After dyeing, a thorough wash-off is necessary to remove unfixed dye and other chemicals. A lot of salt is also needed to fix reactive dyes to the fibre – up to 100 grams of salt per litre of water – which can be a hazard if left untreated.

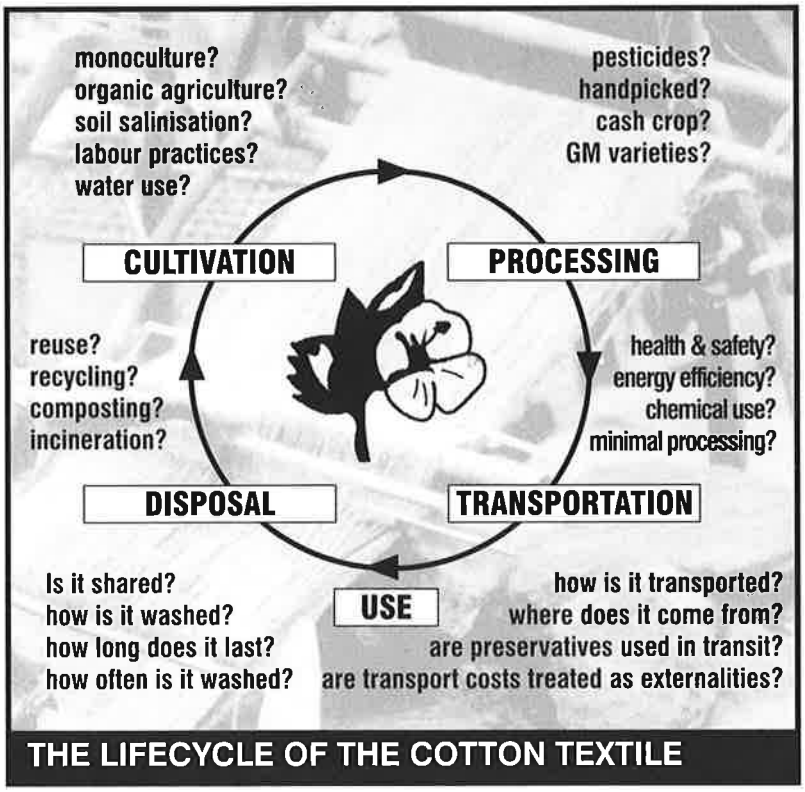
As an alternative to colouring fibre by dyeing, coloured fibre can be grown in the field. Naturally pigmented cotton can be cultivated in shades of beige, brown, green and mauve and take advantage of the natural variations in the colour of cotton fibre. Also GM technology is promising the cultivation of cotton in intense colours and blue shades (for use as denim).

COTTON TRANSPORTATION

Cotton is a global fibre and it is likely that it is transported several times between cultivators and processors before the product reaches the consumer.

When anything is transported, it uses local resources and causes pollution locally (normally a great distance away from the user) and these are commonly considered to be costs 'external' to the product. These transport-related costs have been assessed for a cotton T shirt, moved between different growing and processing regions of the USA[2]. It was concluded that the environmental cost of transportation was significant and was 16 times the cost of processing.

The environmental and health effects of transportation are well documented and include, high levels of CO^2 emissions linked to global warming, increased respiratory problems, and fossil fuel consumption.



THE LIFECYCLE OF THE COTTON TEXTILE

COTTON USE AND DISPOSAL

Studies show that 73 per cent of energy consumed over the entire lifecycle of a cotton garment can be attributed to consumer use[3]. Cotton items are commonly washed 'at the boil' (70°C) whereas synthetics are washed at 40°C. Further, while there are approximately the same number of natural and synthetic textiles in circulation, cotton makes up the bulk (89 per cent) of washing loads. This perhaps suggests that cotton fabrics are laundered more frequently than synthetics (as well as on high temperatures) and consequently have a higher impact (and therefore should be avoided).

Cotton, like most fibres, can be reused and recycled into new end uses. Indeed as a natural fibre, there is likely to be a market for cotton waste, albeit high quality white waste (*see 'The beginning of the end-of-life' Ecodesign, Vol VIII, No.2*). Cotton is also biodegradable although it is likely that this process is inhibited by the many chemicals (including dyes) applied to the fabric during processing.

CONCLUSIONS

What any lifecycle survey of a named product type or material like cotton shows, is how highly complex ecodesign can be. But eco design can also be simple, it can focus in on one aspect of the lifecycle and devote strategic thinking and creative energy to an individual need or to altering the rhythm of resource flow at a particular point. It seems that ecodesign simultaneously has to be both big and small. It has to be concerned about technology and also about society, culture and people. It has to be both practical and theoretical. And it has to be sensible and able to be implemented today as well as being 'blue sky' and futures oriented.

The lifecycle story of cotton (discussed only in part here) touches on many of these points. I am acutely aware that it does not provide any answers – only more questions – but it is a starting point and one from which all those involved can begin to work through solutions. ed

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1. Walsh, J.A.H. and Brown, M.S. (1995), Pricing environmental impacts: a tale of two T-shirts, Illahee, Vol. 11, Nos. 3&4, pp175-182.

2. ibid.

3. Laursen, S. E. and Hansen, J. (1997), Environmental Assessment of Textiles, Copenhagen: Danish Environment Protection Agency.