

Pesticide Laboratory Capacity in the SADC Region – A Vital Link in Pesticide Risk Reduction



Why is it important for laboratories in the SADC region to be able to analyze pesticides and pesticide residues?

Pesticide analysis is required in order to determine whether humans are exposed to pesticides and to quantify the extent of their exposure. This will enable us to determine if they are incurring health effects from these exposures. It is also needed to support research and development to control health hazards from pesticides. For these reasons, Work and Health in Southern Africa (WAHSA) conducted a pesticide laboratory capacity analysis. The survey was aimed at identifying current laboratory capacity within the SADC region. At the moment, because of limited capacity amongst SADC laboratories, many organizations rely on institutions in developed countries to conduct pesticides analyses (e.g., in Sweden, Netherlands and Norway). For this reason, the study also aimed to identify where WAHSA could try to improve on the current situation.

What is the current laboratory capacity to analyze pesticides in the SADC region?

Countries which have laboratories for pesticide analysis as of August 2008:

- Mauritius (3 labs)
- South Africa (9 labs)
- Tanzania (3 labs)
- Zambia (2 labs)

Not all laboratories can do the full range of analyses. For example, 13 of the 15 laboratories in table 1 reported being able to measure pesticides in water. However, only five laboratories reported being able to measure pesticides in human samples, such as blood or urine. Capacities therefore differed greatly between laboratories. See Table 1 for a list of capacity these labs have for analyzing pesticides in the SADC region.

What training does the laboratory staff have in the SADC region?

Most staff are not trained to analyze pesticides. However, those with qualifications have either National Diploma's or a Bachelors or Masters Degree. In only a few cases did staff have PhD qualifications.

Table 1: Capacity for analyzing pesticides in the SADC region

Country	Name of laboratory	Conduct analyses of pesticide residues	Conduct bio-monitoring (testing for pesticides in samples)
Mauritius	National Environment Laboratory, Mauritius	Yes	No
	Forensic Science Laboratory, Government Analyst Division, Mauritius	Yes – in water only	No
	Agricultural Chemistry Laboratory, Mauritius Sugar Industry Institute, Mauritius	Yes – in sugar, soil and aqueous samples	No
South Africa	Hearshaw & Kinnes Analysis Laboratory, Cape Town	Yes – in fruit, vegetables, soil and water	No
	Forensic Chem. Laboratory, Cape Town	No	Blood, urine, stomach contents of post-mortem cases
	Biocrop, Johannesburg	Yes – in soil, water, milk, honey, meat, fat, nuts, dried fruit and vegetables	No
	NIOH Analysis Laboratory, Johannesburg	No	Biomarkers in humans
	CSIR Biosciences, Johannesburg	Yes – in water and plants	Mother's milk
	SABS Pesticide Residues, Chromatographic Services, Pretoria	Yes – in food, soil and water	No
	ARC, (OVI) Pretoria	Yes – in animal tissue	No
	SMI, Analysis, Johannesburg	Yes – in air, soil and water down to PPT levels.	No
	Agri research Council, Pesticide Science Division, Division of Plant Protection, Research Institute of the ARC, Roodeplaat Campus, Pretoria	Yes – in environmental samples, such as air, soil, and water	No
Tanzania	Government Chemist Laboratory Agency, Dar es Salaam, Tanzania	Yes	No
	TPRI	Yes – in water, soil and food	Human body fluids
	University of Dar es Salaam	Yes – in water, soil, food, sediments, vegetables and milk	No
Zambia	Food and Drugs control, Lusaka, Zambia	Yes – food, soil and water	No
	UNZ, Dept. of Chemistry, University of Zambia, Lusaka, Zambia	Yes – food, soil and water, vegetation, sediments and wildlife samples	Biomarkers in humans

How many samples can these laboratories analyze at a time?

There are two main categories:

- Laboratories that processed few samples (10-20 samples per week); or
- Laboratories that processed larger numbers of samples (≥ 100 samples per week)

The turn-around time (how long before results are provided) also has two main categories:

- Laboratories provide results within 1-5 days; or
- Laboratories required long periods to report results - up to 30 days

Who commonly uses these laboratories?

Government and private institutions primarily make use of these laboratories. Research projects are next most likely to make use of these laboratories. These laboratories are likely to conduct ad hoc analyses. In other words, some laboratories only do testing on an occasional basis.



What can SADC stakeholders do to improve the capacity of laboratories?

- Provide support and funds for laboratories to operate effectively, to up-date equipment and have the means to maintain equipment
- Provide support and funds for current and future laboratory staff to receive tertiary training.
- Provide support and funds for more staff to improve on current laboratories sample analysis abilities. A ratio of two to three support staff for each analyst is recommended
- Include pesticide analysis in strategic planning processes.
- Leverage donor funding to develop sustainable capacity to conduct analyses: Ensure adequate maintenance and support for equipment; adequate conditions of service for skilled laboratory staff and access to appropriate training in analytical methods.
- Where funds are available to develop residue testing for phytosanitary purposes to support trade, make sure that investments are extended to building capacity to do bio-monitoring to monitor human health. There is an economy of scale which you can take advantage of.

IMPORTANT BENEFITS OF BUILDING LABORATORY CAPACITY IN PESTICIDE ANALYSIS IN THE SADC REGION

- Through building this capacity costs would be reduced, especially in reducing the practice of sending samples to developed countries.
- Furthermore, analysis could be conducted in a more timely fashion in order to prevent exposures.
- It is important for policy makers to have their own information on which to make important policy decisions. If there are no analyses, or analyses must be done overseas, policy makers will not have the data they need to make informed decisions about national and international policies to reduce pesticide risks. For example, a country cannot meet a reporting requirement for the Rotterdam (PIC) or Stockholm (POPs) conventions if there is no ability to measure pesticides or meet phytosanitary requirements for trading with the European Union.

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