

Why controlling rats on small-scale African farms is vital for food security

By [Lourens Swanepoel](#)

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[Recent analysis](#) suggests that Africa will only be able to achieve food security if it invests in crop intensification like increased fertiliser and pesticide input per hectare. But the expansion of agricultural production areas can also improve this.



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A complicating factor in African agriculture is that most of the production comes from relatively [small farms](#). Most of these are less than two hectares in size. This is much smaller than in Europe and the Middle East where most farms are greater [than 10 hectares](#). In Latin America most farms [exceed 50 hectares](#).

This means that addressing issues that affect small scale farmers' productivity can play an important role in food security. Most farmers simply can't afford pest management control. Often, these methods are lacking in rural areas. And where there are products it can be adulterated or misused.

Agricultural pests are one of the key factors affecting smallholder farmer production. In many parts of Africa, large population outbreaks of rodents occur often and can sometimes lead up to [100% crop loss](#). Rodents can damage nearly every crop people try to grow. It's often difficult to measure chronic damage because it happens over the entire growing season and even after the crop is harvested.

The neglected rodents

Efforts to control pests face a number of challenges. Firstly, management is often limited, because of the high cost of herbicides, insecticides and rodenticides. On top of this, they aren't readily available in local farming areas. And most pest control focuses on invertebrate pests like stem borers, armyworm and locusts. Very little attention is paid to vertebrate pests like rodents or birds like the [red-billed quelea](#) (*Quelea quelea*).

Rodents are a particularly important group of pests. Agriculturally, they can inflict considerable economic damage because of their abundance, diversity, feeding habits and high reproduction abilities.

Research on rodent pest control tends to be neglected. But some community based development programmes are looking at how rodents can be controlled using [ecological methods](#). [Ecologically-based rodent management](#) involves, firstly, increasing our understanding of their population biology, social behaviour, taxonomy and community ecology. These insights can then be used to develop effective and sustainable management strategies. This approach has been effective in reducing pest damage as well as [reducing reliance on rodenticide poisons](#) in many countries.

There is little data on the effects of pest control on rodents, particularly when it comes to smallholder farming systems. To gain a better understanding, we did a [systematic review](#) on the effect of rodent pests on smallholder farming in Africa and the island nation of Madagascar.



The damage to maize caused by rats.
Author supplied

Rodent management in Africa

Our review highlighted several important findings. We found median crop losses (midpoint of reported losses) attributed to rodent pests were around 15%. This has a significant impact on smallholder grain yields and is comparable to losses from cereal stem borers in Africa where much greater investments have been made in [control programmes](#).

But there was a big discrepancy in estimated and reported losses, which highlights the importance of standardising research protocols. For example, very little research has been done to try and find a link between rodent density to crop impact. This limits the setting of reasonable management thresholds on when to control rodents based on their density.

Most importantly, we found a paucity of research investigating the effectiveness of control measures on rodent pests.

We made several detailed recommendations that we feel will improve the robustness of rodent pest research. The most important ones included the fact that researchers must adopt a “meta-analytic” [framework](#). For example, they must place their study in the context of prior literature and they must report on the effect of rodent control, particularly making the comparison between studies and strategies more explicit. This framework has been successfully applied to other evidence based research fields [like medical research](#).

Another was that researchers and funding organisations must be encouraged to establish and fund [long-term studies](#). Once a firm foundation has been established on understanding the drivers of population cycles of the dominant rodent pest species, other important aspects like management and community ecology can be successfully developed.

For example, in some African countries – like Tanzania – there have been great improvements in understanding the ecology of pest rodent species. Researchers showed that rainfall plays an important role in predicting rodent pest outbreaks. This facilitated regional planning to control rodent pests in agricultural areas.

We also found that researchers must focus more on empirical treatment control studies that test a management action compared to no management actions. These must be done with suitable replication that investigates management actions on rodent pest populations and associated crop losses. For example, our [recent meta-analysis showed](#) that avian predators, like barn owls, can reduce rodent pests.

Lastly, we suggest that ecologically based rodent management activities and research should be carried out by multidisciplinary and interdisciplinary teams. In this way research can be sustained over a longer period if there's collaboration, knowledge is transferred and communities are involved.

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