

This is the third of six information sheets on improving agro-chemical management in the Caribbean. This sheet looks at the experience of St. Lucia, Jamaica, and the Wider Caribbean and makes some specific recommendations for addressing the resulting problems. Agro-chemicals have been reviewed with particular attention to their toxicity within the marine environment and their impact on public health. Note that discussion of toxicity relates to the active ingredients contained in agro-chemical formulations, and not to any products of their breakdown.

1. Overview

There has been a long-term increase in the quantities of imports and manufacture of agro-chemicals in St. Lucia, Jamaica, and the Wider Caribbean. There is an urgent need to:

- Raise public awareness of the potential dangers of agro-chemicals
- Conduct further research into the chronic and acute effects of agro-chemical use on people, including occupational exposure, environmental pollution, and food contamination
- Conduct further research on the toxic effects of agro-chemicals in the environment.

The example of St. Lucia and Jamaica

Long-term trends indicate that total pesticide use is increasing in both St. Lucia and Jamaica, and that agricultural pesticides form a large proportion of the pesticides in use. Table 1 shows the total pesticides imported (not only agro-chemicals) to St. Lucia and Jamaica.

Concurrent with this, there is clear evidence of a long-term increase in the quantities of imports and manufacture of agro-chemicals, not only in St. Lucia and Jamaica, but also in the Wider Caribbean (Table 2). Recent data have shown that 57% of the pesticides imported to Jamaica are for use in the agricultural sector (PCA, 2003). The data also show that there is considerable inter-annual variation in the use of different fertilisers as well as pesticides (Table 3), highlighting the importance of continually reviewing such information.

The main factors influencing variations in the quantity of agro-chemicals in use are:

- Changes in legislative arrangements
- Dumping of agro-chemicals
- Increased pests and diseases
- Changes in agricultural practices
- Changes in crop types.

Other external factors include international trade issues and climatic variations.

For the three-year period 1998–2000, the largest contributors to the total quantity of pesticides imported into Jamaica were mancozeb, 2, 4-D, diuron, glyphosate, paraquat, and terbutryn. For St. Lucia, the largest contributors were ethoprophos, paraquat, carbofuran, glyphosphate-trimesium, imazalil, and diuron.

There are clear indications that insecticides constitute the largest proportion of pesticides imported into Jamaica and St. Lucia (and the Caribbean) each year, and this trend is likely to continue. This is largely due to the fact that many of the insecticides are household pesticides, which are greatly used in both countries.

Table 1 Summary of pesticide imports in St. Lucia and Jamaica (1999–2001)

Field of use	Import quantity (kg)					
	1999		2000		2001	
	St. Lucia	Jamaica	St. Lucia	Jamaica	St. Lucia	Jamaica
Insecticide	299,919	728,657	238,445	796,513	571,846	1,256,889
Nematicide	187,384	208,840	68,532	158,455	36,730	93,563
Fungicide	171,710	1,006,288	11,896	1,056,017	6,410	877,236
Herbicide	281,079	689,194	69,613	719,800	80,988	963,200
Other	5,903	106,699	6,536	86,292	1,182	84,111
Total	945,995	2,739,678	395,023	2,817,076	697,156	3,274,998

Source: Mathurin.

Table 2 Total imports of pesticides in selected Caribbean countries (1996–2000)

Country	Total pesticide imports (kg)				
	1996	1997	1998	1999	2000
Antigua & Barbuda			272,446	533,680	104,369
Dominica	574,200	499,323	410,496	4,783,153	608,722
St. Vincent & Grenadines	679,365	1,480,189	783,703	2,109,236	
Grenada	114,945	65,891	150,538	76,475	68,983
Suriname	6,271,481	15,946,805	7,894,401		

Source: Dasgupta and Perue, 2003.

Table 3 Import of fertilisers in Jamaica (1980–2000)

Fertiliser type	1980	1985	1990	1995	2000
	Total pesticide imports (kg)				
Nitrogen (N)	26,195,566	15,520,274	14,191,987	21,848,061	26,241,372
Phosphorus (P)	10,669,848	807,497	12,702	224,085	62,970
Potassium (K)	2,603,044	166,036	362,920	13,026,587	13,264,092
NPK		2,722	430,060	53,614	316,757
PK				68	
NP	716,767	3,110,224	907	12,633,669	11,258,763
NK		41,736	12,702		
Other	3,629	2,570,381	3,018,587	7,847,313	178,039
Total	40,188,854	22,218,870	18,029,866	55,633,397	51,321,993

Source: Espeut and Hay, 2003.

2. Recommendations

- Information relating to agro-chemicals and their effects on human health and the environment should be scrutinised, as many studies are funded by the pesticide manufacturers and this may lead to the suppression of unfavourable results.
- There is a definite need for further research on the impact of agro-chemicals on humans to identify pesticide poisonings and to see whether there may be correlations between pesticide exposure and certain medical conditions such as cancers, infertility, and other health effects. Carefully designed public health monitoring plans must be developed, in areas such as chronic and acute toxicity, and there needs to be adequate analytical capacity to enable monitoring for compliance with standards for public health.
- Additional studies should also be conducted on the use and fate of agro-chemicals in tropical ecosystems (including their impact on marine biota) and especially in terms of their persistence in the environment in areas of heavy pesticide use. In particular, chronic and acute toxicity of residues in the environment need to be monitored. Priorities for monitoring should be adjusted periodically to reflect new information on agro-chemical properties, importation, and usage patterns, as well as social conditions.
- A programme should be developed that aims to educate the general public, users of agro-chemicals, and the medical profession on the many detrimental effects of pesticides on human health and the health of other organisms. This programme should also include increased awareness of Integrated Pest Management (IPM) and Integrated Management of Pests and Pesticides (IMPP), the undesirability of pesticide persistence in the environment, acute and chronic toxic effects of pesticides, and change-management concepts. This must be accompanied by the training and certification of extension officers, farmers, and commercial pesticide applicators.
- It is important that governments recognise the utmost importance of developing procedures for selecting appropriate agro-chemicals for use in ecosystems of the Wider Caribbean region. This should not be based only on cost but on the potential threats to human health and life, the health of non-target and/or beneficial organisms, the persistence of the agro-chemicals in the environment, and other effects on the environment, as well as their potential benefits to immediate users and the wider society. While it is important to consider the income generated by major crops—

coffee, banana, sugar and citrus—these are not considered cash crops. This consideration must thus be balanced with concern for workers' well being and good environmental practices.

Some measures that governments should prioritise for implementation are:

- To conduct cost-benefit analyses of agro-chemical use and IPM
- To provide adequate funding and legislative support for a central regional laboratory and for the relevant university departments and state laboratories to monitor agro-chemical use and interaction in the Caribbean environment, and to develop models for these interactions
- To find creative means of paying the high attendant costs of protecting public health and the environment
- To foster an indigenous agro-chemical industry that carries out regional research, development, and production.

Furthermore, the relevant university departments and centres:

- Must play a greater role in educating the government and other important major decision-makers about the far-reaching effects of agro-chemicals, and lobby for positive changes as well as significantly more funds for relevant research
- Need to explore and pursue possibilities for more partnerships with relevant non-governmental groups and extra-regional governments for funding and collaborative research.

Further information

Available as downloadable files under the Land-Water Interface option in the left-hand panel at <http://www.mragltd.com>:

- Dasgupta, T., and C. Perue, 2003. Toxicity Review for Agro-chemicals in St. Lucia and Jamaica. DFID NRSP Project R7668. July 2003. Chemistry Department, UWI, Mona, Jamaica.
- Esteban, N., P. Espeut, B. Hay, C. Mees, and S. Seddon-Brown, 2003. Importation, administration and harmonisation of agro-chemical management in St. Lucia, Jamaica and the Wider Caribbean. DFID NRSP Project R7668. C-CAM and MRAG Ltd.
- Mathurin, PCB St. Lucia, pers. comm.
- PCA, Pesticide Control Authority, 2003. Summary Annual Report April 2002–March 2003. Paper presented to CGPC 8th Annual Meeting in St. Vincent & Grenadines. June 2003.

Other information sheets in the series are:

1. Management of agro-chemicals for improved public and environmental health
2. The fate of agro-chemicals in the land-water interface in St. Lucia and Jamaica: Environmental monitoring
4. The on farm use of agro-chemicals and associated soil management and farming practices in St. Lucia and Jamaica
5. Harmonisation of agro-chemical management in the Caribbean
6. Management options for the use of agro-chemicals.

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