Solidaridad

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TOWARDS SUSTAINABILITY IN THE TEXTILE SECTOR? A new paradigm on fibre sourcing

1 Summary: Resource constraints

Demand for food, feed, fuel and fibre is set to continue rising for the foreseeable future. Not only because of a rising world population, but because more and more people are joining the middle classes, increasing their consumption and adopting different diets containing more meat and processed foods; at the same time, consumption of products like textiles is rising as their cost falls relative to incomes. Many products which we depend on for our daily lives are (partly) produced on agricultural land (which itself is under pressure from developments for housing, leisure, commerce and industry).

How can we meet this growing demand for food, feed, fuel and fibre in a sustainable way? Competition over resources is bound to increase while the availability of these resources are finite (fossil fuels) and also vulnerable to degradation and depletion (land, water and nutrients). Indeed, most of the available arable land is already developed, and any further land cleared may not be very good, while much existing land is already depleted by poor management (some 24% of the 11.5 billion hectares of vegetated land worldwide is degraded by human activity, and 12% of crop land has been lost for farming).

How does the textile sector respond to these challenges? And is there a link with the wider context of food, farming and business cooperation? Which sourcing strategies for textile raw materials are future proof?

2 Are we on the right track? New perspectives on sustainability

Instead of framing the challenge for sustainability in the textile sector around the resource constraints linked to single commodities – such as for example cotton – we can broaden our thinking towards alternative sourcing pathways. By thinking holistically about the whole farm ecosystem and its outputs, we can find new strategies to meet future demands for textile fibres in such a way that they cost less and last longer.[1] To inspire out-of-the-box solutions for sustainable textiles, we have to sharpen our strategy by focussing on underlying values that should drive the process of continuous improvement towards true sustainability.

2.1 New Core Values

- *Choose efficiency over growth:* instead of producing more crops for fibre or reserving land only for fibre, we need to search for efficiency in current agricultural production systems, and for example use already available fibrous waste from supply chains and recycle used

1 By this we suggest that products would cost less over the product's lifespan, but this can also mean that the value of the material has a second life, and for example consumers can hand in their old clothes and get a discount.

textiles into new products. Fibres that are currently considered niche or waste products perhaps need to be revisited and invested in, by brands as well as universities.[2]

- *Value quality over quantity:* our consumption patterns are based on cheap purchases of products with a short lifespan, of which some clothing might be never worn or used.[3] While an investment in quality material could enhance both consumer satisfaction as well as the sustainability of the resource use as it lasts over a longer period of time.

- *Assess the life cycle, not the fibre source:* Whether a fibre stems from natural or synthetic source does not determine its sustainability. We need to assess the different stages and locations/conditions of production (i.e., is it suitable for the crop, is it detracting from other needs, etc.), processing, and end use quality and lifespan of the product to say anything about the sustainability performance of textile products.

- *Enhance synergies in food and fibre production:* Smart land use planning – by means of crop rotation and intercropping of food and fibre crops - can reduce pressure on resources and at the same time improve production. It is not only agricultural sound practice to support soil quality and pest management, but a strategy to diversify production at farm level. When processing agricultural produce, fibrous waste material from food crops is a potential product with new value and purpose.

3 Introduction: Viewing the whole system

The statements above aim to move the discourse on sustainability in the textile sector to another level. There is no quick fix towards optimal sustainability performance. Challenges rise and at the same time opportunities appear, when we shift our focus, ask questions, increase our knowledge and test our practices, continuously. Sustainability is not about compartmentalizing system elements such as water, greenhouse gasses and nutrient flows. It is about viewing and planning for the whole system while finding out (and implementing) what works at a specific time and place. Nor is it about increasing profit margins through efficiency gains. It is about balancing costs and benefits, for nature and for people, in an inclusive and equitable way, with attention for change towards the future such as projected numbers on population growth. It can also be about challenging assumptions or preconceptions, such as those on consumption, which can often be biased towards particular viewpoints or assumptions on what people will want to consume (e.g., more cheap meat rather than less better quality meat, as dietary advice will likely influence dietary change as much as wealth and the promotion of fast or processed food). With this in mind we can start exploring production and sourcing strategies for fibres that are truly future proof.

4 Improvements in sustainability in textiles business models today

4.1 Agricultural production & natural fibres

There are various ongoing initiatives, started by business as well as (donor) governments and NGOs, to address and improve sustainability in the textiles sector. There is now a growth and spread of numerous sustainability standards for cotton, which promote better agricultural practices, offer farmer support and aim to create the market link between certified supply and demand.[4] Although many improvements are being made on the ground through training and certification, few standards are able to address all relevant social, economic and environmental issues. In fact, standards address

2 An interesting past project of this type can be seen at this link. http://www2.wrap.org.uk/downloads/Emerging_fibres_-_summary.61bdc4ce.10840.pdf

3 See for example (link to research: http://www.wrap.org.uk/category/materials-and-products/textiles)

4 http://www.ecolabelindex.com/ecolabels/?search=cotton&as_values_020=

different elements, do not cooperate well and even in a single sector like cotton, they compete with each other. Due to the number of standards and variety of methodologies and metrics to account for the actual change in the field, comparison in performance is difficult and evidence to back up claims is often weak. This situation results in the risk of *greenwashing* with confusion over labels and claims and entry of weaker schemes, while losing trust of buyers and consumers at the end of the supply chain, instead of realizing the initial goal of more sustainable practices and products.

Do existing standards for the textile sector lead towards true sustainability or is it merely damage reduction in an unsustainable system?

On top of that, standards are increasingly competing with each other in their outreach to producers as well as end markets, which adds a layer of complexity in the already crowded space where supply chain actors have to find ways to cooperate towards shared goals of improvement. Lastly, there is a question that no one within standard setting bodies is likely to ask, with respect to the suitability of certain areas and regions to produce cotton at all, let alone which is the best system farmers of that profile and in that area should be in. Sadly, this latter item is too often determined by who has funds rather than by which is the best system, and is something that should be addressed. Because what are the limits of scale and intensity of resource use that determine whether a production system is still sustainable? Depending on the landscape context - its population density and water resources for example - this will differ for each geography. Therefore, we have to look at the larger picture of rural development in an area instead of ticking the boxes of a single commodity standard, bearing in mind the lack of completeness in standards in assessing suitability and development.

4.2 Industrial processing & synthetic fibres

In the case of synthetic fibres, sustainability efforts focus primarily on reducing the environmental footprint in production and processing and lengthening the lifespan of synthetic textile products by recycling and reuse. There are also some efforts to look at the sustainability of raw materials, e.g., recycled polyester and various bio-polymers. Some Northern European countries are making headway by looking at how technology, investments and a supporting regulatory framework can support recycling and reuse of synthetic fibres across different sectors. Considering that fossil fuels - the ultimate source from which most synthetic fibres are derived - will run out in the near future is a clear driver for sustainable use and reuse. Initiatives such as Waste2Wear[5] provide inspiring examples of how synthetic material such as plastics, deemed worthless to society after one time use and an environmental problem in terms of pollution, can have a second life as clothing. Such innovative ideas show that there is no such thing as waste and material can be turned back into value again.

4.3 The sustainability potential of alternative fibre resources: Viewing the whole system

There is a broad range of natural material that is not a primary fibre crop[6], but fibrous matter appears as by-product of food crop production and consumption, for example in the case of banana, pineapple, palm oil and coconut. Whilst appearing somewhere along the supply chain or as consumer waste, this biomass offers a potential opportunity for a textile business model (banana and pineapple

[5] http://www.waste2wear.com/

6 Primary fibre crops, such as cotton, linen, flax, hemp, are produced for the purpose of fibre and material use. Often there are by-products, such as oil from seeds or animal feed from biomass, but the main product is the source of fibre.

have long histories as textiles fibres for example[7]). Tapping into these resources that would otherwise remain underutilized requires further exploration and cooperation between food and beverage industry and the textile sector to ensure suitable fibre characteristics and quality. This resource pathway uncovers hidden potential to improve the sustainability performance of the textile sector, since the footprint of production and processing can be shared with multiple functions of the original crop and divided over a variety of end products – of which fibre for textile is only one.[8]

4.4 Over-consumption and fast fashion: the real cost of cotton

Cotton land use has remained relatively stable over the past 70 years - it reached 35 million hectares in the 1950s and is barely above that level now (minimum has been 28 million and maximum 36 during this time), despite production reaching 26 million tonnes in 2014 - it is yield growth that has driven the growth in cotton volumes. These went from an average of 230 kgs of lint per hectare in 1950/51, peaking at just under 800 kgs in 2007/8, with a slight decline since. According to the International Cotton Advisory Committee (ICAC), maintaining the cotton area is dependent on prices remaining relatively high to counter competition from demand for biofuels and food crops (often easier to grow, so temping for farmers when cotton prices decline), as well as tighter water supplies (where irrigated, there is competition from other uses as well as higher prices, and where rain-fed there is more erratic and unpredictable rain-fall), and to offset rising production costs[9].

Meanwhile, cotton has a high water footprint despite being a relatively drought tolerant crop: '*Among natural plant fibres, cotton has the second highest global average footprint at 9,114 litres per kilo (Hoekstra 2013). It is associated with 'severe water scarcity' in rivers in Pakistan (Indus), Turkey (Tigris/Euphrates, USA (Colorado) and Australia (Murray).*[10]
Further problems to note include the relatively high negative externalities of cotton as a whole (a figure given by consultants McKinsey is US$ 7,266/tonne for 2011, when the cotton price averaged only US$ 1476/tonne), and concerns over low incomes and wages among smallholders and workers, especially seasonal and migrant workers (alongside job security and working condition concerns, bonded, forced and even slave labour remaining significant concerns).

Finally, cotton is confronted by a relative decline in its market position, with polyester now accounting for over 70% of textiles demand. Natural fibres as a whole accounted for only 31 million tonnes of world fibre consumption out of 83 million tonnes in 2012, with cotton making up 77% of the natural fibres part. For other natural fibres, '*Bast fiber consumption (flax, hemp, jute, ramie, and allied fibers) totaled 4 million metric tons in 2012, and other natural fibers (abaca, agave, coir, kapok, silk, sisal and wool) added another 2.5 million tons*'.[11]

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7 See for example: http://www.teonline.com/knowledge-centre/banana-fiber.html http://www.ecotextile.com/2013031111946/materials-production-news/banana-fibre-for-textile-production.html http://fosetonline.org/AGA/13-AGB-DR%20S%20K%20DEY.pdf http://www.theguardian.com/business/2014/dec/21/wearable-pineapple-leather-alternative http://www.rca.ac.uk/news-and-events/news/rca-textiles-produces-first-leather-alternative/).
Also: '*Recently, studies have been initiated that are aiming at zero emission models for the sisal industries and to use this waste biomass for ethanol fermentation purposes or production of biogas.*' for example, see ftp://ftp.fao.org/docrep/fao/011/i0709e/i0709e03.pdf
Further examples can be found at http://www.wornclothing.co.uk/projects/indian-shoddy-industry/ http://www.uniformreuse.co.uk/uk-clothing-waste.html

8 See for example Van Dam, J. et al., Securing renewable resource supplies for changing market demands in a bio-based economy, Industrial Crops and Products 21 (2005) 129–144

9 See (http://dnfi.org/wp-content/uploads/2013/08/Portugal-Paper.pdf).

10 Hoekstra A.Y., 2013, The water footprint of modern consumer society, Routledge: London

11 http://dnfi.org/wp-content/uploads/2013/08/Portugal-Paper.pdf

5 Improvements in sustainability: Future pathways for fibre sourcing beyond certification

5.1 Improve agricultural systems performance

Fibre supply, from natural sources, stems either directly from fibre crops or indirectly as by product from other crops. It can also be derived from other biomass sources such as (plantation) forests or natural environment (reed, wild varieties of fibre crops). When crops are directly produced for fibre, the production determines a great deal of the sustainability performance of the fibre material and finally the textile product. Cotton is grown in both high input systems, supported by latest science and technology, and low input systems, by choice or default due to lack of access to inputs by farmers in some regions. Depending on the available land and water resources, the quality of the soil and land-use management in cropping and rotation, production systems desire different inputs and lead to different outcomes – both economically as well as environmentally.

There are various measures that are helpful in characterizing a production system, distinguishing agriculture by its scale, ownership, input intensity, mechanization, biodiversity and (access to) seed variety (GM or non GM). Depending on the local context and the chosen parameters for sustainability, some agricultural production systems will function better than others (depending on climate and variety, allowing for rain fed or drought resistant crops). It is not possible to attach a score to each production system, it is more relevant to consider underlying values that determine sustainable performance in a specific location or region. Diversity, intensity (use of resources), inclusiveness and optimization of landscape performance say a great deal more than labelling production organic or gm, with high or low input needs.

Agro-ecological intensification[12] is a systems approach to agriculture based on these values, with the aim to increase productivity in terms of yields as well as maintaining nutrient flows, building soil quality and biodiversity through crop combinations in the production system. By means of crop synergies and natural pest management strategies, a farmer does not only manage his own inputs but at the same time diversifies economically, decreasing risk and dependence on a single crop. Both production of cotton as well as other crops with multipurpose functions could thrive through agro-ecological intensification as one of the fibre sourcing pathways to more sustainably grown natural fibres.

Box 1. Cotton and food security

It is worth noting that a sustainable production system for natural fibres in most contexts (i.e., smallholder production systems in developing regions) must take into account food (and livelihood) security for producers, workers and their communities. Critical to this is the notion of food security, i.e., their ability to provide a balanced and sufficient diet either from farming or farming income, that has no gaps or shortfalls (that cannot be made up from other incomes or production sources under their control). This implies a diverse farming system and not a monocrop production system. A diverse farming system grows several different crops, may include plantations or small areas of fruit trees and potentially access to wild food sources, and will also use (sustainable) production approaches such as crop rotation and intercropping. Cotton or other fibre production can contribute to food security by bringing cash income and access to an organized market and support system, provided prices remain sufficient to provide a profit.

12 Pablo Tittonel (2013) Inaugural address Wageningen University

5.2 Innovation through science and technology: Fibre sourcing and processing

Not only in latest developments in agriculture, but especially in the processing of fibrous material science and technology play a key role. For example, the processing of lignocellulose biomass wastes is attracting interest for its quality fibre potential.[13] Research is crucial to look further into valorisation of such by-products, residues and waste streams. As opposed to well established supply chains in both food and textile markets, linking the two together and finding relevant biomass streams that can crossover is unexplored terrain. This process of vertical integration, as stated by Van Dam (2005), entails an optimal design of the value chain by combining markets for food, energy and non food and is needed because the use of biomass products always involves several more or less independent chains: "*Sustainable exploitation of biomass can only be realized when all flows of products and residues are allocated to uses that guarantee maximum value.*"[14] Initiatives to address these cross-sector challenges are for example the Dutch Biorefinery Cluster, a partnership where the agriculture sector and the pulp and paper industry have combined their knowledge to explore new technologies for optimal fibre extraction and fibre quality.[15]

6 Concluding remarks: What we need

We all have a responsibility for the consequences of our actions, and as corporate citizens, businesses in the textiles sector, from farm to retail and including ancillary actors like input providers and others, we need to take responsibility for mitigating negative impacts and increasing positive impacts.

Rather than focussing on single products, supply chains or impacts per unit, this must instead be a broader focus including a change of perspective on the industry itself and its system and performance, as well as a focus on reducing the footprint of fibre resources as part of responsible resource use, resource use reduction, efficiency and use of waste and by-product. The textiles industry must find the ambition to create value, close production cycles and extend lifespan (reuse/recycle) towards customers.

To achieve change requires cooperation, which is critical to finding innovative solutions, which themselves may come through unexpected partnerships or relationships. It also requires a process of continuous leaning (and sometimes experimentation) about what sustainability is, where you are on the learning and implementation curves as well as communication – about what has been achieved, about challenges, and sharing this to ensure others can learn and build on the positive and avoid the errors pioneers may make. Understanding these challenges is a first step in taking responsibility and working towards improvement .

This research was made in collaboration with Ecotextile News journalist Simon Ferrigno.

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For more information, please contact:
Katie Minderhoud, Market Developer
+31 30 2720313 or +31 6 296 01233
Katie.Minderhoud@solidaridad.nl

[13] http://www.dutchbiorefinerycluster.nl/positionering/biofib
[14] Van Dam, J. et al., Securing renewable resource supplies for changing market demands in a bio-based economy, Industrial Crops and Products 21 (2005) 129–144
[15] http://www.dutchbiorefinerycluster.nl/

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