Senegalese farmers discuss pesticide issues

Small-scale horticulture growers in Senegal face different challenges in producing crops for export and local markets. PAN UK and PAN Africa's joint Food and Fairness project is working with farmers to identify their specific pest management challenges and pesticide issues. ***Siré Badji*** *describes these from the perspective of the farmers.*

Over half the population of Senegal lives in rural areas. Like most of Africa, agriculture is central to their lives, and its produce is crucial to the economy of the country. Farmers grow cotton as well as horticulture crops like green beans and tomatoes for export. Millet, cassava, rice, maize and sorghum feed farming families and are sold on local markets. Often, the rewards for their labour are meagre, and the environment is tough.

Most farmers now use pesticides to produce their crops, but it is the horticulture crops where use is generally greatest. Ironically this is the crop where high residues are most likely to harm consumers. Farmers are aware of this, but struggle to manage the hazardous chemicals because of insufficient information, training, resources and inadequate means of protecting themselves. Serious pest problems must be managed, but the cost of chemicals is high, and access to resources like water is difficult and costly.

Pesticide Action Network Africa (PAN Africa) works across Senegal and in 2005 carried out surveys of smallholder growers [PN71 pp 12-13]. In addition, in 2006-2007 PAN Africa facilitated several group discussions with farmers growing horticulture crops about their pest management problems and practices in two areas of the country. Both areas are in Les Niayès, a long, narrow fertile zone that stretches 250 km along the coast from Dakar to St. Louis in the North, which accounts for 80% of the Senegal's total vegetable production. The town of Sangalkam is now the major horticulture production zone in Les Niayès, lying about 80 km from the capital Dakar. Two groups of farmers from villages near Sangalkalm were interviewed – one had received training in Integrated Pest and Production Management (IPPM) while the other had not. The second village, Pambal, lies in the Thiès region, about 30 km from Dakar. This group of women farmers grows beans, tomato, cabbage, aubergine, cucumber and okra, mainly for the local markets but with some export of green beans to Europe. The women have not received training in IPPM or organic production.

Production problems

Smallholder growers face many serious problems in producing and selling vegetables and in earning a decent income. The main production constraints mentioned by untrained farmers relate to natural resources and agricultural inputs. Much of the soil is heavily infested with nematodes, which can cause tomato and other crops to be stunted and produce low yields. Pesticides used by farmers to control nematodes are expensive and often hard to find, including carbofuran and ethoprophos. Maintaining soil fertility is hard since earlier government subsidy on synthetic fertiliser was withdrawn. Often farmers do not have the means to purchase fertilisers and it is the local vegetable traders which buy fertiliser and resell it to farmers at full cost. The cost of vegetable seeds and their quality are both major problems: farmers find often that seed does not germinate properly but the supplier denies any responsibility and the farmer loses out.

Water availability is also a serious problem as many sources have become brackish and salty water can harm crops. Nevertheless, the problem is not generalised and one can still find good, fresh water in some areas. Water extraction is a constant challenge because of the cost of diesel for motor pumps for those that own them, while those without have to haul water manually, which is very heavy work.

Storing and preserving fresh produce is difficult due to a lack of cool storage facilities, forcing farmers to sell their produce quickly to avoid it perishing. Unsold produce is therefore often given to livestock or sold at an extremely low price.

All smallholders struggle to pay labour costs which are relatively expensive, costing between 45-75 euros per month. Another option is to share the harvest with the farm worker. Labour costs are a particular obstacle for women, who have less access to cash than their menfolk, and is one of the reasons why the plots of the Pambal women do not generally exceed 0.5-1.0 hectares.

Farmers identified their most crucial problem as lack of access to credit, leaving them at the mercy of middlemen buying produce in rural areas. These intermediaries will often provide advance funding to farmers at the start of the season so they can purchase the inputs they need, and then return to purchase the harvest. These middlemen can fix prices which are rarely favourable to farmers, who have no negotiating power.

Watering vegetables is heavy and time-consuming daily work for many smallholder families, Les Niayes region, Senegal.

Photo: © M.Mollica www.mimimollica.com

Conventional farmers' pest management

The main pest for all producers in Les Niayes zone is whitefly *Bemisia tabacii*. This attacks almost all vegetable crops, but is especially damaging in tomato particularly during the cooler period and causes significant losses. Conventional farmers make many insecticide applications but this is not an efficient method of controlling this pest. Certain farmers now use netting in nurseries to try to reduce infestation and loss. Others said that the insecticide imidacloprid is very effective but is relatively expensive at CFA 80,000 (122 euros) per litre, which is beyond the reach of most smallholders. The Thiès women explained that if they carry out treatments but their neighbouring farmers do not,

whiteflies will re-enter their plots very rapidly. Other problem pests are aphids and a disease which none of the agronomists in the zone have been able to identify, which attacks the leaves causing leaf curl and loss of flower buds.

The Pambal women described how many different types of treatments have been recommended for nematodes and they have tried these but without much success. They have observed that nematode damage is much more visible when they used specific sources of water to irrigate their plots. They also believe that certain plants or trees including papaya, baobab and eucalyptus can encourage the development of diseases and pests.

The untrained Sangalkam farmers were concerned that they could not recognise pests. They often need advice from agronomists or more experienced farmers in order to recognise natural enemies of pests and understand that they should avoid eliminating these from their fields. They have problems with certain diseases which they have not been able to identify and in this case agronomists recommend cutting off affected parts or whole plants to prevent further disease spread through the field.

To control insect pests they use a wide range of pesticides which they purchase on the open market, most commonly deltamethrin, dimethoate and methamidophos. To increase the effectiveness of the product, they often add diesel or liquid soap. PAN Africa is concerned about this practice because these mixtures are not always recommended and could increase toxicity and make the mixture more hazardous for farmer and consumer health. The majority of the farmers do not use appropriate protective equipment. Furthermore, the pesticide solution is prepared in a haphazard way without concern for application dose, much less for effects on health and environment. Farmers' main concern is to stop pests and reduce damage to their crops as much as possible. However, several also use certain alternative pest control methods: mainly using neem leaves, as promulgated by advisers trained in IPM, and some use Biobit (*Bacillus thuringiensis*), a biopesticide, but say this is relatively expensive and not always effective. Two of the Pambal women also tried using neem seed against pests and appreciated that it can be useful. They learnt about this technique from other women who had taken a training course.

Changes in knowledge and practice with IPPM training

The trained Sangalkam farmers took part in IPPM Farmer Field Schools run by the FAO and the local research institute CERES locustox. They found the training extremely useful. Technical crop management planning improves production. They now use manure, which was a novelty for them, and apply chemicals more rationally. The training helped them to better value local natural resources, notably cow manure as fertiliser and plants with pesticidal effects such as neem and castor oil plants. In terms of economics, IPPM helps them to reduce production costs (reduced quantity of seed, reduced pesticide applications and reduced volume of synthetic fertilisers used compared with conventional methods). It also helps them to produce better quality fruit and vegetables but unfortunately these are sold at the same price as conventional produce.

Using netting to protect seedlings from whitefly attack instead of spraying insecticide, IPPM women's group, Sangalkam district, Senegal

Photo: PAN Africa

One member of the Niayes Horticulture Producers Association (FPMN) described his experience. 'Green bean seeds are very expensive. With the IPPM training I've been able to gain experience in managing green bean sowing and now I only use 30 kg seed per hectare instead of 75 kg recommended in the conventional system protocols. I can do this by sowing at distances of 40cm between rows and 20cm within rows. I've applied just two treatments using Batic (*B.t.* biopesticide) and I only made these applications after seeing infestations. I managed to harvest a good yield of 15 tonnes per hectare. I made real benefits in reducing the cost of production and I obtained good quality and yield'.

IPPM training has made farmers much more aware of issues around pesticide use and of the need to avoid bad practices and the risks of exposure they used to run before. One grower expressed this well: 'Before the training I just managed my crop any old way, I used to use any pesticides that I could get hold of, and I didn't pay attention to the importance of recommended doses, I just needed to see insects in the field to unleash a treatment. With the IPPM project I've understood that my previous practice was suicidal and now I've adopted IPPM and good agricultural practice'. Farmers highlighted the value of special topics on pesticides, pollution and environment discussed and debated during the training.

Some of the trained farmers have transferred some of their know-how to crops not targeted by the project, practicing IPPM on crops such as sweet pepper and bissap (hibiscus flowers used to make a traditional fruit drink). Other farmers continue to make comparisons between farmers' conventional practice and IPPM in their own field. The main changes in practice are: permanent observations of the field, which is time consuming; abandoning the practice of seed broadcasting (which was easy and quick) for sowing in defined rows; being able to manage larger areas well; and working out application thresholds.

But change in behaviour was highlighted as one of the main constraints to adoption – some trained farmers have not totally abandoned their former practices. It is also difficult to persuade untrained farmers to adopt good agricultural practice and to change their behaviour regarding their use of pesticides.

Using IPPM requires more time in the field and a considerable amount of labour to prepare soil, do field scouting and prepare natural fertiliser and botanical extracts for pest control. Alternatives to pesticides are not well known or disseminated. Only neem, castor oil plant and chilli pepper are used for pest control and some crop diseases. Farmers said it was difficult to work out pest thresholds and decide when it is necessary to apply and how to choose the best natural or chemical pesticide to be used. Control of nematodes remains a real problem. For certain farmers, using powder from castor oil seeds spread over the soil and applied to crops seems to work effectively against many pests.

Unfortunately the efforts of IPPM producers are not recognised or rewarded in terms of price or favoured markets and differences between production practices are not distinguished in the market. Consumers are not informed of the dangers related to poor pesticide practices in horticulture so the efforts of IPPM farmers to produce and market better quality in its broadest sense is often in vain.

Pesticides and health impacts

Both trained and untrained farmers from both

Traditional market vendors, Castor retail market, Dakar, Senegal *Photo: PAN Africa*

areas said that they were well aware of the risks that pesticides can pose to health. They cited numerous poisoning incidents linked to the use of pesticides, frequently due to lack of protective clothing. The majority said that they do not use any form of protection because of its cost. A mask, safety glasses, gloves and boots cost around 25 euros. Certain farmers have received some training in pesticide handling, however, they continue to treat their crops without any form of protection. Farmers in each group called for protective equipment to be subsidised by government agencies (as is done for lifejackets for Senegal's fishermen) or the farmers' federations. In contrast, some export companies such as SEPAS buy protective clothing sets for the small and medium size growers registered as their suppliers and provide training in safety issues and good agricultural practice.

Several farmers in the Sangalkam groups had personally experienced health problems linked to pesticides or knew of family members who had been victims of poisoning following misuse. Some of them continue to suffer chronic ill-health symptoms, such as persistent coughing, frequent headaches and skin problems. One farmer who applied pesticides without any protection told how one day after spraying he had not bothered to change his clothes or to wash and by the time he returned home he was having breathing problems and skin allergy. He partly recovered but still suffers persistent repercussions from this incident. Farmers recounted the tragic case of a young local woman who after applying pesticides used the pesticide bottle as a water container to wash herself. Half-an-hour later she was haemorrhaging in the genital area and was rushed to hospital, where doctors were unable to save her life.

Farmers described how they eat charcoal or drink milk to mitigate mild symptoms, while in the case of serious poisoning, they will consult the doctor or go to an emergency health centre. Poisoning and ill-health are very frequent. PAN Africa highlights that pesticides can be absorbed rapidly by the body, especially via the skin, which is why it is absolutely essential to have protective equipment throughout preparation and application.

One woman from Pambal reported how one of her farm workers almost died after poor handling of pesticides. Several women had experienced problems when using pesticides or had relatives or friends who had suffered poisoning symptoms. They said that certain symptoms such as headache, nausea, generalised fatigue and skin problems were due to poor handling of pesticides. One described the case of one of her husband's farm workers, who had not properly closed his knapsack sprayer and the pesticide drenched him. After spraying, he spent the rest of the day with the wet, contaminated clothing still on. Two days later he became extremely weak with very violent diarrhoea and was rushed to the local clinic where they were able to save him.

Mr D from Beer village first realised the dangers that pesticides pose in 1992 when he lost all his goats which browsed on a field of green beans just treated with deltamethrin. Mr S from Nagga village reported a case where a farmer had invited some of his friends to help planting potatoes. He had two buckets in the fields, one containing pesticides and another with drinking water - one of his friends who came late confused the drinking water with the pesticide. Mrs S in Goram village talked about a case where a farmer had just sprayed several large fields and went home without taking off his work clothes before cuddling his two children. A few moments later, both children started to vomit. The family thought this was due to cholera and it was only at the hospital they realised that it was due to pesticide poisoning. Mr G in Keur Massar village declared that he had been a victim of poisoning after distributing the fungicide maneb to farmers. Although he removed his gloves and washed his hands well before buying some cakes he suffered direct poisoning effects (vomiting and excessive sweating) after eating them.

Farmers observed that pesticides can damage soil and the environment. The IPPM training curriculum emphasised awareness of the harmful effects of pesticides. IPPM farmers certainly appreciated how much their training has helped them to reduce risks of poisoning and to better protect their health and that of their families. The Pambal women's group are calling for training in alternatives to pesticides so that they can reduce their production costs and preserve human health and the environment.

Pesticide hazard perceptions in the marketplace

Untrained farmers were broadly aware of the risks that pesticide residues in food pose for consumers and that European importers were concerned about this issue. As the majority of farmers which PAN Africa met do not work with export companies they do not need to comply with EU requirements. In terms of maximum residue limits, they admitted they do not understand the concept very well but know that it means respecting the pre-harvest interval for all chemical products used. Nevertheless, they do not always respect this period if the local traders oblige them to harvest produce at short notice. This practice poses a serious risk for Senegalese consumers' health. Farmers are conscious of this but they often have to organise their picking schedule according to market price and demand, without considering harmful effects for consumers. However, they said that local consumers should also play a role and demand better quality products like European consumers do, free from, or with reduced levels of, pesticides, and be willing to pay higher prices. The farmers are willing to conform to EU requirements in terms of pesticide safety issues and respecting good agricultural practice but explained that to do this they need to have closer contacts with European importers or to be working closely with exporters. They deplored the fact that at national level there are no initiatives geared towards consumers to improve demand for higher quality produce.

Discussing client quality demands, IPPM farmers described how their main purchasers, the local traders known as bana bana, look for

quality in terms of zero pest damage, broken rind or any sign of disease and produce should be fresh, ripe and beautiful in cosmetic appearance (size, colour, grade). They also look for produce with a minimum of nitrogenous fertiliser because excess of this will reduce shelf-life and they may look at seed variety as certain varieties last longer than others do. These quality criteria relate solely to issues of profitability for the bana bana, they do not take into account good agricultural practice. For produce destined for export it is different, because buyers from export companies generally provide the inputs to be used and will monitor farmer practice during the season so that the farmer is obliged to follow the quality and pesticide controls required.

In order to be able to produce crops without pesticides, farmers need to receive support in IPPM training on how to manage pests effectively without overuse of pesticides. It is equally important to create markets for produce which is organic or with reduced pesticide levels. They feel that the role of consumer associations and the government should be to support them to produce alternative quality produce and thereby protect the health of the whole population.

PAN Africa met with some market stall holders from three different open markets in Dakar, selling wholesale and retail vegetables and fruit for local consumers, to discuss their perceptions of produce quality and safety. For most retail stall holders, cosmetic appearance is the main criterion affecting consumer choice for vegetables. In answer to the question whether they know that pesticide residues can be found in fruit and vegetables, the majority responded in the negative. Nevertheless, a few of them did say that they were aware of some risk, but that this did not directly concern them and that it was really up to farmers and agricultural extension staff to do everything to avoid pesticide residues in produce at the consumer stage. Stall holders explained that residue issues do not influence their supply source because consumers are not interested in these aspects of quality, which is why they could not give any information on produce traceability in their marketing channels.

None of the produce traders interviewed was aware of the authorised EU maximum residue limits in fruit and vegetables and they were not really interested in the technical aspects of production. None had received any training in pesticide use or with regard to pre-harvest intervals to avoid residues being found in fruit and vegetables. Several commented that local horticulture produce sometimes perished very quickly and that this could be due to high levels of synthetic fertiliser used by farmers.

Conclusions

Clearly, there are many serious problems in current pesticide handling and pest management among untrained smallholders producing for the Senegalese market, compounded by a lack of awareness or interest in avoiding residues among local traders and consumers.

Organic women growers sell their produce directly to consumers at the weekly market inThiès, Senegal *Photo: Elhadji Hamath Hane, AGRINAT*

This contrasts with the much greater awareness and action to control residues and dangerous pesticide handling in the export horticulture sector.

The experience of IPPM or organic training is that residues can be reduced or eliminated and human health can be protected, although farmers need more support in the most effective ways to manage pests and diseases without using harmful pesticides, as well as market incentives. PAN Africa is now conducting a survey of consumers, traders and retailers in Dakar and Thiès in order to find out more about their perceptions of quality and their criteria for selecting fresh produce. This detailed information will form the basis for designing an awareness programme for building local market demand for safer and healthier horticulture practice among Senegal's thousands of smallholder growers.

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DuPont settles more Benlate suits

In July 2003 the Florida Supreme Court reinstated a decision finding DuPont and Pine Island Farms guilty in a case involving John Castillo. Back in 1989 his mother Mrs Castillo was walking near agricultural land in Florida with her young daughter and was drenched by a cloud of spray drift from a passing tractor. Unknown to her at the time she was pregnant with her son John who was subsequently born in June 2000 with no discernible eyes.

The pesticide which had drenched Mrs Castillo was the fungicide Benlate, containing benomyl. Subsequent research showed that pregnant rats treated with benomyl gave birth to offspring with anophthalmia or microophthalmia (no, or small, eyes). A case was brought against the manufacturer, DuPont, and the owners of the farm, Pine Island Farms. The evidence was judged sufficient to find them guilty in 1996. An appeal by the companies, although initially successfully, was overturned in July 2003 with the court awarding US$4 million to John Castillo.

However, John Castillo was not the only victim of this chemical. Families in many countries have been affected and many additional legal cases have been brought against DuPont.

DuPont has now agreed to settle several lawsuits relating to birth defects. A number of claimants will share a US$9 million payout from the Delaware-based DuPont according to documents lodged with the US Securities and Exchange Commission following a nine-year legal battle. DuPont has also agreed to settle five cases of alleged crop damage in Hawaii for US$8.5 million. Additional cases are outstanding.

1. Care A, Court finds DuPont product responsible for birth defects, Pesticides News 62, pp16-17, 2003.
2. DuPont settles more Benlate suits, Agrow 520, p2, 2007.
3. Watson J, Victims of fungicide receive payout, Scotland on Sunday, 12 August 2007.