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The Year of the Rat ends – time to fight hunger!

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Abstract

This paper investigates the importance of ecologically based rodent management in the light of the current food crisis, and the potential effects of this approach on the position of the undernourished. Hunger and food prices are on the rise owing to shortages that can be traced to reasons such as climatic extremes, use of crops for biofuels, reduced growth in yields which lag behind population growth, reduced world stocks and lack of sufficient investment in maintaining the irrigation infrastructure. For the undernourished this is problematic as they are most vulnerable to the rise in food prices. Very often, agricultural experts focus on an increase in agricultural production to reduce food prices. It is postulated in this article that almost 280 million undernourished could additionally benefit if more attention were paid to reducing pre- and post-harvest losses by rodents. Moreover, rodent-borne diseases would decrease, diseases that can be catastrophic to the livelihoods of the poorest of the poor.

Keywords: food crisis; rodents; harvest losses; rats; mice; rodent management

1 INTRODUCTION

Hunger and food prices are on the rise. Cereal prices rose sharply during the first half of 2008 because of shortages that can be traced to climatic extremes, the use of crops for biofuels, the loss of agricultural land to cities, declining yield growth, lack of sufficient investment in maintaining the irrigation infrastructure and increasing demand for livestock feed in growing economies. According to the FAO, the undernourished now comprise at least 826 million people in 113 countries, and they are most vulnerable to a continuing rise in food prices. In Asia there are 558 million undernourished people, in Africa 212 million and in Latin America 52 million, and even in Europe (mainly Eastern Europe) 3.8 million people are undernourished. Moreover, it is expected that the financial crisis will keep food prices high, which will lead to an increase in the number of undernourished persons.

2 RODENT DAMAGE

The solutions for alleviating hunger are many, and one often overlooked problem is losses to rodents. For centuries, farmers have considered rodents as an inevitable pest in their fields, and, in the current Chinese calendar Year of the Rat, this is often still the case. Rodents are serious competitors with people for cereals, and occasional massive rodent population outbreaks ruin harvests.[1] In Asia, under traditional rice farming systems, rodents typically cause chronic losses to rice in the order of 5–10% per annum.[2] In Indonesia, rodents are the most important preharvest pest, causing on average 17% annual losses of rice. Post-harvest losses caused by rodents in grain stores add around 5–10% each year to the losses of smallholder families.[3] Total cereal production in Indonesia is 65.3 million t (FAO statistics 2004). A loss of 15% equates to an annual loss of 9.8 million t of cereals to rodents. In developing countries, annual cereal intake is about 250 kg person^{-1}, and cereals provide about 60% of daily calories. These losses in Indonesia are sufficient to feed 39 million people, which is far larger than the number of undernourished people in Indonesia (14 million).

In Africa, agricultural losses to rodents are also high. In Tanzania, preharvest losses to maize are around 15%, while damage at sowing and to seedlings can exceed 40%.[4] In Kenya, rodents cause losses of 20–30% to maize crops, with 34–100% loss during rodent outbreaks.[5] In parts of South America, native rodents cause crop damage varying between 5 and 90% of total production.[6]

3 NEED FOR REDUCING HARVEST LOSSES

Rodent-borne diseases add another important dimension to the impact of rodents on agricultural and periurban communities. The economic impact of rodents as carriers of human diseases is poorly documented and difficult to estimate. One interesting example is the bacterial disease leptospirosis, which is widespread globally. An epizootic from 1996 to 2001 in north-east Thailand led to more than 14 000 reported human cases and 365 deaths at its peak.[7] In the Philippines, leptospirosis is a problem each year. A recent study highlighted a most disturbing statistic – mortality from leptospirosis in 1996 to 1999 in the Philippine General Hospital ranged from 11.7 to 19.8%.[8] Moreover, demographic analyses of these leptospirosis cases indicated that most are males in the 21–25 years of age group. This cohort provides an important part of the agricultural workforce, so their inability to work for extended periods could have serious implications for the livelihoods of smallholder cereal-growing households.

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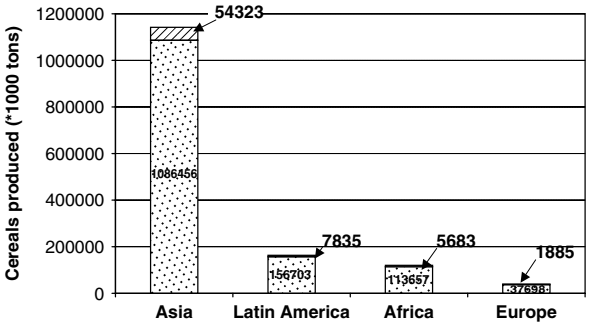

Figure 1. Harvest production in 113 countries in the world where undernourishment exists, by continent (source: FAOSTAT). The increase in cereal production were proper rodent management to be applied is shown above each bar. Overall, this amounts to approximately 70 million t.

Table 1. The amount of food that would be gained if proper rodent management were applied, and the number and percentage of undernourished that could benefit from ecologically based rodent management (data derived from FAOSTAT)

Continent	Million t of cereals gained[a]	Number of extra people nourished (millions)	Percentage of undernourished benefiting
Asia	54.32	217.3	39
Latin America	7.84	31.3	60
Africa	5.68	22.7	11
Europe	1.89	7.5	197
Total (world)	69.73	278.8	34

[a] All types of cereals, e.g. wheat, rice.

Effective rodent management based on a solid understanding of the ecology of the main pest species has been achieved through coordinated community actions of hundreds of smallholder farmers in Indonesia, the Philippines and Vietnam.[9–11] Their ecological knowledge enables communities to focus on when (before the onset of the main breeding season; when animals are aggregated after the fields have been ploughed) and where to focus rodent control using traditional (non-poison) methods of control. Just as importantly, a strong ecological context to rodent management enables the community to develop management techniques that primarily target the pest species. This is important in a biodiversity context, given that less than 10% of rodent species in most regions of the globe are significant pests,[12] and the non-pest species arguably provide an important ecosystem service.[13]

The authors examined a conservative scenario in which ecologically based management approaches could reduce rodent losses of the cereal harvest by 5% in the countries where people are undernourished. In the 113 countries where undernourishment is prevalent, the total cereal production is almost 1.4 billion t, and therefore annual losses to rodents could be potentially reduced by almost 70 million t (Fig. 1).

Estimates show that this is sufficient to provide the annual food consumption for almost 280 million people in developing countries; enough to feed 34% of the total undernourished people in the world (Table 1).

Although the authors are aware that equal global distribution of harvests remains problematic, they claim that, if more attention were paid to understanding the ecology and management of rodent pests and how to scale out community-based management, then simple, cheap and effective rodent control strategies could be developed.[10] The better our knowledge of the biological weaknesses of these age-old adversaries, the stronger will be our position to reduce world hunger, reductions that are eagerly required to counterbalance the current population increase and rising cereal prices. Thus, the focus of agroecologists should be not only on increasing agricultural production by means of scientific advances in crop breeding and genetic engineering but also on reducing pre- and post-harvest losses by rodent pests through ecologically based management. An additional pay-off in effective rodent management is a reduction in rodent-borne diseases, especially in poor communities where hygiene and infrastructure (houses, roads with puddles, sewage and garbage treatment) need improvement, and chronic illness can be catastrophic to the livelihoods of families for whom the Year of the Rat was not an occasion of joy.

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