

Disappearing natural resources: what flowers tell us about new value chains

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Depleting natural resources: Do we need new value chains?

The COVID-19 crisis has highlighted the shortcomings of global value chains well illustrated by the cut flower industry. In fact, flower growers, florists and all the other actors of the cut flower value chain had to dump flowers because the pandemic has completely shattered the value chain they are embedded in. At the heart of the crisis, in March 2020, the Dutch auction had sold 30% fewer flowers than the preceding month. This external shock shows how the interdependence of actors within global value chains can have dramatic consequences.

In fact, the pandemic adds to criticisms already addressed to global value chains when it comes to sustainability. Among other effects, global value chains encourage non-ethical practices in countries seen as pollution havens and pollution due to international shipping. Flower growers mainly located in developing countries such as Colombia and Kenya tend to apply fewer social and chemical regulations than their counterparts in Western countries. Further, as the majority of flowers sold in the USA comes from the Vancouver flower auction, they undergo air transport, which implies even more pollution resulting from an already wasteful industry.

These practices lead to the depletion of natural resources such as water and soil that eventually jeopardize the sustainability of firms. Natural resource depletion may also lead to price increases. Fighting against natural resource depletion not only concerns sustainable development but also constitutes an important strategic objective for firms (Bonn and Fisher, 2011).

Until now, firms mostly addressed the resource depletion issue by trying to optimize the current exploitation of natural resources and improve their sustainability. We suggest taking the pandemic as a signal of warning to question the way business is currently structured and look at more radical solutions to tackle natural resource depletion.

We propose a new model for natural resource management that we illustrate with examples from the cut flower, fishing and textile fiber industries. The model involves the exploitation of alternative natural resources that foster locality. This shift involves structural evolution for industries by first replacing global value chains with local ones; secondly, changing the value of the alternative natural resource; and third by grounding firms' growth strategies on the replication of local value chains.

Shortcomings of global value chains regarding natural resource depletion

In search of perpetual value creation, firms want to optimize their use of natural resources by relying on economies of scale and on the specialization of actors. This favors cost

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minimization, flexibility and speed. To do so, firms have constructed global value chains, defined as the full range of activities distributed among many firms scattered around the world (Ponte *et al.*, 2019). However, global value chains have many shortcomings when it comes to sustainability. For instance, in the fishing industry, despite policies set up since the 1970s to limit fishing catches, the Food and Agriculture Organization of the United Nations estimates that the fraction of fish stocks within biologically sustainable levels decreased from 90% in 1974 to 65.8% in 2017. The recent crisis provoked a value chain dislocation, exacerbating the shortcomings inherent to this industry. As fish is among the most traded food products in the world, the measures set up to contain the spread of COVID-19 (e.g. closing food services, cessation of tourism, reduction of transport services, trade restrictions) have shattered the whole industry. The crisis highlights three major weak points inherent in global value chains: they tend to over-exploit natural resources, they favor speculation over natural resources' prices and they increase the interdependence of countries in relation to natural resources.

First, the overspecialization of countries across global value chains leads to potential over-exploitation of natural resources. For instance, Kenya has become the world's third-largest cut flower exporter, with over 123 tons in 2015, mainly to Europe (Kavilu, 2016). Most Kenyan crops are located in the Lake Naivasha region. As flower farming activities in this region grew, they competed with pastoral activities that were traditionally present in these lands and reduced grazing land and water supplies available for livestock. Today, 70% of the country's flower farming occurs in this area. Local Maasai herdsmen fear that the expansion of flower farming will endanger their seminomadic activity as flower farmers are accused of blocking access to Lake Naivasha, which is the only local water source. Some Maasai have already abandoned their traditional ways of living to support their families. Kenya's specialization in growing flowers has led to the appropriation and control of lands and water by a few flower farmers at the expense of subsistence farming activities that are now endangered. Adding to the dismal outlook, the Kenyan Agricultural Employers Association estimates that more than 6,000 workers in flower farms have lost their jobs because of COVID-19.

Second, the price of natural resources may be subject to speculation, which renders resource pricing unpredictable and potentially ignites tensions (George *et al.*, 2015). In the cut flowers case, production has expanded while global demand has not followed suit, creating a vicious circle of oversupply resulting in a decline in the price of flowers, giving growers no other option but to produce low-price flowers (Stewart, 2008). To remain profitable, flower growers are obliged to produce more flowers to compensate for their low prices and to grow them at low costs, which spurs alterations to their environmental standards. Consequences are dramatic as prices drop. During the pandemic of 2020, even though March is traditionally the month with the highest sales volume in the Dutch auctions, the average sale price was below 20 euro cents, the lowest price since July 2013. Flower growers had no choice but to sell below cost.

Third, global value chains create interdependence between actors. As natural resources are usually located in fixed areas, they trigger political risks from governments that tend to regulate their access. Their control creates tensions (George and Schillebeeckx, 2018) and, contrary to popular opinion, developing countries may not achieve economic upgrading through their involvement in global value chains (Dindial *et al.*, 2020). When the Andean Trade Preference Act lifted duties on numerous exports from Colombia to the USA in 1991, the 6% import duty on Colombian cut flowers disappeared. This accord pushed Colombians to invest in the flower industry. In 2012, the USA-Colombia Trade Promotion Agreement permanently reinforced the duty-free flower agreement. The pact rolled back import fees on Colombian flowers. At that time, Colombia's dependence on flowers had already been settled for nearly two decades, Colombian growers could not withdraw from the industry and stop selling cut flowers to the US market, especially as Colombians do not

consume flowers themselves. On the other hand, the intensification of Colombian production led to the disappearance of the American cut flower industry. In fact, while California supplied the large majority of cut flowers in the 1990s, Can production has now become marginal compared to that of South American countries (Stewart, 2008). Due to the politicization of the flower industry, the USA and Colombia became mutually dependent, with no interest in switching their respective roles. Such a state of affairs reinforces current practices, which makes the two previous points denounced above potentially irreversible. During harsh crises such as the COVID-19 pandemic, this situation of dependence has major consequences. The Colombian Flower Exporters Association estimates that given the lockdowns and stay-at-home orders from the US Government, sales for Mother's Day in 2020 were 40% lower than normal, equal to a \$108m reduction in revenue for Colombia flower growers for the months of April and May 2020.

The cut flower industry is not the only one to experience the shortcomings of global value chains. Apparel brands have been affected as approximately one out of two items of clothing are made of cotton. The World Wildlife Fund estimates that the cultivation of this textile fiber takes up approximately 2.5% of global arable land, consumes eight-to-10% of the world's pesticides and is the largest user of water among all agricultural commodities. For instance, 97% of the water in the Indus River in Asia goes toward producing crops such as cotton. The industry has also become highly dependent on the market price as the COVID-19 crisis illustrates. As prices have dropped to \$0.48 per pound in April 2020 (in comparison to \$0.60 a month earlier), farmers, who did not have a choice, sold below cost. Others preferred holding on, therefore impeding ginners buying cotton, weakening the most vulnerable actors of the globalized cotton value chain. Overall, despite promises of many apparel brands to pollute less, resource depletion will continue as long as this over-consuming system is still in place.

Optimizing global value chain hardly solves natural resource depletion

To optimize global value chains and make them more sustainable, firms have first sought continuous improvement. The objective was to simultaneously minimize harms to the environment and realize significant savings by incorporating environmental constraints into the product design and development processes (Hart and Dowell, 2011). For instance, for Dutch flower breeders have approached natural resource depletion by planting flowers in water and rock rather than soil to reduce pesticide use. They have also developed a closed-loop water recycling system aimed at saving water (Porter and Van der Linde, 1995). This innovation has dramatically lowered not only the environmental impact of the flower industry but also improved costs and the quality of flowers produced. As a result, it helped enhance the industry's global competitiveness... for a while. But while these outcomes are certainly positive, researchers only examined this resource challenge from the breeders' perspective while ignoring other parts of the value chain where over-exploitation, speculation and interdependence issues may still apply.

Firms took a more holistic view on global value chains by looking at different areas for improvement, including sourcing and labor regimes in supplier operations. They also monitored and documented the sources and processes of sustainability compliance (Ponte, 2020). The label Fairtrade international began certifying flowers in 2001 and now the label now covers over 67,000 workers in East Africa, constraining flower producers who endorse the label to meet floor wage requirements. However, we argue that these improvements do not question the economies of scale and the specialization of actors at the core of the global value chain models. The latter have continued their expansion and natural resource depletion.

Inspired by entrepreneurs who developed new approaches to tackle natural resource depletion, we present a more radical means to build value chains both more sustainable and more robust when major crises occur.

Shifting to alternative local natural resource exploitation

If we want firms to address the depletion of natural resources, we argue that rather than relying on natural resources embedded within global value chains, firms should rely on alternative local natural resources instead. This is a way to move away from the shortcomings of global value chains by avoiding over-exploitation, market speculation and interdependence.

The Slow Flower Movement shows that it is possible to promote local natural resources. This initiative, launched in the USA by journalist Debra Prinzing, addresses natural resource depletion in the cut flower industry by renouncing the exploitation of exotic flowers around the globe which has been criticized for harming the environment. The alternative encourages local networks of growers to sell their flowers less than 50 miles from where they grow and to respect the flowers' natural growing conditions. Such practices avoid overdependence on wholesalers and market auctions, stopping market speculation. Further, as locally grown flowers adapt to local weather conditions, they are less demanding in terms of natural resources, especially water, and they are less reliant on fertilizers and pesticides. They also grow in unheated greenhouses and, as they are sold in the same country where they grow, they need not comply with sanitary inspections by customs officials, which encourages heavy use of pesticides to prevent pest contamination. The Slow Flower Movement model avoids the over-exploitation of natural resources.

The initiative is blooming. Fifteen wholesale markets for local flowers are now operating in the US compared to only one in 2011. In Great Britain, the "Flowers from the Farm" cooperative that brings together producers of all sizes to access British-grown flowers has doubled the number of participants in two years to reach 800, all the more interesting as consumers are even willing to pay up to 25% more for locally grown flowers. It makes it a promising market even in crisis contexts as breakdown in supply chains caused by the pandemic has highlighted the desire for local flowers.

Similarly, while we explained that the fishing industry unsuccessfully relied on fishermen to prevent the depletion of fish, other solutions can address the issue more successfully. For instance, it is possible to rely on "forgotten" fish, i.e. those species that fishermen prefer throwing overboard because they are sold at prices so low that they are not competitive in comparison to anchovetas, AK pollocks or tunas that account for the three most-captured fish species. Fishing "forgotten" fish alleviates the pressure on the most endangered fish stocks by distributing demand over a larger number of species. However, to exploit local flowers, "forgotten" fish and alternative local natural resources from other industries, it is necessary to build new value chains.

Building new value chains

Shifting to local natural resources involves the mobilization of new capabilities and new actors and *in fine* implies the creation of whole new value chains. Many owners and managers around the world experienced a close call during the pandemic. As the crisis shattered global value chains, businesses had to rely on local value chains to continue selling their goods. Reconstructing value chains using alternative local resources is demanding for industries because know-how, skills, methods, tools and staff required may differ, depending on the natural resources in use. Debra Prinzing embarked on a 52-week exploration of bouquet design to demonstrate the feasibility of creating bouquets year round by exclusively relying on locally grown elements from her garden, nearby farms and flower fields. She synthesized this exploration in a book titled *Slow Flowers* (Prinzing, 2013).

Firms alone cannot reconstruct entire value chains. It is thus necessary to convince many stakeholders to adapt to and take part in this new value chain. In her search for an alternative to the Vancouver flower auction, Debra Prinzing constructed a network of flower

farms, regional wholesale hubs and studio florists, which by 2014, grew into a directory that now lists over 700 organizations across the US.

In the textile industry, hemp appears to be a convincing sustainable alternative to cotton, as the fiber consumes less water and pesticides. However, as hemp has been declining since the beginning of the 20th century, the value chain has dislocated itself and know-how has been lost. Entrepreneurial initiatives have strived to create networks which link representatives from cultivation, spinning, dyeing, weaving and manufacture. This involves convincing farmers to cultivate hemp for the textile industry. It also involves developing new capabilities such as the natural retting of straw, a process that differs considerably from the one used in cotton transformation.

As the new value chain relies on alternative local natural resources, the value offered to consumers evolves. For the cut flower industry, it involves not having access to tulips in the winter, orchids year round or roses at the Vancouver flower market on Valentine's Day. If firms willing to rely on local value chains want to keep their competitive advantage, they must find a way to rethink their offer value.

Rethinking the value offered to consumers

To offer consumers a more palatable trade off, firms can build on the alternative natural resources' intrinsic properties. While weather conditions hardly allow orchids to grow in the US, other flowers such as violets grow in California. Due to their acclimation to local weather, the fragrance of local flowers is stronger than that of imported flowers. They also have greater longevity than the customary seven-day vase life guarantee, as they do not travel two to four days by air shipping. Flower shops can also highlight flowers' local anchoring by selling heirloom varieties and species that consumers do not traditionally find in bouquets.

In the textile industry, hemp offers a lower ecological footprint in comparison to traditional cotton and started being introduced as an alternative. Hemp was discarded from the textile industry at the beginning of the 20th century because the textile industry considered it to be less valuable than cotton. Hemp has a rough feel in its natural spun state and is susceptible to fraying. Hemp fabrics are, however, stronger, more durable, and better insulating than cotton and they do not stretch out of shape. Finally, hemp fibers dye well and retain their color better than any other fabric including cotton and linen. Firms in the textile industry can build on these benefits to use hemp as a credible alternative to cotton. Levi's, a global leader in jeanswear and casual clothing, recently launched a collection of jeans made of hemp.

Replicating value chains on a local scale

How can we expand initiatives such as the Slow Flower Movement while allowing natural resource preservation? Global value chains do not allow for this, as they encourage overspecialization, rising prices, and political risks and in turn, create tensions over natural resources, factors that we pinpointed as being exacerbated during crises.

Firms should develop a new growth model that builds on local value chains whose expansion relies on the replication of existing markets on a local scale (Westley *et al.*, 2014). Locality is at the heart of the very principle of the Slow Flower Movement. Flower growers who fared best during the pandemic are the relatively smaller farms which are less tied to traditional supply chains feeding wholesalers and grocery markets. The Slow Flower Movement has not expanded beyond the United States by constituting global value chains, but has been replicated at local scales in other countries such as Australia, France and Great Britain. These countries followed the same principles of relying on local networks and flower varieties. In France, the Collective of the French Flower already has more than 150

Table 1 Shift required to anticipate natural resource depletion

Perspective	Natural resource management	Strategic approach	Growth strategy
Global value chains	Exploiting existing resources	Optimizing current value chains	Expanding global value chains
New local value chains	Exploiting alternative local resources	Building new value chains and rethinking resource value	Replicating value chains at the local scale

members who exploit at least 50% of local and seasonal French flowers. Similarly, local initiatives promoting “forgotten” fish are proliferating all around the world. These are the firms that were affected less by the pandemic, as they benefited from reduced competition with fish imports.

Conclusion

In this article, we showed that global value chains have disastrous effects on the environment and thus endanger the future of firms. These effects are exacerbated during crises such as the COVID-19 pandemic. Taking the disruption of global value chains caused by the pandemic as an opportunity to change the way we currently exploit natural resources, we suggest offering a novel model that relies on alternative local resources rather than on the over-exploitation of endangered natural resources. This strategy implies constructing new value chains that are replicated at the local scale and rethinking the resource values for consumers (Table 1).

Offering new value chains takes time because it involves collective action through appealing to stakeholders within the industries and among consumers. That is why we think that firms should act now and start transforming their current model of natural resource exploitation. The Slow Flower Movement, “forgotten” fish and the hemp cases show that different industries have already started organizing local value chains.

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