



A RETURN TO THE USE OF NATURAL DYES  
CULTIVATION OF DYE PLANTS AND RECYCLING OF FORESTRY  
AND AGRICULTURAL WASTE FOR ARTISANAL AND INDUSTRIAL DYEING

IDEASS <sup>SPAIN</sup>

Innovation for Development and South-South Cooperation

# Introduction

**Written by Ana Roquero**

**Day by day** grows the demand for natural products. This tendency is also true for the dyeing industry. In the last decade not only has progress been made in ethical approaches to the sustainable production of natural dyes, but many new enterprises, of different sizes, have begun to cultivate, extract and apply natural dyes.

**The general** belief is that the employment of natural dyes is an activity that is friendly to the environment. However, for these dyes to be really labelled as environmentally friendly, production must respect certain specific standards. Throughout history, large-scale dyeing activities have always produced pollution. There have been times when European dyers used such toxic products as arsenic to render plant dyes fast. However, it is also true that before the introduction

of synthetic dyes, wild dye plants were rarely used to meet the enormous demand of the textile industry; otherwise they would have been wiped out. Dye plants were generally cultivated, and it is important to bear this in mind today.

**Nowadays**, we can and must set up clean production systems. For dye production to be certified as such, it must meet two fundamental conditions:

- Wild plants must not be used;
- Dye processes must not cause pollution.

**The natural** dye approach can be seen as a response to two fundamental motivations:

A return to the traditional artisanal techniques of a

- certain region or culture;
- Industrial production of coloured cloth that is environmentally friendly.

**Existing experience** on a return to the use of natural dyes has until now mostly concerned artisanal production. Results have been particularly encouraging in Latin America, where the age-old tradition of cloth making is seen as a major art form, but where, since the middle of the 20th century, traditional dyes had been replaced by synthetic products. The target for indigenous textile production is changing: most production, which is not necessarily of inferior quality but often spontaneous and imaginative, is directed at the tourist market, while a smaller part, highly prized and of extraordinary quality, targets private collectors, institutions and ethnographic museums. In the first case, craftsmen find it easier to sell a garment if it coloured with natural dyes, in the second case, customers demand the use of traditional dyes. It is precisely this elite market which may help this great heritage and craft to survive.

**As for** industrial production, in the last few years more and more enterprises have started to cultivate dye plants and extract natural dyes, using processes that are a model of sustainability. France, Spain, Holland, Mexico, Chile, Peru, El Salvador and United States are some of the countries which produce natural reds, blues and yellows under the sustainability label.

**Under the** direction of Gonzalo Nieto, the Royal Botanical Gardens of Madrid, which is part of High Scientific Research Council of Spain, gives scientific endorsement to practices involving a return to the use of dye plants.

# The problem it solves

## Responsible consumption

**Historically cloth** and garments were valuable objects which were kept the whole lifelong and were even handed down in wills. Today, they are products to be used and thrown away. These cheap products are largely produced by illegal labour, by workers with no rights. Consequently, the market is so inundated with 'throw-away clothes' that even in the wake of great natural disasters humanitarian aid organisations ask for no clothes to be sent since they are overwhelmed by the quantity.

**The initiative** to create clothes that are considered worth keeping will contribute, albeit to a small degree, to a change in the dynamics of responsible consumption.

**The use** of natural dyes in cloth making can be seen as a necessary luxury to trigger off a change in habits. Dyes which stand out for their beauty and ecological attributes would never be employed on just any material but on noble fabrics such as wool, silk, linen or cotton, made to last more than one season. Therefore, the idea is not one of low cost textile production, although it should be affordable for a large sector of consumers.

## Positive aspects in the use of natural dyes

- **Historical and ethnographic:** The use of natural dyes means a return to dyestuffs traditionally used in different geographical and cultural areas, revitalising traditional dyeing techniques in danger of disappearing.
- **Sustainability:** The eventual depletion of fossil fuels such as coal and oil, which are used in the production of synthetic dyes, means that a return to the use of dye plants is a matter of foresight. The cultivation of these plants is also an opportunity for farmers in areas where other crops are difficult to grow. Again looking towards the future, the dye industry must start to exploit material from forestry and agricultural waste, which at present is thrown away or burnt.
- **Economic and human development:** These practices provide new job opportunities for traditional artisans and producers. Experience with groups of craftsmen in Latin America has shown that they can help boost the domestic economy. Furthermore, the cultivation of dye plants has produced good economic results in agricultural communities of different countries.
- **Aesthetic:** Natural dyes can produce special aesthetic qualities, which, combined with the ethical significance of a product that is environmentally friendly, gives added value to textile production as craftwork and as an industry.



# A return to the use of natural dyes in practice

## A RETURN TO TRADITIONAL CRAFTWORK TECHNIQUES IN A REGION OR CULTURE

### Bibliographic information

**The first** step in setting up a project of this kind is to provide interested groups with existing literature on the different aspects of dye production: historical, technical, chemical and botanical. Publications on this topic can be found practically all over the world.

Selected bibliography:

- Böhmer, Harald: *Koekboya, Natural Dyes and Textiles*, REMHÖB-Verlag, Ganderkesee (Germany) 2002
- Brunello, F.: *L'Arte della Tintura nella Storia dell'Humanità*, Neri Pozza, Vicenza (Italy) 1971
- Cardon, Dominique: *Le monde des teintures naturelles*, Éditions Belin, Paris (France) 2003
- Dean, Jenny: *The Craft of Natural Dyeing*, Search press, Tunbridge Wells, Kent (United Kingdom) 1994
- Garcia, Michel: *Plantes colorants - Teintures Végétales*, Édisud, Aix-en-Provence (France) 2006
- Roquero, Ana: *Tintes y tintoreros de América - Catálogo de materias primas y registro etnográfico de México, Centroamérica, Andes Centrales y Selva Amazónica*, Instituto del Patrimonio Histórico Español, Madrid (Spain) 2006

**These books** include classifications of dye plants, descriptions of their characteristics, details of their distribution and summaries of traditional dyeing techniques used in different parts of the world. These works can be used as a starting point for the practices.



Woollen fabrics dyed with cochineal and various colour modifiers (ash and lemon juice), Salasaca (Tungurahua, Ecuador)



## Looking into the viability of setting up practices in a region

**Research should** be conducted by a person or a team with a solid knowledge of the dyeing process and its chemical and botanical basis. This person or team should also have experience in ethnographic research. The methodology involves:

### *Ethnographic research*

**Ethnographic research** will be carried out to record the current processes used in an area or find out about them from local people. The information obtained may well be incomplete, fail to correspond entirely to traditional uses or even be erroneous. This is why the interviewer must be well-versed in the subject to determine the degree of validity of the information.

**This information** can be recorded in writing and, if possible, filmed so that it can be transmitted to those who are attempting to rediscover the techniques.

### *The study of dye plants*

**Dye plants** will be studied in the area where the project is to be carried out primarily for ethno-botanical purposes. A herbarium will be created using bibliographical information, contributions from the local population, and in collaboration with the botany departments of the country's scientific institutions. A study will be made of the viability of cultivating the species that have been collected because it is important that use is not made of plants in the wild.



### *Cultivation and recycling*

**The last** step involves the localisation of land suitable for the cultivation of the selected plants and contacting farmers interested in the project.

**Mention should** be made of the recent experiment in the use of an integral strategy for the sustainable exploitation of natural dyestuffs, called 'Jardín y Bosque del Tintorero', which is being carried out jointly by the Mexican anthropologist Marta Turok and the local dyers from the village of Xochistlahuaca (Guerrero, Mexico).

**At the** same time contact will be made with sawmills, vegetable markets and plant-nurseries, and so on to establish a plan for the recycling of waste.

## Dyeing of fibres and fabrics

### Colour samples

**Once the** dyestuffs available in the project area are known, colour samples will be created for possible use by local dyers. These samples will be accompanied by information on utilisation procedures and auxiliary products needed to render each colour fast.



### Technical training and project follow-up

**Setting up** a dye project necessarily involves training for local technicians, who will stay in the country to permanently monitor production. These technicians will be liaising with local producers and international technical assistance organisations.

### Creating infrastructure

**Advice on** the infrastructure needed for dye production is equally important. A study will be carried out on the best systems for obtaining heat (preferably solar burners), handling dye waste material, and saving water. These aspects will be studied by experts (chemists and biologists).

### Commercial assistance

**Finally,** it is vital that producers are given expert advice on marketing, since without this all previous efforts would be wasted.

## INDUSTRIAL PRODUCTION

**Assistance to** enterprises that wish to begin natural dye production and/or application will be provided by experts in traditional dyeing, textile engineers and agriculturalists.

This kind of project involves start-up phases in different production areas:

- Cultivation of dye plants
- Colour extraction
- Dye application

### Supply of raw materials

**A regular** supply of raw materials is vital to guarantee the production of dyes on an industrial scale, so it is important to plan the cultivation of dye plants.

#### *Start-up*

**The traditional** cultivation of dye plants such as madder, weld and woad was common in Europe until the beginning of the 20th century and it has been revived in countries such as France and Holland. In other parts of the world (Asian countries) cultivation of the indigo plant has never ceased. At present, there are enough books on the cultivation of dye to provide a useful starting point.

**The selection** of suitable species in each region and the localisation of suitable land for cultivation will be carried out by agricultural engineers, who, in turn, will contact farmers interested in the project.

#### *Supply using established producers*

**Raw materials** for colour extraction industries can also be provided by established cultivators. Below is a list of cultivated products and the countries that produce them:

- Cochineal (red) - Canary Islands, Peru and Mexico
- Indigo (blue) - El Salvador
- Woad (blue) - France
- Weld (yellow) - France
- Madder (red) - Holland
- Plantain (yellow) - France
- Woundwort (yellow) - France

Cloth dyed with mahogany residues





### *Dye products from recycled material*

**As in** the case of artisanal dyes, the necessary contacts will be made with sawmills, vegetable markets, plant nurseries etc to produce a plan for the recycling of waste material: wood bark, avocado seeds, onion skins, pomegranate skins etc.

### **Colour extraction**

#### *Infrastructure and method*

**Technical assistance** for colour extraction plants and procedures will be provided by chemists and the textile engineers.

### **Dye application**

#### *Collection of colour samples*

**As with** the project on artisanal dyes, an expert in natural dyes will provide dye factories with colour samples together with information on the dyestuffs used, application procedures and products needed to render each colour fast.







## Ethical and sustainability criteria

**Industrially produced** dyes and naturally dyed fibres and fabrics must be certified as clean, that is, they must adhere to the following standards:

- Legal and fairly paid labour is employed in each production phase
- Dye plants are not picked in the wild
- No toxic products are used in dye making
- Waste material contains no contaminants
- Water and energy is used in reasonable amounts

**Enterprises will** be given the name and address of organisations that validate sustainability labels.



Marketing of naturally dyed textile products from a dye workshop in Madrid

# International interest

## Institutions and associations

**It is** impossible to number the many organisations whose programmes are based on the aforementioned guidelines. Here are just a few examples:

- AMACUP - Asociación Mexicana de Artes y Culturas Populares (México)
- Couleur Garance. Dye Plant Conservatory Garden, Lauris (France)
- Filière des Colorants Naturels. Association for dye plant research and promotion (France)
- DOBAG project (naturally dyed rugs), Marmara University and German Development Aid Programme (Turkey)
- Earthues, Seattle, USA

## Recognition

**Work carried out** on natural dyes and dyeing has received numerous international prizes. Here are a few examples of the awards received in the last three years:

- L'Oréal Foundation Prize "Art et Science de la Couleur" to Dominique Cardon for Le Monde des Teintures naturelles, 2003

- The Prize "Tierra de Mujeres" for work on protecting the environment, awarded to Ana Roquero for her work on dyeing, French Institute - Yves Rocher Foundation, 2004-2005
- Medal for Ecological Merit "Fundación Música por la Tierra" awarded to Habacuc (purple dye producer in the Tehuantepec Isthmus), Marta Turok (anthropologist) and Javier Acevedo (biologist), 18 May 2006

## Conferences

**Finally,** mention should be made of "International Symposium on Natural Dyes" sponsored by UNESCO and the Craft Council of India, held in Hyderabad (India) in November 2006. The meeting was attended by more than 6000 specialists (dyers, historians, anthropologists, museum curators, chemists, artists, etc) from 52 countries. A good omen for the future of environmentally friendly dyes.



## Further information

**The following** experts can provide more information on techniques for cultivating dye plants and recycling forest and agricultural waste for artisanal and semi-industrial dyeing.

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## Contact information

**The Royal** Botanical Gardens of Madrid, which is part of Spain's Higher Council for Scientific Research of Spain, directed by Mr Gonzalo Nieto, gives scientific endorsement to practices aimed at returning to the use of dye plants.

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**The IDEASS Programme** – Innovation for Development and South-South Cooperation – is part of the international cooperation Initiative ART. IDEASS grew out of the major world summits in the 1990s and the Millennium General Assembly and it gives priority to cooperation between protagonists in the South, with the support of the industrialised countries.

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## Innovation for Development and South-South Cooperation



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In the interested countries, ART promotes and supports national co-operation framework programmes for Governance and Local Development - ART GOLD. These Programs create an organized institutional context that allows the various national and international actors to contribute to a country's human development in co-ordinated and complementary ways. Participants include donor countries, United Nations agencies, regional governments, city and local governments, associations, universities, private sector organizations and non-governmental organizations.

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