannin content, are used to pre-treat the yarn for the absorption of red dye, the leaf-galls produce yellow colouring matter. *Terminalia* is a common forest tree found throughout the forests of India. Like most other dye-producing plants, it is an important ingredient in indigenous medicine. Other forest plants commonly used for dyeing, either as colouring

agents or auxiliaries, are *Mallotus Philippinensis* and *Caesalpinia sappan*, both used in silk & wool dyeing, *Punica granatum*, *Acacia catechu*, *Rubia tinctoria* and *cordifolia*, *Woodfordia fruticosa* and *Onosma echioides*. [see Table of Dye-Bearing Plants] There are a host of other local plants that are in use in local practices. Others are, or used to be cultivated, such as *Morinda tinctoria* and indigo [*indigofera tinctoria*]

Extraction of colour is done usually by first powdering the dried vegetable dye-bearing matter, then heating or boiling it in water for a period ranging from 10 to 20 minutes. The yarn, fabric or fibre to be dyed is first well scoured to remove natural oils, then heated in the extract, at different temperatures depending on the dye material, usually for about 30-45 minutes, to create a lasting bond between the fibre and the colouring matter.

Our aim is to analyse past practice and existing knowledge as a base for the development of a natural dyeing practice appropriate to contemporary circumstances, that can be part of a larger national strategy for the reaffirmation of the primacy of Nature as our ultimate resource. In this paper we will explore some living natural dyeing traditions from different parts of the country, to examine in actual practice local knowledge of the plants, the water sources, the soil, climate, the specific techniques and relations of production developed in each place, and how they all intermeshed. Dyeing practices vary immeasurably from region to region. It is the art of combining local dye-yielding plants with locally available adjunctive materials, plants or minerals, for mordanting (a pre-dyeing process that makes the fibre receptive to dye), or colour-fastness, or brightening, in which Indian dyeing excelled in the past, and it is this regional specificity, rather than generalized principles, that should be re-established. Such regional specificity is, incidentally, also a cornerstone of biological and cultural diversity in general.

Ultimately our process must address the issues that Max Weber considers critical in the relation between economic activity & society: the interest conflicts of interest in decision-making, the use of resources on the basis of community good versus individual good, the rising need for income as part of the Market economy. How have these factors affected natural dyeing in specific locations? We will draw some tentative conclusions in this paper, leaving to the next stage the consideration of how attempts should be made to re-establish practices of natural dyeing on significant scales in the present and the future, and to link these to the revival and maintenance of biodiversity.

There was once a garden, full of the most beautiful flowers, scents, sights and sounds, running water, shady trees, and many natural and man-made contrivances to delight the heart. Birds, animals and humans enjoyed this garden and its delights. In this paradise lived a colony of peacocks, and they too both enjoyed and added to the beauties and joys of the garden, eating, dancing, and calling to each other with happiness. One day, the king who owned the garden, on a whim, ordered that one of the peacocks be entirely sewn up in a leather sack, with only a small channel through which a few grains of coarse meal should be fed, barely enough to keep the bird alive. This was done, and as time passed the peacock forgot the beauties of the garden, the calls of its mates, the scent of the flowers, the joy of dance and the taste of good and varied food. The dirty and constraining leather sack became its world. It forgot its own beauty and thought of itself

as a worthless and ugly fellow, capable of nothing but of swallowing the meagre grains of meal which were its only diet. What's more, it recreated in its constrained imagination the entire world in the image of the leather sack, and of all other creatures as similarly encumbered and constrained. In its dark and blinded world terror and despair loomed large.

Much of our development planning starts from inside the leather sack, recasting a world of peace, plenty and harmony in our blinkered imaginations into a world of terror and despair, and planning for 'survival' strategies for that dark existence. The more we do so, the more despair and terror we generate, the greater the impetus towards self-fulfilling prophecies of doom. Then destruction of nature, of human values evolved over millenia, of humanity itself, become consequences within the realm of possibility. But can we turn away from this hope-less despair, and build for ourselves a bright future? Is it possible to break out of the meshes of fear to visualize, delineate, articulate and share a different vision, one based on axioms of harmony, peace and delight? Have we the confidence to call the bluff of the doom-sayers?

The principles of natural dyeing as part of biodiversity and of cultural diversity, of peoples' lives and activities, are pathways to that harmonious future. Whatever may have been its contexts in the past, today the most important ingredients for the re-establishment of natural dyeing is are the ingenuity and confidence of the various practitioner communities, developed through linkages with sensitive and discerning markets, and the revival and protection of the biological resource base itself. The critical aspect in natural dyeing practice and its market linkages, is diversity: diversity of dyeing materials based on a diversity of plants in different ecosystems, locations, diversity of technique, diversity of colour palette, and this diversity must be reflected all through the marketing chain, all the way to the individual customer. After all, the present market-dominated mode of economic activity which is so damaging to our natural resource base has been around only for the last 150 years, whereas our experience in stable and sustainable economic activities meshed with nature dates back several millenia.

It is excellence that must be the aim of natural dyeing, excellence made up of consistency, brightness and durability of shade. Standards of consistency which should be aimed at, should not be confused with standardization which cannot be the basis of a sustainable relation with localized resource bases. Standardization in dyeing means producing the same colour in different and varying circumstances, which would be the death-knell of excellence in natural dyeing. Standardization is the handmaiden of mass production, which is the daughter of mercantilism, which signifies the subjugation of important aspects - of quality, of specialization, and of the interest of both consumer and producer - to suit the interest of 'business', of the merchant-trader. The consumer yearns for variety, the natural dyer thrives on specialization, but specialization which provides infinite variety is extinguished by standardization.

Natural dyes and the forest

" there is scarcely a forest in the whole of the Presidency of Madras which is not within the limits of some village, and there is not one in which, so far as the Board can ascertain, the State asserted any rights of propertyuntil very recently. All of them without exception, are subject to tribal or communal rights which have existed from time immemorial and which are as difficult to define and value as they are necessary to the rural population ... Here the forests are, and always have been, a common property"

[Board of Revenue, 1871, quoted in Guha, *Social Ecology*]

Dyeing one colour, with one plant, *Morinda tinctoria*, is the occupation of a whole community of weaver-dyers in the region of Kotpad in Orissa. The Panikka community living on the borders of Madhya Pradesh and Orissa provides traditional aal-dyed gamchas, waist-cloths and sarees to the different tribal communities of Bastar, Jagdalpur and of Orissa itself. The bark of the secondary roots of the tree is extracted by the Indrawati, forest dwellers, bought from them and sold to the local dyeing community by local dalit traders, a fine example of the co-operative chains of interactions between forest, harvesters, traders and users, that have through judicious usage been the beneficiaries as well as guardians of the local forests. "Women are the masters of the complicated dyeing process among the Panikka which takes 25 days to complete" says Jagada Rajappa, a senior natural dyeing consultant, in her field notes. "Cotton yarn is given the oil & dung treatment before being boiled several times with the extract... They say the tree cannot be cultivated, but must seed itself naturally". However, the Agricultural Ledger of 1895 refers to the extensive cultivation of aal in Central India, the district of Savner itself exporting 400,000 lbs (about 180,000 kg) a year upto 1890.

In Uttaranchal the mid-altitude (8-10,000 ft) Kumaon forests have or had splendid populations of walnut, writes E Theophilus (*personal communication*) "Forms a good part of the diet of boars and flying squirrels in autumn. Many of these grand trees have been killed due to extraction of the bark of the root, which is bought and sold out of the valley by traders. The local people don't really know what the end-use is". And there's the rub: the gap between local resource and its local knowledge and use, which allows for destructive commercial extraction. " Especially when extracted from the wild, from small or fragile populations..." laments Theophilus.

Bhotiya people in the same area used to use the local plant material to dye their woollen clothes for their own use, and for trade in Tibetan markets. "Bhotiyas...Jadhs, Khampas and Bora-Karkis...moved across the high passes between India and Tibet with their flocks of sheep and goats...The Indo Tibetan political crisis in 1956 however, saw the closure of the border... The loss of the Tibetan markets for their goods has further pushed them into poverty. ...their intimate knowledge of high altitude dye-yielding and medicinal plants..has almost vanished with the disappearance of the forests and the richly varied undergrowth" according to Indira Ramesh of the Himalayan Trust, Dehra Dun, which is trying to revive dyeng skills. Now, while the local people are "ruthlessly excluded" the Forest Department has awarded "contracts to agents to extract these for sale outside the region to industrial units and exporters." (*Indira Ramesh, personal*

communication) This is the origin of the packaged natural dyes promoted by the National Handloom Development Corporation.

Naturally occurring dye-bearing and auxillary plants in India are many, trees as well as creepers, shrubs and small herbs, and except some such as indigo, aal, pomegranate, most of them collected from the forest, rather than cultivated. To encourage and revive local natural dyeing practices, it may be more in keeping with contemporary circumstances to encourage cultivation of dye-bearing plants on wastelands. Many plants have multiple uses, of which dyeing is one.

Terminalia chebula is the backbone of Indian vegetable dyeing on cotton, as it is of herbal medicine. Its seed pods with their high tannin content, like the leaves of dhaura, *Woodfordia fruticosa*, produce the essential pre-treatment material without which cotton will not take some colours, particularly red. Its leaf galls produce yellow, of varying shades in different parts of the country, either by itself or mixed with pomegranate [*Punica granatum*]rind. *Acacia catechu* produces shades of brown, while the root bark of *Rubia tinctoria*, manjishta, a Himalayan creeper, is the favoured material for red dye. Jackfruit wood, plentiful in the South and in the northern foothills, gives a lovely bright yellow. Some plant materials such as annatto, *Bixa orellana*, seem to produce fast colours in one place, fleeting ones in others. *Hedyotis umbellatum*, known as chayaveru, was the plant that produced the legendary pinkish red of the kalamkaris of the Andhra coast, growing wild on the shell-rich soils. On silk and wool beautiful fast pinks and reds are obtained from *Caesalpinia sappan*, the native Indian brasilwood tree after which a country is named, while kapila, *Mallotus philippinensis* produces bright yellow, also on silk. Other dye-bearing trees such as aal, *Morinda tinctoria*, used to be grown on a large scale, particularly in the Marathwada area, but now are no longer cultivated, though still collected from the forest for the dyeing of by tribal people in Orissa.

In the world of today, where commercialization rules, cultivation rather than collection of dye-bearing plants should be encouraged, and a process of substitution of forest trees with cultivated plants initiated through localized research involving dyeing communities. Practices of cultivation, too, can benefit from reference to tradition, and enhance rather than compete with the forest, through increased intensity of cultivation, not the intensity backed with chemical agriculture, but by mimicking the natural intensity of the forest. Shiv Visvanathan [1997] quotes Edgar Anderson's description of a Guatemalan garden which was 'covered with such riotous growth, that it appeared planless...' " So successful in imitating nature are these gardens that often such native orchards have been mistaken for part of natural woodlands by European and American plant collectors" writes Visvanathan. Can such intensive cultivation be part of the common property resource of local communities, replacing the vanishing forests?

The indigo dyers of Ilkal

Phaniraj Konappa Guled's family has been dyeing and producing silk and cotton sarees in Ilkal, (near Bhagalpur in Karnataka) since 1875. In Ilkal families of dyers and weavers together produce the 'Ilkal saree', a deep blue-black indigo body with red borders and

pallav (end). It can be made in cotton or silk, though traditionally it was a combination of both, cotton warp with silk weft and borders. Before the advent of chemical colours, the cotton was indigo dyed, and the red border dyed with 'piste ka phul' (that's what the locals call it, is it really what it sounds like, pistachio flower?). Fourteen dips in the indigo vat were needed to produce the deep blue-black of the Chandrakali sari, the most famous of all the varieties. The Ilkal saree is still highly sought after even in its chemical incarnation, by all classes of wearers in Maharashtra, and the Guled's main customers are traders from that state, and from Gujarat.

The main occupation in the villages around Ilkal - Ameengarh, Sillibari, Dotihara, Kamathgi upto the 1970s was indigo dyeing and weaving, with perhaps 4-500 looms in each, and 5,000 in Ilkal town itself, making a total of 10,000, all weaving the Ilkal saree. In Guledgudd alone khand (a narrow-width brocade material used locally for cholis, the blouses worn with sarees) is woven along with the indigo vat dyeing which is still practiced using German 'indigo'. There were upto the 1970s some 3,000 looms weaving khand in Guledgudd, where the dyeing still goes on, according to Phaniraj... "The water of Hirehalla nala of Ilkal was what gave our indigo dyeing its sheen" says Phaniraj. Now the stream is dry. It has been dammed upstream at Balkundi, sometime in the early 70s. As in Kalahasti, the requirements of capital intensive industry have taken precedence over long-established peoples' industries. "The government's policies are all wrong" says Guled senior.

Natural indigo vat dyeing continued here till it was replaced in the 1970s by German 'indigo', though still using the vat process, and recently, in the 1990s the Guled family has have given up the vat process altogether, replacing it with naphthol dyes - the most toxic of chemical dyes, now banned in Germany. Today the famed and centuries old indigo dyeing of Ilkal is on the verge of extinction. The generation who practiced the craft every day, and so were familiar with all the aspects, how to get the best results, how to put the vat right if it goes wrong, that generation is now in its 70s & 80s. A very few vats are still working, but with German synthetic 'indigo' which matures in 2 days, rather than the natural vegetable indigo which takes 10.

On a visit to Ilkal what strikes one even today is the scale of dyeing, production and trade of the Ilkal saree - people are wearing it, making it, trading in it, it is significant in terms of spread, value of output and of trade, and of the numbers employed, but yet the whole activity has escaped the notice, interest and support of the State as an industry. The blurring of economic engagement into its social context is a characteristic of human economic activity that is harmonious with nature, fostering a unique combination of intense specialization with large scale. This seamless melt of industry with daily life, this protective camouflage, while ensuring the sustainability of the activity, makes that activity as a whole invisible to the gaze of the colonial administrator, or the scientific observer, so that elements of the process can be isolated, atomized, studied and appropriated, while the activity itself is denied recognition or support. Similarly the carefully cultivated native gardens of South America were invisible to the 'scientific' European observers of the period between the 16th & 19th centuries, who took the luxuriant growth to be part of the forest [*Visvanathan 1997*], and appropriated maize, the

bean, the potato, and many other food crops carefully nurtured over thousands of years by native cultivators[Nabhan 1989]. Today, in the modern version of the colonial state, the Principal Secretary, Industries of the Government of Andhra Pradesh can deny that handloom weaving, the largest occupation in the state after agriculture, with an estimated output of Rs 1,500 crores, is an industry.

The indigo story

The most important factor in the complex production system that is the Ilkal saree is indigo. Indigo is the most important of all dye-producing plants, with a dye content in the leaves far higher than any other known dye-yielding plant.

"It ought to be remembered that the whole of the merchandise which is exported from the Moghul kingdom, comes from four kinds of plants - that is to say, the shrub that produces the cotton from which a large quantity of cloth, coarse and fine, is made ...The second is the plant which produces indigo"

says Nicolas Manucci in the 17th century. The export fell in the 18th century because of competition from the colonial plantations of the West Indies, and picked up again when these switched to the more profitable coffee and sugar. In the 19th century indigo got a bad name through the East India Company's punitive taxation policies in Bengal, and their practice of advancing money to the British planters, who in turn forced the reluctant peasants to grow indigo instead of their own food crops, and to sell it to their factories at rates ruinous to the growers. These draconian practices resulted in the famous Blue mutiny, the revolt of the indigo-growing peasants supported by the Bengali middle class and a section of liberal opinion among the British.

In 1895 England imported over 40,000 tonnes of indigo from India. The cultivation and trade in indigo along with the weaving, dyeing and printing of cotton cloth, was one of the chief occupations as well as exports of India in antiquity until the 19th century. Dyeing of cotton with indigo was one of the many finely developed skills and large-scale industries that had made this country rich over a period of at least two thousand years.

Today, it is not economic to cultivate indigo and produce the dye. An acre yields on an average 10 kg per cutting, with 2 cuttings a year. A kilo of indigo cake costs Rs 600 per kg to grow and process, and sells in the market for Rs 850 per kg, and even at this price there is today no assured market, giving the farmer an inadequate and insecure return on his investment. The synthetic German 'indigo' is available in the market for Rs 650 per kg. Why has the Government never protected the indigo cultivators by charging the German indigo with duties and excise? How much 'indigo' is imported into the country? How are the makers allowed to call it 'indigo'? Indigo used to be one of our chief exports in antiquity. Why has the state neglected it completely in recent times? Perhaps because of its uneconomic returns the Tamil Nadu farmers have been adulterating their indigo with clay, so that that avid customer, Japan, has completely stopped its imports. In Andhra indigo is produced today by only one or two rich farmers in Cuddapah, who

grow it from for sentimental reasons: ("our forefathers grew it") rotate the cultivation with other crops, to benefit the soil from the nitrogen fixing properties of indigo.

Ten years ago we tried our hand at indigo production at the village of Tondamnadu near Kalahasti. The wife of the farmer from whom we leased the land and the tanks told us this story: Ten years before us, somebody tried to make indigo. At that time chemical fertilisers had newly reached the village, and some sacks of it were stored near the indigo extraction tanks. Three puppies ate some of the fertilizer and became violently ill. One wandered over to the vats where the indigo solution was being beaten, drank some of the indigo froth from the tank, and survived, the other two died.

Indigo dyeing will be the mainstay of natural dyeing if the natural dyeing industry is to be revived, the other colours taking secondary places, because indigo dye particularly on cotton can be produced with a lesser energy investment than any other colour. The reasons for this are that weight for weight there is more dye content in the plant by far than any other, and that in the dyeing process it is the only dye on cotton that does not need a mordant, and thirdly, that indigo dyeing is a cold process needing no fuel.

In order to re-introduce indigo dyeing on a significant scale, a series of short, medium and long-term measures will have to be devised, to reconnect the producers of indigo with vat dyers and indigo printers, and the dyers with weavers, to rebuild the country's skill base and capabilities in producing indigo dyed and patterned textiles, for domestic markets as well as for export. Research on which varieties, the arrecta or the sumatrana, are more suited to local conditions, were begun by the East India company, and these research directions will have to be continued and new ones initiated, to determine the indigo content of different varieties, and into the extraction processes to see if more dye can be extracted. In the present process only about 35% of the dye is extracted, the rest going waste. The Murugappa Chettiar Research Centre, Chennai, has made a tentative beginning in such research. Dastkar Andhra has obtained seeds of the famed Multan variety from Pakistan, and one from Thailand, as well as the *strobilanthes* variety used in both Assam and Japan, and is conducting trials with indigo growers in Andhra. Today, indigo is grown on about 1000 acres in the Gingi taluk of Tamil Nadu, though the area is falling because the practice of the Tamil Nadu growers of adding clay to the indigo cake to increase its weight has badly affected their market. The usual practice is for small farmers situated near the big trader/farmers to sell the crop in plant form, from which the dye is extracted on the larger farms. Currently there are 3-4 large indigo farmers, with an estimated output of 1000 kg each.

The main trade product of Cuddapah, in Andhra Pradesh, throughout most of the nineteenth century was indigo, and was valued for its purity. Today it is grown on only one farm, with a small output of about 3-400 kgs. Dastkar Andhra is involved in an attempt to encourage indigo production here by introducing potential indigo farmers to user communities.

Experiments in cultivation and extraction practices will have to be systematically undertaken to improve the yield, which is currently around 10 kg an acre, whereas

records of experiments in British times show that it is possible to increase the output considerably through improved extraction methods. Experiments will also have to be undertaken to explore indigo use directly from the leaf by weavers and dyers, bypassing the extraction and subsequent drying process suited to commercial marketing of indigo. Research into both directions needs to be taken up, firstly, to increase profit margins for commercial cultivation, and secondly to develop an extraction process suited to the small artisan that would be less energy intensive and therefore more suited to the subsistence mode.

How the East was won: the advent of Chemical dyes

The dye materials and dyeing techniques of India were the objects of intense curiosity of Western observers, as much as the markets were the targets of their mercantile interest. Dyeing was observed, recorded, copied, 'improved' and patented [Rawson 1901]. Dyeing properties of plants were studied in isolation, separated from their other beneficial properties, the action of the plant extract both on the host material and its contact with the human skin. Thus the action of harda, *Terminalia chebula*, in strengthening cotton and silk yarn, and the medicinal properties of indigo dye against skin diseases nowhere find a place in the substitution of these dyed by chemicals.#

From observation and imitation of Indian processes of natural dyeing the Europeans went onto analysis of each dye, into its chemical structures and to a search for substitutes that could be produced in laboratories and factories. And thus was born the chemical industry of Europe, an industry whose products eventually broke the close relation between nature and human dyeing activity.

The substitution of plant dyes by chemicals did not 'just happen'. It was part of a meticulous and sustained process over 70 years spanning most of the nineteenth century by European chemists, which was the foundation of the great chemical conglomerates of the 20th century: BASF, Hoechst in Germany, CIBA in Switzerland, and the aptly named Imperial Chemical Industries in Britain. The substitution began with the distillation of indigo with lime by Otto Unverdorben in 1826, then the discovery of a similar substance in coal tar by F F Runge in 1834 [Clark *et al* 1993]. It was J Fritzsche who named it 'aniline' from 'anil' by which the Portugese knew neel since around 1300[*ibid*]. But the great era of chemical dyeing is considered to have begun with the work of Perkin in 1856 with the treatment of aniline with potassium bichromate, which produced a colour which came to be known as mauve. The process was immediately patented and production begun in the following year. Alizarin was derived from anthracene by Perkin in 1869, and in the same year they produced 1 ton, followed by 40 and then 220 tons in the next 2 years. The price of natural madder, the vegetable source of red dye, fell dramatically [*ibid*].

Though Indigo was first synthesized by Adolph von Baeyer in 1880, it was not till 10 years later that it was produced from naphthalene, which was available in large enough quantities for commercial production. The accidental breaking of a laboratory thermometer in the mixture showed mercury to be an excellent catalyst, and using this

process Synthetic indigo began to be produced by Badische Anilin-und-Soda Fabrik [BASF] in 1897. It immediately affected the export of indigo from India into Europe, and within a few years this industry collapsed. 'By 1900 the amount produced was equivalent to that grown in a quarter of a million acres in India and the 19,000 tons exported from that country in 1897 fell to 8000 tons in 1901 and 1000 tons in 1914' [ibid]. This replacement of indigo by a synthetic substitute 'was the culmination of 30 years research, an expenditure by BASF alone of 900,000 pounds sterling, and the issue of 152 German patents by 1900' [ibid].

Here a process designated as 'science', was able to undermine an industry that was rooted in this country since time immemorial. There were efforts by British indigo planters to protect the natural indigo industry, but they were sporadic and ineffective, and naturally looked to the interest of the European planters rather than of the indigenous growers. By the middle of the 20th century the indigo industry practically died out in the country of its birth, with no action taken on its behalf by the State. Even the efforts of the colonial indigo growers were not continued by the State after independence. Why did not the government of independent India either sponsor a local synthetic industry or ban the import of synthetic indigo? Since independence there has been not a single government initiative in the field of indigo research, either to set up synthetic production - which may have incubated some indigenous industrialists - or to encourage the natural dye industry - which may have retained for us our established position as a world leader in the field. In contrast to the indifference of the Indian State, Mao Tse-tung banned the import of indigo into China to protect China's own local synthetic production.

Printing in Sind & Rajasthan

Dyes in Western India are closely linked to block printing. The fabric printing traditions of Kutch and Gujarat with plant dyes are now almost extinct, having changed over to chemical colours, while in Rajasthan dyeing with plant materials survives only in a few places. Bandhni, the tie-dyeing of fabric, which the Saurashtras jati of Madurai kept alive in its original vegetal form till the mid twentieth century is now done only with chemicals.

The famous ajrak dyeing of Sindh, a unique form in which both sides of the fabric are block-printed, is the only vestige of this once-flourishing craft, practiced both sides of the India-Pakistan border but with alizarin, a coal-tar based red dye, and German indigo in India, modern chemical dyes in Pakistan. The commonality is that in both, the material handled is lengths of woven fabric.

Some scholars maintain that all the textile colouring arts of India originated in Gujarat, and they may well be right..After all, the Saurashtras of Madurai took their distinctive red-dyeing technique form here all the way South in a migration spanning several centuries..The techniques of dyeing using mordants and resist (in which areas not to be dyed are blocked using a paste of mud or wax) were known here since "at least the second millenium B.C." [Gittinger 1982] and printed cotton textiles were the mainstay of India's exports both towards East and West from Roman times, when Pliny complained that India was draining Rome of her gold, to the eighteenth century.

Ajrak printing, graphically described by Noorjehan Bilgrami of Pakistan in her book "Sind jo Ajrak" is alive in Kutch and Barmer, using vegetable colours and mud resist. "Azrakh, dyed in blue, maroon and black is a very famous textile piece of this region," writes Latha Thumurru, a designer consultant to the NGO Kala Raksha, working in Kutch. "There are various other textiles of local origin like Umarwalo, thick fabric tied and dyed in black or blue used for a skirt by one of the local communities' womenfolk, Pado, again tied and dyed in maroon or blue used by women folk of another community of Kutch, and various others....Dhamadka and Bhuj are production centres of these textiles". [Latha Thumurru, personal communication]

The materials used for dyeing here are anar (*Punica granatum*), harda (*Terminalia chebula*), and dhaura (*Woodfordia fruticosa*), though alizarin (derived from coal tar) has replaced manjistha and German chemical 'indigo' its natural form. The same materials, resist and techniques are used by the Chippas, block printers, of Bagru, Sanganer and Kaladera in Rajasthan, and Bagh & Deesa in Madhya Pradesh. Originally made for local markets, the work of the Chippas has spread in popularity, first throughout the country and then for a substantial export trade.

At one stage twenty years ago in Rajasthan this flourishing industry was induced to switch to chemicals. In a short time the local water bodies became poisoned, cattle died and people, particularly children, fell sick. Now chemical printing has been banned by the State Government, and the hybrid 'vegetable dyeing' of the twentieth century, using the products of the early chemical industry of Europe combined with traditional processes is again in practice. For example, alizarin, the early chemical red derived from coal tar, that came from the German chemical industries, as well as 'German indigo' are in general use today in Rajasthani block printing. For a truly vegetal process to be revived here it would need new sources of dye materials, and some incentive such as higher returns for the producers.

Kaladera village, dt. District Jaipur, with 28 artisan communities alone ...has a history of handcrafting varied goods as far as any living memory in the village goes. "Tekeram who does his rounds of the villages around Jaipur and supplies natural dye stuffs to the Chippas reminisces of times when he as a little boy went with his father all the way to Kabul to sell textiles printed in Kaladera and on his way home brought natural dye stuffs from those parts" writes Arpana Bisht, a member of the People Tree Collective that promotes craft traditions, in *Kahani Kaladera Ki*. "Facing stiff competition from the new larger industries as anywhere else in the country what with the cheaper synthetic textiles, screen printed cottons of bhandej, traditional bootis, mirchi and other motifs ... it's a village that has shown great resilience and ingenuity in being able to adapt to it's changing environment. More often than not people are still involved in their traditional occupations without much complaints. Stories abound of people who had left their traditional occupations for something else in times of crisis A Chippa son learning tailoring in distant Ahmedabad, ...a block printer who tried his hand at screenprinting, another blockprinter who worked in a blockprinting unit in Jaipur, return to their fold for some obvious and some not so obvious reasons. They range from a turnaround for good

in their own occupations to a need for 'home' and a non-harsh and a more humane working environment that may pay a trifle less at times but be far more amenable. Through outlets such as People Tree, a small marketing collective with shops in Delhi and Goa, home-based producers are able to find local and export markets”.

"Issar who is a blockprinter narrates how he tried his hand in Bagru at screenprinting but found it to be a very laborious activity with not much skill required and figured it paid as much as blockprinting.....and now with him being able to get a lot more work he is making much more. Shriram who was working in a printing unit in Jaipur says the living costs in the city are much higher and travelling up and down too exhausting and cutting into his time. He returned to his village and works for a printer from his community next door. Underlying all the stories is the recognition and an understanding that working staying at home is the best.....the joy of being with your own family through thick and thin, an 'apna samaaj' (one's own society) to share the joys, sorrows, fears and dreams, intact societal links and most of all being in control of your own working life ...the freedom to work or not on any given day or time of the day....Peppered with this are the necessary visits to home for lunch, chai or a relative's call, a round of bidi, an impromptu chatting session, marriages to go to, death or birth ceremonies to attend and all that falls in between." (*Arpana Bisht, op.cit.*)

Kalamkari in Machilipatnam & Kalahasti

In Kalahasti, near Tirupati in Andhra Pradesh, the traditional craft of kalamkari today gives employment to about 50 families, perhaps more than there ever were. Elaborate story panels and mythological figures are hand-drawn and painted with vegetable colours and mineral mordants in an elaborate process involving 23 different stages, every alternate one of which involves washing in the running water of the Swarnamukhi, the local river. The water of the local rivers, is suited to the dyeing process. Several thousand people are employed in the block printing industry of Machilipatnam, while about 50 families practice Kalamkari painting in Kalahasti, Both the block printing of Machilipatnam and the handpainting of Kalahasti begin with the treatment of the cloth with myrobalan. In the block printing process, the design is at this stage printed on with wooden blocks using for the black outline a fermented solution of jaggery and iron, which in the hand painting is applied with a bamboo pen. The tannin in the myrobalan with which the cloth is treated develops the solution to produce an intense black. It's like magic, watching the grey lines turning black on the treated cloth. When washed in flowing water these lines set into permanence. But it must be flowing water. Still water will cause the lines to smudge.

But now there are two dams on the Swarnamukhi, and the artisans must travel 20 miles to reach the outflow from a lake. Even then the quality of the water is not as good as their river's. Natural dyeing could be a major industry here. The eastern coast of Andhra is particularly well endowed for natural dyeing. The shell-rich sandy soil of the coastal plain and the forests of the nearby Eastern ghats are suited to the growing of Chayaveru, the legendary plant producing the famous pinkish red of Machilipatnam, which grew here

in profusion. For this to happen here as in Ilkal, the rights of local dyers and Kalamkari communities to water resources has to be established.

With the exception of Machilipatnam and Kalahasti, the dyeing traditions of South India are centred on the colouring of cotton yarn. Paradoxically while the former have survived due to the patronage and export trade, the skills of yarn dyeing, connected to a subsistence economy and local demand, have declined. But it was the subsistence economy that provided the stable base on which the export trade was grafted. Now the re-establishment process must begin with export and patronage, but always with the long-term aim to root the processes back in the subsistence economy.

The Srikalahasti Kalakarula Kalamkari Sangam in Kalahasti, Chittoor district, Andhra Pradesh, is an attempt by a handful of kalamkari artists to make a living from the craft. The sangam is known for the good quality of its work, and its insistence on pure vegetal dyes, avoiding the synthetic blue that most of the other artists use.

The NGO revival

In the last thirty years, NGOs have played a major part in the revival of natural dyeing practices in India. The key figure in this process has been that of the late K. V. Chandramouli, acknowledged as the Bhismapitamah of modern natural dyeing, from whom most of the practicing NGOs have learnt their techniques, both of natural dyeing and of training. Chandramouli was a trained chemist recruited by Kamala Devi Chattopadhyay and converted by her to furthering the artisan cause. Chandramouli in his long career, first as a Government employee and later after he retired, learnt the arts of natural dyeing from local practitioners all over the country. He came from a family of scholars, and was able to back up his practical experience with extensive archival research. He was sent by the Government of India to teach natural dyeing in Bangla Ddesh, and was a consultant to several state governments in India. Chandramouli's main contribution was to set up a teaching methodology by which knowledge could be successfully transmitted to artisans in a way in which they could build on and innovate on their own. Thanks to him, Aranya of Bangla Ddesh, Aditi of Bihar, Andretta in Kulu, Dastkar Andhra and other agencies have been able to root natural dyeing back in local artisan communities, through a process which continues today after his death.

NGOs generally support the practitioner communities through several years of market development and market support, usually through regular exhibitions in urban centres. What comes next? We have yet to see what happens after the NGOs withdraw. Will natural dyeing activity be able to sustain itself without them? If natural dyeing processes are to be strongly rooted in community life, the NGO must be able to write itself out of the script.

There are great advantages and also severe limitations to NGO work in natural dyeing. Though today small NGOs in the sub-continent are filling a need as catalysts in the process of revival and revitalization, a role that Government, international agencies or

commercial organizations are unsuited to fill, they cannot take the revival process beyond the preservation of technique. NGO initiatives tend to link the natural dyed products directly to urban and export markets, which tend to be capricious and demanding, beyond the capabilities of rural producers to handle without organic trading connections. By 'organic' trading connections, I mean links that enable the producers to negotiate without loss of identity and self-respect. Tekeram of Kaladera, speaking of visits to Kabul with his father to sell printed textiles and buy dye materials, could retain and re-inforce his own village identity while dealing with a foreign market environment.

In contrast, the dominance today of 'the market' overwhelms village-based producers with feelings of inadequacy and ignorance. Ultimately, producer links to larger commercial processes must grow out of their own secure base as part of larger communities with strong connections to their own local environment, and to trading to provide linkages for village production processes, including those of natural dyeing.

There is no doubt that there are important and intermeshing roles to be played by the State, international agencies, and by NGOs. Systematic research needs to be carried out, such as that being undertaken by Ann Shankar of Punjab Durrie Weavers in a UN supported project. "We have so far found references to around 450 Indian dye-yielding plants", she writes. "So far we have collected 354 specimens from 210 different plants. Testing is currently in progress and we have full results for over 100 of the plant powders". Ann Shankar is making the information available through a web page. This is an example of how international agencies can play an important role for the support and nurture of emerging community initiatives, making sure that information eventually ends up in the hands of the producers. At the same time, it is important that the laboratory research is linked with field practice at an early stage, to avoid appropriation of what should be community knowledge by commercial interests. It is also critical to sort out issues of intellectual property rights, in particular to ensure that the traditional and indigenous knowledge that dyers/weavers have, is respected and protected, and its commercialisation by others is done only with the consent of these people and with appropriate sharing of benefits.

Conclusion: Future prospects of natural dyeing in India

Natural circumstances have made this country particularly suited to the practice of natural dyeing. Human agency in the recent past has not been so beneficial, with the stoppage of flowing waters, the destruction of plant life and worst of all, the poisoning of soil and water by chemical poisons. Whole populations of artisanal practitioners in interlinked occupations related to dyeing have been uprooted and their carefully nurtured knowledge lost. To us this destructive process looms large, as destruction stands out in stark and violent contrast to peaceful constructive processes that continue unnoticed. A study over a long period, as advocated by the French social historian Fernand Braudel will give a more hopeful picture. "But the Sun has continued to give forth to India its vast vivifying rays, the Heavens to pour down upon the vast surface its tropical rains ..." as F C Brown, a cotton planter of the nineteenth century says. As long as we can depend on these cosmic

forces, all is not lost. It remains for us to understand our own roles in both constructive and destructive trends.

Natural dyeing is a double-edged sword. Linked to its local users it can be a powerful tool to regenerate local flora. But if it is separated from user communities through commercial intermediaries it can be an equally powerful force in the depredation of the resource base. Society's management of the natural forest deals with competing claims by the different occupations that use and protect the local soil, water, and plant growth. This relation between nature and society must be mediated not by a powerful state claiming to act in the name of an abstract entity called 'the people' but by the self-regulatory mechanisms of local self-governance.

Looking into dyeing traditions from this viewpoint, a vital feature that was unnoticed or ignored by the colonial researchers dominates the landscape: What were the mechanisms by which the knowledge and skill of the dyer was acquired, accumulated, stored and transmitted? This leads us to the question: what is to be the context of the skills today? In earlier times, ritual and custom played a large part, dictating which communities should wear which colours, on which occasions. Particular jatis were associated with particular plants and processes, such as indigo and indigo dyeing, or aal . Today, can economic returns be enough of an incentive for revival? Or must dyeing process be part of a new set of relations that evolve in contemporary circumstances, where some aspects such as the climate remain relatively unchanged, while other natural resources such as rivers and forests become extinct or inaccessible? In our opinion, economic activities should be embedded in society and in their local natural resource base, and even the process of re-rooting natural dyeing should itself be based on these fundamental principles. In this way the contemporization of a traditional practice in will help to reverse the current trend towards destructive exploitation of human and natural resources

Natural dyeing is a practice of society in tune with nature. Just as the intensively cultivated traditional gardens of the native South Americans so closely approximated nature that they were thought by Europeans to be part of the forest, so the traditional production systems of natural dyeing are so deeply embedded in their social structure as to have escaped modern scientific examination, so much so that today natural dyeing, like other artisan practices in this country, does not even have the status of an industry. And just as a seed loses its viability if it is not continuously renewed, so information, the knowledge of technique and familiarity with material is lost if it is not used in practice. Natural dyeing has to be part of a gamut of environmentally sensible economic activities, that would integrate the lives and activities of agricultural producers, pastoralists, and others dependent on natural resources, in a web of mutually supportive rather than competitive professions. Sustainable linkages must evolve between the dye-materials, their cultivation or collection, and their use. Trade linkages must evolve that promote transparency and by-pass the local market-distant markets dichotomy. Research institutions must evolve that include the field in the research process.

New relations must be developed between the regeneration and use of natural resources. It is of no use to pine for a golden and romantic past, the commercial age is here and must be dealt with in a way that can benefit and not destroy livelihoods, people, and nature. There are clear directions to be followed for the State, agencies of the state, academics, NGOs, Peoples' movements, and practitioner communities, in a future course for natural dyeing. There are also areas in which the direction is not so clear, where the interests of different local occupations are in conflict. Apparent conflicts in rights between forest or field, pastoral or agrarian, and between both and artisanal or tribal, must be resolved on the basis of the good of society rather than of individual benefit. The answers must be local and varied, and evolved in consultation with all the people involved. The National Biodiversity Action Plan could be the starting point for a series of such collective reflections.

The diversity inherent in nature, which allows for a vast number of combinations and permutations of the mineral content of local soils and local water with dye-bearing and adjunctive plants, is the critical factor in the establishment and sustainability of natural dyeing practices with strong local and regional identities. One plant may be useful in one region, and not in another. For example, the dye obtained from *Bixa orellana* when used in South India, produces only a fleeting colour, but in Rajasthan the colour is fast to light and washing. There are examples of plants producing different colours in different places.

*These limits, excluding animal and mineral dyestuffs and fibres other than silk, wool, and cotton, are to give us the space to explore the subject in some depth, not because mineral dyeing and painting or fibres such as grass, jute, sisal, or the colouring of leather, or painting on wood or paper or mural painting are less important.

#It was not only in the East that the whole effect of the plant was studied, the writings of the ancient Greeks, Galen and Dioscorides, recognized and passed on the knowledge of medicinal qualities of dyeing plants, particularly indigo, via Arab treatises, reaching medieval Europe in the 'herbals' of Culpeper and others [Balfour-Paul].

Dastkar Andhra & Natural Dyeing

As a non-profit trust concerned with the promotion of artisanal skills and the artisanal mode of production, Dastkar Andhra has been associated with natural dyeing since 1990.

Under the technical guidance of the late great Shri K V Chandramouli, the acknowledged master and world renowned expert in the field, Dastkar Andhra's programme has been specifically formulated to remake the connections between artisan producers, their natural resources, and market demands.

The different components of DA's natural dyeing programme are:

1. *Training of artisan groups in production dyeing.* This is carried out through serial training workshops at artisans' own locations [workshops include Pasalapudi, East Godavari district, weaver groups in Orissa & Karnataka, NGOs in Tamil Nadu, Berozgar Mahila Samithi, Bhagalpur, Bihar, 5 Central Asian countries, Kyrgyztan]. Sponsors for recent workshops

include AP Council of Science & Technology, National Handloom Development Council, UNDP, Tashkent, Guntur Zilla Khadi Sanstha, District Rural Development Agencies, Andhra Pradesh.

2. Experimentation on materials, processes, and specific variables to suit specific locations. This is a continuous programme at DA's Natural Dyeing Centre, Hyderabad [recent research includes oiling processes, different materials for red, over dyeing variety of dye materials with indigo, dyeing of jute, sisal, tassal]
3. Training of resource persons. Carried out through periodic workshops held in Hyderabad or by request in other locations. Intensive training for 2-3 weeks is undertaken in Hyderabad.
4. Archival research, documentation, information exchange. DA has collaborated in publishing natural dyeing instruction booklets in local languages. Library research, seminars of practitioners and resource persons are regular activities.
5. Research into dye material collection & propagation. Linkages are being established between forest collectors in Kerala and Orissa, and indigo growers in Andhra Pradesh with artisan users in different parts of the country.
6. Market research and marketing of natural dyed fabrics. Regular marketing of natural dyed cotton handloomed fabrics to the current value of approximately 16 lakhs per year from production centres in Srikakulam, Adilabad, Nalgonda and East Godavari.
7. Setting up of traditional dyeing vats, Chinnur, Adilabad & Uravakonda, Anatapur. The first continuous fermentation vat of recent times was set up by DA in April 1999 and is in regular production since then. Cotton yarn is dyed in the vat and woven by the Chinnur Cheynetha Sangam. The traditional vat of Uravakonda, defunct since 1987, has been re-established in 2001.

Dastkar Andhra has taken up the responsibility for the establishment of an institutional framework for artisanal natural dyeing through building up of networks, linkages and resource centres, and through the dissemination and sharing of information through regular artisan meetings and seminars. Channels are developed for exchange of market information leading to market linkages with buyers both within the country and abroad.

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Tips for NBSAP partners on integrating natural dye & dyeing issues into local/state plans:

Policy regarding natural dyeing should be formulated in collaboration with natural dyeing practitioners, dye material collectors, and cultivators, if any exist.

Policy should recognize the inalienable right of local producer communities to local dye-bearing plant resources, in preference over commercial trade interests.

Natural dyeing by producer communities should be recognized as an industrial practice, with concomitant rights to raw material and water resources.

Methodology for encouragement of natural dyeing practices:

1. Contact dyer communities who used to use natural dyes, may have given it up now, other communities who were minor forest produce collectors, and who used to supply dyers, either directly or through intermediaries, document their experience.
2. Document traditional practices, technologies & linkages between users, suppliers, markets, etc., for the record and as a basis for revival. It is best to begin with learning about earlier local practices, before planning interventions of technology upgradation, etc. Often energy extensive technologies are more sustainable than intensive ones.
3. Encourage cultivation of dye-bearing plants on local wastelands.
4. Before attempting revival of traditional practices or setting up new practices, ensure both market for finished product, as well as access to dye-producing plants.
5. Re-establish links between growers/collectors, users and customers

Viability of contemporary practice depends on several factors:

- training new practitioners to a level of skill where fastness and brightness is routinely achieved: this takes time and continuous practice
- regular contacts with resource people either traditional local natural dyers, or resource agencies, until practitioners are able to work independently
- backward forward linkages, to resource base[dye materials, water, fuel] and markets. New sources of dye materials, water & fuel may have to be found, suited to contemporary circumstances.
- linkages between cluster of local practices, e.g., dye material collection, dyeing, weaving, other craft production.

Paper prepared for NBSAP by:

Uzramma
Dastkar Andhra, 95 Park Lane, Secunderabad 500 003

Biographical note:

Uzramma is a grandmother of two who started Dastkar Andhra originally as a branch of the national organization Dastkar. DA is a non-profit research & consultancy for the household cotton textile industry of Andhra Pradesh, and has been involved with natural dyeing for the last 12 years. Beginning in 1990 under the tutelage of the late Shri KV Chandramouli the DA team with their consultant Smt Jagada Rajappa initiated a series of training programmes through which artisan groups and resource persons from different parts of India and from 5 Central Asian countries have been trained in natural dyeing processes. [see box, Dastkar Andhra & Natural dyeing]

Uzramma is currently the Managing Trustee of Dastkar Andhra, and lives in Hyderabad, India.

LIST OF PEOPLE/ORGANIZATIONS INVOLVED IN NATURAL DYEING

1. Sri A. Krishnamurthy
Dye House
142,Priyadarshini Nagar
Nainar Mandapam
Palai Veethi
Pondicherry-605 101, Tamilnadu
Tel: 0413-82041

2. Sunny-Mita
4A-Pocket C
Siddarth Extension
New Delhi-14
Tel: 011-6844360
Email: anandolan@bigfoot.com

3. WIDA(Shashi Prabha)
Semiliguda,Koraput District-764036
Orissa
Tel: 06853-20396

4. Adithi
2/30,State Bank Collony
Bailey Road,Patna -800014,Bihar
Tel: 0612-284832
Telefax: 0612-283018

5. K. Rajan
HLWDS,Kuzhivilakathu
Thumpodu,Balarampuram
Trivandrum-695501,Kerala
Tel: 0471-401438
Fax: 0471-401438
Email: hlwds@md5.vsnl.net.in

5. Mohana Ayyangar
207,Janaki Jivan
Lady Jehangir Road
Matunga,Mumbai-400019

6. Sewa Aabodana
1474/77 , Tokarsanipol
Near Gaekwad Haveli
Raikhad,Ahmedabad,Gujarat
7. Indo Dutch Project Management Society(S.Sadanand)
440,6th Cross,7th Block,Jayanagar West,
Ban galore-560082,Karnataka
Tel:080-6763111,6763231(Res):080-5533757
Email: idpms@vsnl
8. Hema Kannan
Au-PPSt Centre, Behind Girls Hostel
Anna University,Chennai-600025,Tamilnadu
Tel: 044-2301896,(res): 044-2452817
Email: ppstau@yahoo.com
9. Urmul Marusthali Bunker Vikas Samiti
Adarsh Nagar,Sector-4
Phalodi,Jodhpur-3423,Rajasthan
Tel: 02925-2272
10. Dastkar Kutch Project
205/Vrindavan Apartment
Kalyaneshwar wadi
Bhuj-370001, Kutch,Gujarat
11. Dara
Imagination,Auroshilpam
Auroville-605101,Tamilnadu
Tel: 0413-622002,622621
Email: dara@auroville.org.in
12. M/s.Phaniraj Konnappaguled
3809,New Kothwalpet
Ilkal-587125,Karnataka
Tel: 08351-40264
13. Bharathan
Gandhigram Khadi and VIPC Trust
Gandhigram-624302,Tamilnadu
Tel: 0451-452326
14. Shri S.H Ansari
National Handlooms development Corp.Ltd
10th and 11th Floor,Vikas Deep
22,Station Road
Lucknow,Uttar Pradesh
Tel: 0522-212096,214324,242209
15. Sri Gopala Krishna (Indigo Merchant)

K.S Udayar and Sons
Kongarapattu Post
Gingee Taluk,U.R(Dist)-604306, Tamilnadu
Tel: 044-6216664,6204468

16. Sri Prahalad Meher
At/Po,Sonepur Raj(Near SBI)
Dist.Subarnapur-767017, Orissa
Tel: 06654-20047

17. Sri Ravi
M.K.M International (Indigo Merchant)
65,Car Street
Madhurantakam-603306
Chengai.M.G.R (Dt.),Tamilnadu
Tel: 04115-52602

18. Sri M.Tamil Arasan
No.14,1st Street ,Jayapuram
Tindivanam-604002
U.R District,Tamilnadu
Tel: 04147-24912

19. Amruta Kesari Depot
364,Avenue Road
Near Kaja Market
Bangalore-2,Karnataka
Tel: 080-664812, 2236336

20. T. Mehboob Peera(Indigo Merchant)
N.No. 23/353
Islamapuram Street,
Proddottur,Anadhra Pradesh

21.Sri Janardhan Rao
C/o Arthic
52,Jagdish Nagar,1135-341
Raseelpura,Secunderabad-500003,Andhra Pradesh
Tel: 040-7811580

22. Sandur Kushala Kala Kendra
Sandur-583119,Bellary District,Karnataka)
Tel: 08395-60208
Fax: 08395-61221
Email: sandurkushalakala@rediffmail.com

23. Mrs.VictoriaVijaya Kumar
Tata Tea Ltd.
Aranya Vegetable Dyeing Unit
Srishti Nullatanni Estate
Munnar,Kerala-685612
Tel(off): 0486-530561-530566,(res): 0486-530557

Fax: 04865-30333
Email : visam@vsnl.com

24. RAGUNATH P.Nama
Chippon ka Mohalla
Village Kaladera
District Jaipur,Rajasthan-303801

25. Ms.Indira Ramesh[the Himalayan Trust]
155,4th Main road
Mallechwaram
Bangalore-560003
Tel: 080-3310
Email: clramesh@bgl.vsnl.net.in

26.Prakash Bhai
Parkarvas,Sumrasar,Sheikh Ta Bhuj
Kutch-370001,Gujarat
Tel: 028932-77238,5367

27. Khatri Mohammadbhai Siddikbhai
Dhamadka-370020
Kutch,Gujarat
Tel: 02836-87233

28. Abdulhamid Hussein Khatri
Umar Hussein Khatri
Bhuj,Kutch,Gujarat
Email: liya@vsnl.com
Website: www.rajasthanonline.net/liya

29. M.Yesudas
Bethany Colony,Leprosy Ashram, Bapatla-522101
Guntur District,Andhra Pradesh
Tel: 086432-4760

30.Shri Niranjana
Berozgar Vikas Mahila Kalyan Sanstha
MIG-59,Housing Board
Barasi,Bhagalpur,Bihar-812002
Tel: 0641-428775

31.Ms.Jagada Rajappa
12-2-827/13,Kanthi Nagar Colony
Mehdipatnam ,Hyderabad-28,Andhra Pradesh
Tel: 040-3513871
Email: jagadar@yahoo.com

32. Ms.Padmini Tolat Balram
D-5,Jaymin Apartments
Chandranagar,Paldi
Ahmedabad-380007,Gujarat

Tel: 079-6611468,6620677
Email: pannutolat@yahoo.com

33. Ms.Ruby Ghaznavi
2Managing Director,AranyaCrafts Limited
24,Rd16 Dhanmondi,Dhaka, Bangladesh
Tel: 00880-2-816914
Fax: 00880-2-883174
Email: aranya@citechco.net

34. Shri S.K Sinha, Director,Khadi Processing,
Khadi and Village Industries Commission
Gamodaya 3 Irla Road,Vile Parle(West)
Mumbai-400056

35.Yousaf Bhai and Sultan Bhai
Tajpur Panchpipli,Jamalpet
Ahmedabad-380001,Gujarat
Fax: 079-5321994
Email: yusanatural@hotmail.com

36.Reaching the Unreached(Mr.Mohanraj)
G.Kallupatti
Genguvarupatti(Post)
Periyakulam(Tk),Dt.Theni
Madurai-625203,Tamilnadu
Tel: 04546-36230

37. Share
33.A Mettupalayam
T.B sanatorium
Vellore-632011,Tamil Nadu

38. Mr.Manoharan
Shanthi Malai Trust
Shiva Nagar
P.B No.7
Sri ramanashram (Post)
Thiruvannamalai-606603,Kerala

39. Suraj Narayan Titanawala
Adarsh NagarBehind U.C.O Bank,
Bagru-303007,Rajasthan

40. Dastkar Ranthambore Project
Dastkari Kendra,
At&Post.Sherpur Khichipur
Opp. Village Kutalpur Malliyan
Dt. Sawai Madhopur,Rajasthan

41. SEVA (Sustainable-agriculture & Environmental Voluntary Action)
45,TPM Nagar,Viratipathu

Madurai -625016,Tamilnadu
Tel: 0452-780082
Fax(pp): 0452-604765
Email: numvali@vsnl.com

42. Koteswara Rao/Mukuteshwara Rao
Machilipatnam Vegetable Kalamkari Art Production Centre
The Kalamkari Craft
Pollavaram-521162,Andhra Pradesh
Tel: 08672-43243(off),43252(res)
Fax: 08672-4333558)

43. Mr.Brijwallab
Shilpi Handicraft
Near Seleberi, Sanganer
Jaipur-303902,Rajasthan

44. Badshah Miyan Ahmad
Alam House
A119,Sanjay Nagar
(Last shop opp. rest No.17)
Bhatta Basti,Shashtri Nagar
Jaipur-302016,Rajasthan
Tel: 0141-303845
Fax: 0141-303615
Email: alam@datainfosys.net

45. Anokhi Registhan Pvt.Ltd
2,Tilak Marg, C-Scheme
Jaipur-302005,Rajasthan
Tel: 0141-750860,750861,862863
Fax: 0141-750864
Email: anokhi@bigfoot.com

46. Juli Cariappa
Birwal P.O
H.D Kote Taluk-571,Karnataka
Phone: 0821-511144
Fax: 0821-411805
Email: cwhabp@sancharnet.in
cwhabp@yahoo.com.in

47. Crafts Council Of Assam
1/1,Penn Road
Alipore,Calcutta-27

48. Jenny Balfour Paul
Email: J.A.Balfour-Paul@exeter.ac.uk

49. Patricia Cheesman Naemma
138/8, Sri changkhian,
Huaykaeow Road

T Changpeuak, Chiang Mai,
Thailand-50300
Ph:- 053-226042
Fax:- 053-217707
E-mail:- patstudi@loxinfo.co.th

50. Noorjahan Bilgrami
36/1,Khayaban-e-Hafiz
Defence Housing Society
Karachi,Pakistan
Email: zayd@khi.compol.com

51. Masuma Lotia
38-B, Lalazar Drive
M.Tamizudin Khan Road
Karachi-74000
Pakistan
Tel: 0092-21-256 4607/561 0232
Email: sfl@cyber.net.pk

52. Mini and Mary Singh
Andretta Pottery
Village Andretta
Dt-Kangra-176103, Himanchal Pradesh

53. Berozgar Mahila Kala Sanstha
MIG-59,Housing Board
Barari,Bhagalpur
Bihar-812002
Tel:0641-427278

54. Chinnur Cheynetha Kala Sangam
C/o.P.Satyanarayan Reddy
Chinnur Engineering Company
Chinnur,Dist.Adilabad-504201,Andhra Pradesh
Tel:08737-41260

55. Venkata Ramanna
Pasalapudi H.W.C.S Ltd
No. B 782,Pasalpudi
Rayavaram (Mandal)-533271
East Godavari District
Andhra Pradesh

56. Urmul Rural Health Research & Development Trust,
Sri Ganganagar Road,
Lunkaransar,
Bikaner – 334603.
Rajasthan.

57. Sri Kalahasti Kalamkari Kala Karula Sangam
15/45, Sri Ram Mandiram

Sri Kalahati-517644
Chittoor Dt. ,Andhra Pradesh

58. Dastkar Andhra
95 Park Lane,
Secunderabad 500 003
Tel 040-7721735,7892905, fax 7847187
e-mail dastkar1@satyam.net.in