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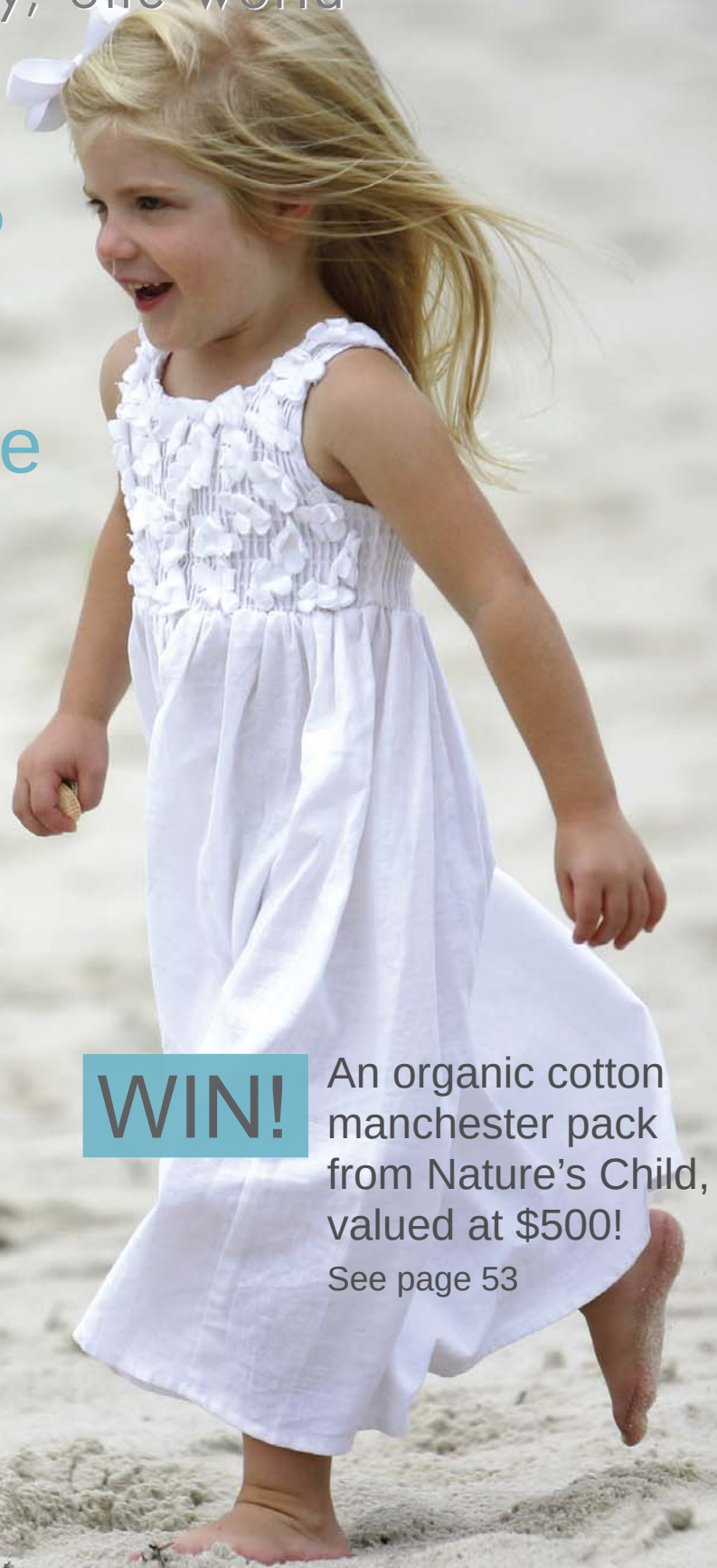

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Cotton
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Environmental researcher **Jo Immig** examines the complexities behind the cotton industry, its cost to the environment, and to humanity.

Despite the fact that cotton is a natural fibre, conjuring up images of cool summer clothing, crisp sheets and fluffy towels, the actual process of growing and processing cotton these days is far from natural or sustainable, and it's also having devastating impacts on communities.

A convergence of globalisation and consumerism is driving an insatiable demand for cotton, which makes up at least fifty percent of the textile market. Synthetic textiles make up the other half and have their own set of problems.

We've seen the advent of 'fast fashion', where garments are churned out using cheap labour to appeal for a season, then get tossed out. All of this cotton has to be grown and processed somewhere using vast amounts of natural resources.

Is organic cotton the answer? What about other fibre crops like hemp and bamboo? Do they provide more sustainable options?

There's no doubt we urgently need more earth-friendly fabrics and fashion but we also need to reassess our consumption of it and look at re-using and recycling clothing and fabrics so they don't just end up as polishing rags or in landfills. Designers can also become more conscious of producing styles and clothing that lasts.

In thinking about this issue, I can't help but recall an enduring image and a very powerful idea, which seems to have more meaning than ever before in these turbulent economic times. It's that of Gandhi, sitting behind a spinning wheel in his dhoti, urging Indians to embark on a non-violent, hand-spun revolution by rejecting imported textiles and the destruction of local craft and the employment that comes with it, in favour of locally made *Khadi*, or 'freedom fabric'.

There's no doubt we urgently need more earth-friendly fabrics and fashion but we also need to reassess our consumption of it...

Industrial cotton

To get the picture of how the majority of cotton is grown today, visualise vast tracts of land cleared of its vegetation, where the soil is laser-levelled to remove its natural contours, creating a flat, featureless landscape. Fields are planted with genetically engineered (GE) cotton varieties, with genes inserted for herbicide resistance and bacteria that turn the cotton plant into its own constantly-producing insecticide factory.

Cotton fields are sprayed both from the air and with ground-based boom sprays, spreading toxic fertilisers, insecticides, herbicides, and defoliants. Huge on-site storage dams and irrigation channels divert water from its course, delivering it to one of the world's thirstiest crops. Business managers, not farmers, run these corporate-owned operations, and they answer to company directors and shareholders, not communities or nature.

For the cotton industry in the 21st century, this vision represents the pinnacle of achievement for industrialised agriculture in a globalised market. According to Cotton Australia, the peak industry body, the Australian cotton industry is comparatively one of the most efficient and productive in the world. But this efficiency and productivity all comes at a cost that most of us don't ever see or consider.

Cotton has a long history

The history of cotton apparently dates back some 7,000 years, as evidenced by fragments of cotton fabric found and dated in Mexico. Cotton was also grown and hand-woven in the Indus River Valley in Pakistan and Egypt's Nile

First-hand experience

I was working as the toxic chemicals campaigner at the Total Environment Centre in Sydney in the mid-1990s when I received a desperate phone call from the Gunnedah Environment Group. Gunnedah is a rural town in the Namoi Valley in New South Wales where cotton is grown.

This group of concerned people and farmers themselves, wanted our help because they believed their entire community and environment were at great risk from exposure to the toxic chemicals used in cotton growing. They also reported that illegal storage dams were being built to hoard water and that laser levelling of land was changing the course of floodwaters, devastating some farms, while depriving others of water.

Cotton growing was booming in the early 1990s and there was big money to be made. Families more familiar with wool and wheat farming suddenly found themselves living next door to cotton fields where lots of chemicals were used and spray drifted inside their homes, over their washing and onto their children, crops and livestock. Kids waiting for school buses were even being exposed.

People were frightened and feeling sick, suffering nosebleeds, asthma attacks, rashes, and headaches. Some even believed the pesticides were to blame for high rates of miscarriage in the area. Anger grew when they discovered their rainwater tanks, in some cases kilometres from the nearest spraying, tested positive to a range of pesticide residues sprayed on cotton.

One badly affected family moved off their farm to live in town, while another family, whose children were very affected by the pesticides, had no option but to endure repeated exposures.

Naïve to just how serious these problems were, I became involved to advocate for those affected and to do something about pesticide pollution. My outrage grew as I found out just how inadequate the law was to protect people from pesticide exposures and just how little was known, or acknowledged, about the hazards of exposing people and the environment to pesticides.

I was propelled on a journey, still ongoing nearly fifteen years later, to have regulations put in place to ensure people in agricultural areas are better protected, and have legal recourse if they are exposed to pesticides.

While there has been some legislative progress since that time, the key issue that drove me to this work remains unresolved. People living in farming areas where there is intensive pesticide use, still have little to protect themselves from pesticide exposures other than to ask the neighbour to let them know before they spray.

It seems unbelievable to recall that we sat around under very tense and sometimes hostile circumstances debating with regulators, cotton farmers, and industry representatives about whether pesticides were even capable of drifting in the air and whether they could possibly even cause harm in 'such small amounts'. We know today that pesticides do indeed drift and repeated exposure over our lifetimes can lead to health effects.

Thankfully we have made some progress on the legislative front. Commercial users of pesticides now at least have to undertake mandatory training in the safe use and handling of pesticides and records must also be kept of pesticide applications. In New South Wales there are also requirements to notify people in public places of intended pesticide use.

Valley, and Arab merchants are credited with bringing cotton cloth to Europe.

Cotton was originally hand picked and spun, but the industrial revolution and the invention of the cotton gin in the late 1700s paved the way for mass production. The availability of water has also been a critical factor in its development throughout the world, and it may well turn out to be the limiting factor for its continued growth in the future.

The big producers of cotton today include China, India, USA, Pakistan, Egypt, Uzbekistan, Brazil, Central and West Africa, and Turkey. While each country has its own story to tell about the history and impacts of cotton growing, it seems that practically every place where cotton is grown, there is evidence of devastation to communities and the environment.

Aral Sea tragedy

The Aral Sea tragedy in Uzbekistan stands out as one of the most egregious environmental and human disasters caused by cotton growing. It also serves as a stark reminder of what happens when greed drives decision-making and nature and common sense take second place.

When the former Soviet Union diverted the Ama Dariya and the Syrdariya rivers, which fed the inland Aral Sea to grow cotton in the desert, they starved it of its water supply. After decades of irrigation, the sea receded and the water table rose to the surface bringing salt with it, causing the death of wildlife and ruining the health and livelihoods of countless numbers of people who were dependent on the inland sea.[1]

Indian farmers' suicide

A human tragedy is unfolding in India today where farmers from the Maharashtra cotton-growing area of Vidarbha, as well as other regions throughout India, are taking their lives because of the hopeless cycle of debt they've found themselves in.

Under conditions from India's World Trade Organisation commitments, the state government is no longer permitted to subsidise or support local farmers by buying their cotton for a fair price. Farmers must now compete on the 'free market' for the first time, where traders beat down the prices and take longer to pay them, forcing them to borrow money from banks and entrenching them in debt.[2]

It's believed that some 4,000 farmers may have already suicided, leaving their families behind in an even more desperate situation.

Cotton in Australia

Large-scale irrigated cotton growing got underway in Australia in the 1960s. Auscott, an American company, saw an opportunity to obtain multiple water licences from the New South Wales government, who were busy promoting irrigation to justify the newly-built Keepit Dam in the Namoi Valley.

It was this rush to irrigated agriculture that has, in part, resulted in the over allocation of water. The Keepit Dam was supposed to provide a backup for cycles of drier times, which are the norm in Australia. This story was repeated in other river valleys across Australia.

Once they acquired the water rights, Auscott imported farm equipment from the USA and began growing cotton on a scale never before seen in Australia. The rest is history, as they say.

Indigenous Australians also played an integral part in the early development of the industry. In the 1970s they were employed as 'chippers' to hand weed the cotton, a job considered too hard for most because of the intensely hot working conditions and the hard physical labour. As the use of planes to aerially apply pesticides increased, these workers were also used as 'human markers' to guide the planes and were frequently doused with chemicals themselves.

The vast majority of Australian-grown cotton is now exported to Asian spinning mills for the textile market, and we buy it back as clothing and textiles. Cottonseed is crushed to make cooking oil, such as blended vegetable oils and is added to processed foods; the meal and hulls are used as stock feed; a surprising fact given the majority of it is now genetically engineered.

Water woes

Here's a fact to consider next time you buy a new pair of jeans and T-shirt—*it takes more than 20,000 litres of water to produce 1kg of cotton.*[3]

According to Siobhan McHugh in her fascinating historical account, *Cottoning On: Stories of Australian Cotton Growing*[4], by the end of the 1960s, irrigated cotton production in the Wee Waa region in New South Wales had heralded the most rapid and dramatic change in land use in the area since European settlement. Cotton irrigators by that stage were using 80 percent of the water from the Keepit Dam.

The cotton industry is quick to dismiss claims that they are profligate users of water, arguing that they use no more than other summer crops such as soy or corn. Yet for years the industry has resisted calls to change their wasteful irrigation practices.

They also defend their water use by claiming water is best 'spent' on the crop that returns the highest dividends per mega-litre of water, ie, cotton. Such a narrow economic focus obviously fails to take into account the water needs of the entire community.

As we have seen in recent times with the Murray-Darling Basin disaster, we have a lot to learn about looking after water in Australia and equitably distributing it. Cubbie cotton station in Queensland, the biggest cotton enterprise and irrigator in the Murray-Darling Basin, was recently given a water licence by the Queensland government estimated to be worth as much as $100 million.[5] The decision has angered downstream users and highlights the urgent need to re-think what we're doing with Australia's precious water resources.

Pressure from the cotton industry to access new water sources and land is never far away. A proposal in the late 1990s to dam the Fitzroy River in the Kimberleys to provide water for an enormous irrigated agricultural enterprise was thankfully defeated. At the time it was envisaged that genetically engineered cotton would be grown on a massive scale in the West Kimberley, an idea that would have created untold damage to the landscape and communities living in the area. This idea may still raise its ugly head again.

> Given the cotton industry's bad reputation with toxic chemical use, it's not surprising they turned to genetic engineering in the hope of solving some of their problems.

Chemical contamination

The cotton industry has a shocking track record as big users and polluters of toxic chemicals. Some estimates indicate that up to 20 percent of the world's pesticide use is on cotton.

It's not uncommon for farmers and farm workers to be exposed to pesticides during work on cotton fields, which not only affects their health, but also the health of their families and generations to come. Wildlife is regularly contaminated, particularly aquatic species and birds, and large fish kills often occur during peak cotton spraying times. These are the gross impacts of pesticide contamination, but there's also unseen damage to species through constant low-level pesticide exposures that impact on their immune systems, making them susceptible to disease and predators.

One of the most notorious cotton pesticides is the organophosphate insecticide methyl parathion, a chemical currently under review by the Australian Pesticides and Veterinary Medicines Authority (APVMA), due to its high toxicity to aquatic organisms, bees, and other insects. It is also very dangerous for agricultural workers and it persists in the soil for long periods.[6]

Australia has had a string of pesticide contamination incidents associated with cotton. In 1994, Australian beef was contaminated with the cotton insecticide Helix® (chlorfluazuron) as a result of cattle being fed contaminated cotton straw. In response, several countries suspended beef imports from Australia.

One year later, farmers were alarmed to discover that newborn calves were also contaminated with Helix, apparently because it was passed through their mother's milk.

Twenty-three farms in New South Wales and Queensland were placed in quarantine in 1996 after inspectors discovered high levels of endosulfan in beef cattle, due to pesticide spray drift off cotton farms contaminating grazing land. Australian beef was rejected for export again in 1999, due to contamination with endosulfan residues.

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Endosulfan, an organochlorine pesticide like DDT, is currently being considered for inclusion on the Stockholm Convention of Persistent Organic Pollutants. It is one stage away from being listed for global phase-out because it disrupts hormones and bio-accumulates up the food chain. Recent bio-monitoring research has found endosulfan metabolites in human placenta samples, which means even the unborn are being exposed to it.

Endosulfan was reviewed by the APVMA during the beef contamination incidents and restrictions were placed on its continued use after cotton

farmers lobbied heavily to keep it. A compromise was struck and cotton farmers are now required by law to notify their neighbours if they intend to use endosulfan and they are restricted to certain formulations and a specified number of applications per season.

The Australian cotton industry, unlike many other cotton growing countries, also uses defoliating chemicals before the cotton crop is harvested. Defoliants are typically a mixture of the chemicals diuron and thiadazuron, which inhibit photosynthesis and cause the plant to drop its leaves. Thiadazuron is toxic to aquatic creatures and does not biodegrade quickly. Diuron can remain active in soil for about 4 to 8 months.[7]

Genetically engineered cotton

Given the cotton industry's bad reputation with toxic chemical use, it's not surprising they turned to genetic engineering in the hope of solving some of their problems.

Since the introduction of Ingard®, the first GE cotton released in Australia in 1996, and the subsequent release of Roundup Ready® cotton in 2000 and Bollgard11® in 2003, the industry claims that around 95 percent of cotton growers now plant GE varieties and over 80 percent of the total crop is GE.

Bollgard11® cotton contains genes from the soil bacterium Bacillus thuringiensis (Bt) which produces a toxin fatal to caterpillars, the main pest of cotton. Since the introduction of Bollgard11® the cotton industry claims

Cloth unplugged

Bamboo—a quick growing plant that does not require fertiliser or pesticides to thrive, requires little water, and survives extreme conditions. It releases a significant amount of oxygen into the atmosphere, more than trees, so planting bamboo can help reduce the level of carbon dioxide in the air as well as reducing soil erosion and desertification. The bamboo fabric is soft like silk, yet hardwearing. Bamboo keeps you cool in the summer and warm in the winter. It is antibacterial, quick-drying and quick to absorb moisture—keeping you dry and comfortable.

However the jury is still out regarding the manufacturing end. Eco fashion fans are concerned by the harsh chemicals it takes to break bamboo down to create fabric. The increased demand for bamboo clothing has encouraged Chinese manufacturers to clear rainforest for bamboo growing. Here's the bad news: China is the sole supplier of organic bamboo textiles for the world—the reason for this monopoly is because they slapped a patent on the process. So other more earth-friendly countries are unable to produce this material. Sigh.

Hemp—a durable, hard-wearing fabric that gets softer with time. It has been around for centuries, and has even been found in the tombs of ancient Egypt. It absorbs moisture which makes it perfect for bedding and keeping you cool on warm summer nights. Hemp manufacturers claim that it lasts longer than other natural fibres. Both industrial hemp and marijuana have the same technical name of cannabis sativa. They are essentially different varieties of the same plant. Industrial hemp contains almost untraceable amounts of THC, the 'active' ingredient in marijuana. Hemp requires little or no use of fertilisers, insecticides, fungicides or herbicides to grow successfully. As with all fabrics, it is important to do your research into how the product is processed, where it is processed and if standards of ethics and sustainability are met.

Organic cotton—like ordinary cotton but better because it strains the environment, farmers and communities less. Australia now grows certified organic cotton that is grown with no irrigation—just rain water. Many organic cotton clothing retailers are using this particular fabric; look for the ones who carry it.

Regardless of which fabric you choose, keep these things in mind. How far did it have to travel to get to your door? What processes were used to dye or bleach the fabric? Is it Fair Trade, or No Sweat Shop labelled? When you see the No Sweat Shop label on a garment, it means the garment was manufactured in Australia and all of the people involved in its production received, as a minimum, the Award wage rates and conditions. Many people are shocked when they learn textile workers in Australia are often paid as little as three dollars an hour. Exploitation is very common in the fashion and clothing industry, in any country. The last thing you might like to consider is…do you really need it?

Resources

'To Bamboo or Not to Bamboo', March 13, 2008, thegreenloopblog.com
Everman, Victoria, 'How Eco Is Organic Cotton? The Facts on 7 Questions', www.life.gaiam.com

that there has been an 85 percent average reduction in pesticide applications.

While this figure may be true for externally applied pesticides (although the figure is difficult to independently verify), when you consider that the cotton plant has now been turned into its own pesticide factory, constantly producing the Bt toxin, you could argue there's actually been a net increase in the use and reliance on pesticides.

To date, GE cottons in Australia have mostly been grown under severe drought conditions, and in relatively small amounts compared to peak cotton production times, so their performance under more difficult pest seasons is also uncertain.

A major concern for the industry is that the caterpillars will quickly develop resistance to the Bt toxin, a problem made all the more likely because they are constantly being exposed to it.

Roundup Ready® cotton is tolerant to the herbicide Roundup®, or glyphosate, which just happens to be the number one selling herbicide of Monsanto, the owner of the GE cotton. There is research showing that since the introduction of the herbicide-tolerance trait there has been an overall increase in the use of herbicides.[8]

The use of antibiotic resistance marker genes (ARMs), derived from micro-organisms to make these GE cottons, is also highly controversial. The UK Advisory Committee on Novel Foods and Processes actually warned in 1994 of the possible food safety issues that might arise from the use of ARMs because the genes could transfer to intestinal bacteria.[9]

During the genetic engineering process, a gene providing resistance to an antibiotic is inserted into GE plants as a marker, which is linked to the new gene with the trait being inserted. The concern is that these antibiotic resistant marker genes could also transfer from the GE plant into bacteria in the gut and cause disease in humans and other animals, rendering some vital antibiotics useless.

Cotton processing and dyeing

Once cotton has been harvested it moves into the processing phase where pre-treatments, dyeing, printing, and finishing introduce a whole new set of chemicals and environmental problems. The production processes also consume large amounts of energy and water, and create toxic waste products.

Volatile organic compounds (VOCs) are used during different stages of processing, and cotton is whitened with bleaching agents such as hypochlorite. The finishing process also uses VOCs and formaldehyde, a known carcinogenic chemical even at very small doses.

The dyeing and printing process uses reactive dyes containing heavy metal pigments and formaldehyde containing fixing agents. The demand for easy-care and wrinkle resistant clothing is also driving chemical use in the finishing phase, where textiles are subjected to a variety of processes, often involving formaldehyde, to give the fabric different properties. Residues of the formaldehyde are found in the fabric surface when we purchase them and present a hazard for workers in the fashion industry.

Stain resisting, waterproofing, and antibacterial chemicals may also be applied for specialist fabrics. These chemicals, such as the perfluronated chemicals and the antibacterial triclosan, are turning up as persistent pollutants in our bodies and the environment.

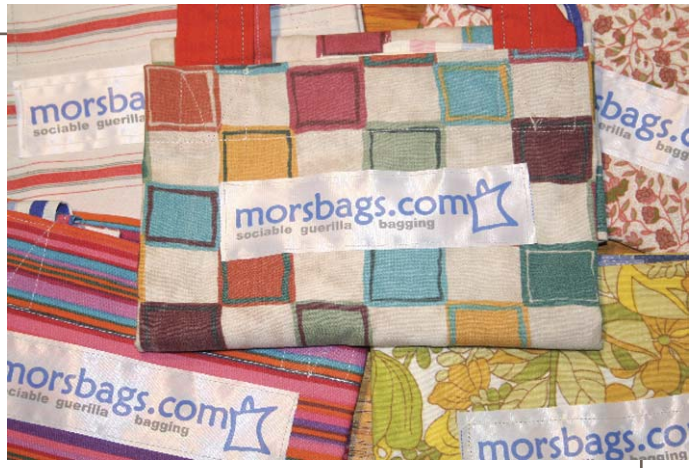
Morsbags—recycling fabric to cut plastic use

A new global project to cut plastic bag use, based on making shopping bags out of recycled fabric and giving them away, shows that a touch of creativity and love can produce amazing results.

New South Wales Northern River's locals, Clare Hopkins, Robyn Burton, and Jo Immig, have joined morsbags.com, which was formed in the UK last year in response to plastic bag pollution killing whales and other wildlife.

Members make fabric shopping bags during social sewing days and then give them away. The project has over 500 'pods' sewing and donating worldwide and has given away over 30,000 bags. The Bangalow pod has contributed close to 500 bags.

Hopkins claims the project has tapped into something deeper than plastic bags. 'It's a revival of community spirit and creativity,' she says. 'We were astounded to discover just how much fabric is sent to landfill from op shops, so by retrieving this fabric, and using it, we think our bags are the truly green enviro bags.'



For more information go to: www.morsbags.com, or contact Clare Hopkins at bommerangbags@hotmail.com

Organic cotton

Certified organic cotton offers many benefits compared to its chemically-grown counterpart and thankfully, it's more available than ever before. In the biologically-based system for growing organic cotton, healthy soils are retained through crop rotation and soil moisture is encouraged with increased organic matter.

Rather than working against nature, beneficial insects are encouraged and biological pesticides such as Neem oil are used for pest management. Water management and hand-harvesting are used as alternatives to toxic defoliating chemicals.

Mechanical weeding, mulching, intercropping (planting other crops to attract beneficial insects) and crop rotating are some of the strategies used for weed management. In the processing phases, non-toxic ingredients are used, as are natural dyes and low-impact water-based inks and pigments. Even growing different strains of cotton can produce different coloured cotton without the need for dyes.

Whilst a vast improvement on industrial cotton, water use still needs to be considered, as do issues around labour and fair trade. Being a more labour intensive crop to grow, it tends to be grown in countries with cheaper labour such as India, China, Turkey, and Africa.

It is reported that around 24 countries are now growing organic cotton and worldwide production is growing at a rate of about 50 percent a year. The USA is also a big producer while Australia grows virtually none.

Given the high level of environmental damage associated with industrial cotton growing and processing, and the impacts it has on communities, it's clear we can no longer continue down this path to meet our fibre needs. The future for sustainable textile production lies in growing a range of fibre crops in environments they are best suited to, and ensuring the people who grow and process them are not exploited in cheap labour markets. Organic cotton, hemp and bamboo, processed with plant-based chemistry, all appear to offer many advantages. We also need to consider our over-consumption of resources, be they sustainable or not. Instead of 'waste couture' it would be wonderful to see a revival of well made clothing in designs that can span the seasons and years, as well as a much greater emphasis on the use of second-hand fabrics and clothing. ■

__Jo Immig__ is an ecologist, freelance writer and researcher. She is currently the coordinator of the National Toxics Network, Australia's only NGO dedicated to creating a toxic-free future. www.ntn.org.au

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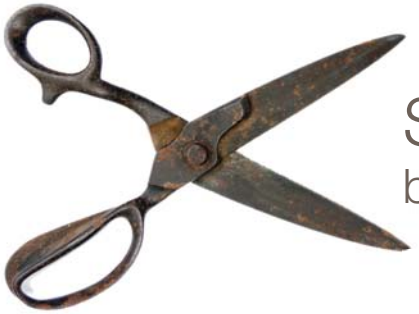


Second wind

breathing new life into old clothes

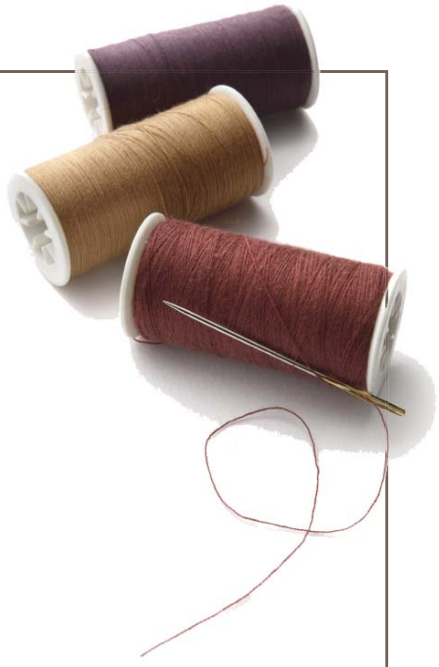
By Amanda Blake Soule

Don't throw away those old clothes yet! Remember the days of yore when every bit of clothing was saved and somehow reused as another piece of clothing or fabric for some other purpose. We're all doing our best to throw away a little bit less than we're used to, and clothing is a perfect place to start. Clothes unsuitable for wear or that you aren't planning to donate can easily be reworked into new clothing. There's an abundance of crafters out there doing just that—recycling clothes into new ones or 'reconstructing' them.

Not only does this save on the amount of trash we generate and the amount of clothing we demand to be produced, but it's also an amazingly creative way to express ourselves and our sense of individuality. What a gift to a child not only to have the skill to create their own clothing, but to have the confidence and creativity to wear something that is truly them and not just like the same shirt that thousands of other people are wearing. You'll be able to give your clothing as much character as the unique person wearing it.

Virtually any piece of clothing can be reconstructed somehow. Look through your discarded clothing—things that are too small, too big, that you never wear, or that are headed out to donation or the trash. Are there aspects of these clothes that you really like? The fabric? A colour? A style? These are good pieces to start with. Once you've found a piece of clothing that you'd like to reconstruct, sewing it is the most obvious way to re-create it into something else, but if sewing isn't your thing, try one of the following ideas with (or for) your children.

Colour from the earth



Did you know that some of the richest dye colours might be right in your backyard? Dyeing with plants and other natural fibres can be fun and educational, as well as safe, inexpensive, and easy to do yourself, as well as with your children. This was the first method by which colour was added to textiles and one that people have continued to return to as a way to connect to the earth and the colours it offers us. Dyeing with natural materials is something that requires experimentation—which is half the fun of this kind of project, especially with children. Depending on the season, the material you choose for a colour, and the textile to be dyed, the variations are as many as the colours of the earth. Here are some suggestions to get you started:

- Brown—oak bark, sumac leaves, coffee grounds, ground acorns, marigold
- Orange/yellow—onion skins, turmeric, goldenrod
- Pink/red—strawberries, roses, dandelion root, red leaves, beets, hibiscus
- Blue/purple—iris roots, red cabbage, blueberries, blackberries, grapes
- Green—grass, nettles, spinach leaves, lily of the valley, rhododendron

This project does involve boiling hot water on a stove, which should be done only by an adult. Children can be involved in the process of selecting the materials and fabrics and, with supervision, in the dyeing process.

What you'll need

- Salt
- Cold water
- Vinegar
- Large pot for boiling the plant material (You may want to use one that is not for cooking, as the process can stain the pot.)
- Rubber gloves, if desired (The dye colour may stain your hands.)
- Fabric to dye. Muslin, silk, and cotton all work well. Start with a light colour or white to get the best results and most vibrant colours. Fabric should be clean and dry when beginning.
- Plant material. This will vary, depending on your location and the season. Remember never to take more from the plant than you need. Berries should be ripe and nuts and plants mature when selecting for dye. Do a search online for 'natural dyes from plants' to get a complete list of plants to use for dye.

What to do

1. You will need to 'set' the fabric in a fixative before beginning to dye. This will help prevent the colour from washing out or fading. If you are using a plant to dye, you will need four parts water to one part vinegar. If you are using a berry to dye, you will use ½ cup salt to 8 cups cold water. Add your fabric to whichever mixture is suitable, and let simmer for at least an hour. Remove from the hot water, and rinse the fabric in cold water until it runs clear.

2. To make the dye bath, place your plant material in a large pot, and cover with water (you can experiment with how much water you want for different shades). Bring to a boil, and let simmer for an hour.

3. Strain the plant material from your water. Add your fabric to the drained water/dye.

4. Allow the fabric to soak as long as you like, anywhere from a couple of hours to overnight for a very strong colour. The colour will dry much lighter than it appears when wet.

5. You will want to wash your dyed fabric separately in cold water for the first few washings to see how the colour holds up and to ensure that it doesn't bleed on your other laundry.

Dyeing

Perhaps with a bit of colour you'll see this item in a new light. This is particularly true for my sweet Ezra, who really wears his shirts until they are covered with a mix of mud, marker, and spaghetti sauce. Tossing a few of these in a bit of dye gives him a whole new wardrobe! (See sidebar for natural dyeing.)

Embellishing

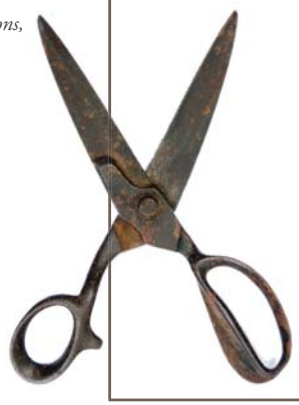
What can you do to that shirt that might make it more fun for you or your child? Does it need some buttons sewn on? Some stencils created for it? Perhaps some beads, a bit of trim, or a little extra fabric will turn it into something you love.

Sewing

Then there are the endless possibilities of what your clothing can become with the help of your sewing machine or just a needle and thread—putting pieces of clothing together, swapping sleeves with another shirt, and so much more. Look at magazines or online for ideas that inspire you. Your clothing can also be used for many things other than reconstructed clothing. What else can you do with it?

Smaller clothes

I use shirts from my husband, Steve, and I to make clothes for our youngest family members. Cut just the right way, a large adult's shirt can provide enough fabric to make a pair of baby or child's pants or shorts (see sidebar). ■



Constructing children's pants

With a bit of sewing experience, you can easily turn old, unwanted adult clothing into clothes sized just right for the little ones in your life. The following instructions are for turning an adult's shirt into a pair of toddler's pants.

A large men's shirt can make a pair of pants for a child up to about age three or shorts for a child under ten.

What you'll need

- One adult's shirt, from your closet or the thrift store. (Flannel, knit, or cotton all work well for this project. Keep in mind that knit jerseys will stretch quite a bit as you sew.)
- A pair of elastic-waisted pants or shorts that are the appropriate size for your child. (These will be used only for tracing the size.)
- Waistband elastic, 3/4-inch width / [2 cm].(Length should be your child s waist measurement plus 1 inch / [2 ½ cm])
- Needle, scissors, thread.

A pair of pants, pinned onto the shirt, provides a size template for your pattern.

What to do

1. Lay the shirt out flat. On top of it, place the pants to be traced, folded in half, with the outside leg of the pant along the side seam of the shirt. Place the hem of the pants along the hem of the shirt (this will save you from hemming the pants). Pin in place.

2. Cut around the pants, allowing ½ inch [a little over a cm] extra for seam allowance. At the top (the waist), leave an extra 2½ inches [a little over 6 cm] for the waistband.

3. Repeat this process on the other side of the shirt. At this point, you can trace the piece you just cut, rather than using the pants as a guide. This will ensure that the pieces are exactly the same size.

4. Open out the two pieces, and place them with right sides together. Pin in place. Sew from the top (waist) to the crotch, on both sides.

5. Open up the pants so that the crotch seam you just sewed is now in the centre, and the two 'legs' are on each side. Pin the pant legs together, matching up crotch seams and bottom hems.

6. Beginning at one hem, sew up the length of the pants to the crotch, and then down the other leg to the hem.

7. To make the waistband, fold down the top edge of the pants ¼ inch [½ cm] and press. Fold down another 1 inch [2 ½ cm] and press again. Sew this down, close to the fold, all the way around the waistband of the pants, leaving a 2-inch opening [5 cm] at the back centre to insert the elastic.

8. Using a large safety pin, insert the elastic through the opening and thread through, being careful not to twist. Sew the two ends of the elastic together where they meet.

9. Stitch the waistband to close the elastic opening. Turn pants right side out. Your reconstructed pants are ready to go!