Is cotton conquering its chemical addiction?

A REVIEW OF PESTICIDE USE IN GLOBAL COTTON PRODUCTION

October 2017
Executive Summary

- Pesticide use patterns have changed over the past few years as many of the older, more toxic pesticides—such as endosulfan—have been banned and replaced by newer, more selective chemicals.

- The coverage of sustainability standards such as the Better Cotton Initiative, Cotton made in Africa, Fairtrade and Organic has dramatically increased. These standards, which restrict the use of some highly hazardous pesticides and promote farming practices to reduce reliance on pesticides now reach over 1.7 million farmers and cover 3.7 million hectares.

- Nevertheless, many highly hazardous pesticides are still used in cotton production and, in some regions, the conditions under which pesticides are used continue to give rise to pesticide exposure and poisoning incidents. This is particularly true in smallholder cotton production.

- The introduction of Bt cotton—cotton genetically modified to be toxic to certain cotton pests—in the early part of the century was followed by a dip in insecticide use, but this reduction has not been sustained in many of the countries examined.

- This renewed increase in insecticide use has been driven by a surge in “secondary” pests like aphids, thrips and jassids. These pests, which had previously caused relatively low levels of damage, have now become a serious threat to cotton productivity.

- Poor resistance management, particularly in mixed smallholder cropping systems with minimal coordination and regulation, is leading some species of bollworm to develop resistance to certain varieties of Bt cotton and to an increase in insecticide use.

- Herbicide use in cotton has not substantially declined. In fact, in some countries, the introduction of varieties of cotton that have been genetically-engineered to be tolerant to some herbicides has been accompanied by an increase in herbicide use.

- Herbicide resistance in weeds, driven by a lack of effective resistance management, is becoming a problem and increasing herbicide use in some countries. This resistance is caused by both the transfer of herbicide-tolerant genes to weeds and, more commonly, by weeds “naturally” developing resistance as a result of excessive herbicide use.

- Australia is notable for its success in delivering and maintaining dramatic reductions in insecticide use. However, despite insecticide use declining by 89% over the past two decades, herbicide use has not dropped. Australian farmers regularly deliver the highest cotton yields in the world.

- The Australian cotton sector is unique in its ability to manage resistance on a “landscape-scale” via rigorous enforcement of requirements across a relatively small number of farmers with dedicated strong scientific support. However, these conditions can rarely be replicated elsewhere.

- Australian farmers have also embraced Integrated Pest Management (IPM). Not only has this helped in resistance management, but IPM has been a significant factor in helping them to control secondary pests without resorting to higher insecticide use.

- Turkey has diverged from other major cotton producing countries by rejecting GM cotton and focussing on IPM. Turkish yields have doubled since the 1980s to some 1700 kg/ha—approximately double the global average—yet pesticide use remains low.

- Numerous studies have been published relating serious health impacts to pesticide exposure among cotton communities. Symptoms recorded include impairment of the nervous system, lower neurobehavioral performance, delayed puberty, breast milk contamination, blood abnormalities as well as many acute symptoms such as nausea, respiratory problems, dizziness and convulsions.

- Case studies presented in this report clearly show that poor practices continue to exist in cotton production. Personal protective equipment is not widely used and, in some instances, children apply pesticides. Re-use of empty pesticide containers is a major route of exposure. Occupational poisoning levels are high with as many as 42% of farmers reporting signs and symptoms of pesticide poisoning.
Introduction

Cotton supports around 100 million rural families across the globe; it provides employment and income, and is the mainstay of the economies of some of the poorest countries in the world. But cotton has its problems: it has been associated with everything from forced and child labour to pesticide poisoning of farmers and their families and environmental pollution. A number of high profile initiatives have been launched to tackle these problems and they are making inroads, many of the most egregious practices harming human health and the environment have been – or are being – addressed. But it is a work in progress and data on the level of change is sketchy.

The debate on pesticide use in cotton in recent years has been severely distorted by the use of figures that are out of date and inaccurate. This report aims to shine a light on the current rate of pesticide use in cotton, and examine trends and patterns of use. We take a detailed look at six countries and regions who between them account for around four-fifths of the world’s cotton production: Africa, Australia, Brazil, China, India and the United States.

The task has not been easy. Reliable data on global pesticide use in cotton is not readily available and is spread across multiple sources with different approaches to data collection. In this report, we have drawn on figures from the Agricultural Outlook 2016-2017 database compiled by the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) of the United Nations. Where possible, these data sets have been compared with information made publicly available from other official and/or scientific literature sources (e.g. International Cotton Advisory Council, US Department of Agriculture and other national data sources).

Findings suggest that total pesticide use in cotton has fallen since the 1980s. In particular, insecticide use has declined, as has herbicide, although neither are as significant as some have claimed and both are on the rise in some places. Pest adaptation to the new transgenic GM environment is also changing the way pests are controlled, and in some cases requiring the pattern of insecticide use to be adapted. Progress is not uniform: some countries have achieved and sustained significant reductions in pesticide use, while others have seen use rise. It is worthwhile noting that those countries who have been most successful at cutting pesticide use – and in keeping it low – have been those who have embraced Integrated Pest Management (IPM). The lesson is clear: if it is serious about reducing pesticide use, the sector must make more use of tools like IPM and other agro-ecological approaches to control pests.
“We are thankful to Pesticide Action Network UK for undertaking this study to provide current data on global patterns of pesticide use in cotton and documenting the associated problems. The study clearly shows that reductions in pesticide use are possible, but that the adoption of IPM and other agro-ecological practices must be central to these efforts if reductions are to be maintained.”

Anita Chester  
Head of Sustainable Materials  
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