FROM: The Econogram (The Economic Analysis Network Newsletter), April 1987, 3(2):3-4.

Contributed paper

Crop and Stored Food Losses Caused by Vertebrate Pests in Pakistan

By Joe E. Brooks

Mr. Joe Brooks, an internationally experienced wildlife biologist, heads the VPC project in Pakistan.

What are vertebrate pests?

The animal kingdom is divided broadly into animals without backbones, the invertebrates (insects, worms, crustacea, etc.) and the vertebrates, consisting of fishes, amphibia, reptiles, birds and mammals.

Although any vertebrate animal that comes into conflict with man by reason of its feeding habits, population numbers, or disease-transmitting capabilities can be a vertebrate pest, the vast majority of vertebrate pests are birds and mammals. In practice, the most serious vertebrate pests are the rodents, especially rats and mice which are adapted to live in close proximity to man, and several kinds of granivorous or omnivorous species of birds.

Major pests of Pakistan

The major vertebrate pests of Pakistan fall within four groups of animals, of which three groups are mammals while the fourth group is birds. These pests are as follows:

a) ***Rodents.*** This group comprises field and house rats, house mice, and porcupines.

b) ***Lagomorph pests.*** In Pakistan these include a few species of rabbits, hares and pikas.

c) ***Artiodactyls.*** These are even-toed, hoofed mammals. Of this group, the wild boar is the only pest species that occurs in Pakistan.

d) ***Pest birds.*** The majority of granivorous (grain-eating) and frugivorous (fruiteating) birds tend to be gregarious and gather together in small or large flocks for foraging and feeding. Some eight or nine species of birds are pests that attack food crops in Pakistan.

The crops which are damaged by these vertebrate pests in Pakistan and the extent of the crop and stored food losses caused are discussed below.

A. CROP LOSSES

Wheat

Production of wheat has averaged between 10 and 14 million metric tons in Pakistan during the last five years. Damage assessments were carried out by various researchers in 1972 and 1976 and by the Vertebrate Pest Control Laboratory (VPCL) in Karachi in 1978 and 1979,. These studies showed that rodent losses averaged between 2.0 and 3.0 percent countrywide. Losses due to house sparrows and parakeets add another 2.6–5.6 percent, while wild boar can add yet another 1 to 2 percent. The total losses due to rodents, birds, and wild boar could be from 5.6 percent to 10.6 percent of total production. This represents losses amounting to 1,128.7 million rupees (based on 1983-84 wholesale prices in Lahore).

Rice

Damage assessments made by VPCL staff in rice fields in areas of Punjab and Sind revealed that at least four rodent species were present. The most serious pest was the lesser bandicoot rat. Damage levels were found to vary considerably from year to year, depending on climatic conditions. Maturing rice is also attacked by house sparrows, baya weavers, and parakeets. Some damage is caused by wild boar.

Sunflower

Damage surveys by the VPCL staff of parakeet attack on sunflower in the main growing areas of Punjab and Sind in 1981 showed that the damage averaged 11.7 percent in seven districts in Punjab, and 16.6 in nine districts in Sind. An earlier study in Multan district had estimated that parakeets consume about 30 percent of the standing sunflower crop.

Sugarcane

Cane from 250 farms was examined by the VPCL staff in 1978 and 1979 at four sugar mills representing two districts each in Sind and Punjab. Overall, rats had reduced sugar production by 10.7 percent in 1978 and 7.7 percent in 1979. In 1985, the VPC project staff at the National Agriculture Research Council (NARC) checked sugarcane fields in Faisalabad District. Boar damage here was estimated at 5.26 percent of all stalks, and 60.5 percent of all fields showed evidence of wild boar attack.

Maize

Maize is particularly subject to attack by wild boar, porcupines, and pest birds. Assessment of wild boar damage to maize in Faisalabad district by the VPC project staff at NARC indicated a 7.5 percent loss of yield. The damage from birds in NWFP and Punjab was between 2 percent and 3 percent.

Orchard crops

The collared pika was found to be a serious pest of apple trees and juniper nurseries in the Ziarat Valley of Baluchistan. Soft fruits, such as apricots, guavas, mangoes, and oranges are attacked by parakeets, bulbuls, and other birds, particularly in Punjab and NWFP.

(cont'd on page 4)

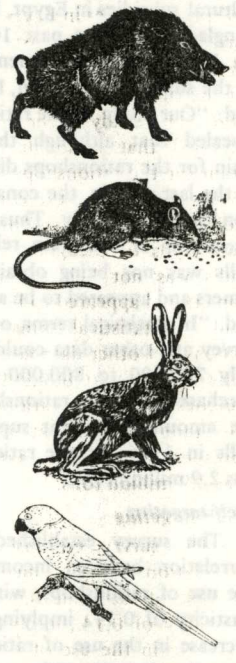
SUMMARY OF ESTIMATED LOSSES OF VARIOUS FIELD CROPS AND STORED GRAINS IN PAKISTAN DUE TO VERTEBRATE PESTS

(Data on Losses from "Handbook of Vertebrate Pest Control in Pakistan, 1980" and other Sources)

CROP	PRODUCTION 1983-84 (000 mt)	LOSSES (000 mt)	VALUE OF LOSSES* Pak. Rs. (Million)	VALUE OF LOSSES* U.S. Dollar (Million)	Principal Pest Species
Wheat	10881.9	600.7	1,128.7	86.8	Rats, birds, wild boar
Rice	3339.5	170.3	449.8	32.1	Rats, birds
Sugarcane**	34287.3	2760.1	665.2	47.5	Rats, wild boar
Maize	1013.5	90.6	198.6	14.2	Wild boar, parakeet, porcupine
Sorghum	222.1	16.0	31.8	2.3	Birds
Barley	139.5	7.8	14.0	1.0	Parakeet, sparrow
Potato	509.8	11.6	23.5	1.7	Porcupine, wild boar
Groundnut	88.0	6	35.6	2.5	Rats, wild boar
Sunflower	41.6	–	27.3	1.9	Parakeet
Apples	128.1	6.4	75.0	5.4	Pika, porcupine, birds
Citrus	864.3	74.5	145.9	8.5	Parakeet
Sub-Total			4,768.1	203.9	
STORED GRAINS					
Provincial Food Depts	4,090.0	8.2	15.4	1.1	Rats, mice, birds
Farm & Vill.	6,000.0	120.0	225.5	16.1	Rats, mice
TOTALS			5,009.0	221.1	

* Based on wholesale market price of commodities at Lahore, 1983-84. 1 U.S. Dollar = 14 Pak. Rupees.

** 1983 mill price = Rs. 241 per metric ton.



Some common vertebrate pests of Pakistan. 1) The wild boar 2) A field rat 3) The desert hare and 4) The rose-ringed parakeet.

IFPRI Studies Nearing Completion

The International Food Policy Research Institute (IFPRI) is currently in the process of giving final shape to the findings of various studies undertaken by it in Pakistan during the past two years. These studies were carried out as part of a project to identify policies that are likely to increase agricultural production and provide an increasing share of the benefits of agricultural growth to the lower income groups in the country.

Two levels

The studies were undertaken at two different levels: the household level, and

Dr. Pinckney

the national level. The household study involved a survey of one thousand urban households, which were visited six times during the course of one year. Issues examined at the household level included the role of the rationing system (and alternatives to the system) and food security in rural households. Studies carried out at the national level were supply and demand projections for wheat and other commodities, and the stabilization of wheat supply.

Leakage

The rationshop and household food security studies were headed by Dr. Harold Alderman who has studied agricultural subsidies in Egypt, Pakistan, and Bangladesh for the past 10 years, and Mr. Marito Garcia. Commenting on some of the surveys in Pakistan, Dr. Alderman said: "Our study of the rationing system revealed that although the supply of grain for the rationshops did not decline in the last decade, the consumer utilization declined greatly. Thus, as much as two-thirds of the grain released to the mills was not being obtained by consumers and appeared to be a leakage," he said. "In statistical terms, our household survey and other data could account for only 700,000 to 800,000 tons of atta purchased through rationshops whereas the amount of wheat supplied to the mills in 1986 for the rationing system was 2.9 million tons."

Self-targeting

The survey established a negative correlation between income levels and the use of rationshops, with an income elasticity of 0.14., implying an absolute decrease in the use of rationshops with increasing income. "The rationshop system was a self-targeting system, reaching the poorer classes which constituted the target group," Dr. Alderman said. "The problem was that releases to the mills were based on the assumption that the system would be utilized by all."

IFPRI has made recommendations to the government from time to time and has suggested that the operation of the rationing system should either be improved, or the system should be abandoned altogether. "We hope our findings have been useful to the government in making some recent decisions in this area," he said.

Questions examined

Some questions examined in the survey were: what are the levels of labor/income availability of a household? what are the health standards? what is the consumption pattern? what is the level of savings and in what form are savings maintained? how does the household meet its credit needs? how does the small farmer sell his produce, and is he hurt because he is small? what are the small farmer's credit needs and from what sources does he obtain credit?

In the light of information acquired in the field, the possibility of formulating policies that would enable low-income households to enter the mainstream of economic activity, rather than consistently lag behind, was also examined.

Other studies

Other studies undertaken by IFPRI during the past two years, relating to the projection of supply and demand for wheat and other agricultural commodities, and the supply stabilization of wheat, were led by Dr. Alberto Valdes and Dr. Thomas Pinckney.

No primary data were compiled for these studies. "The time series data employed by us were obtained from published sources and our projections were based on these," Dr. Pinckney explained. "The projections were aimed at identifying agricultural trends and the areas the government may need to be most concerned with. Our major emphasis was on wheat, and nine different zones were examined by us."

What policy

Dr. Pinckney stressed that although Pakistan has achieved a wheat surplus, there is no room for complacency and a great deal of attention must be given to important inputs such as irrigation water, research and extension, and fertilizer.

Dr. Harold Alderman (extreme left) and Mr. Marito Garcia (seated, foreground) carry out a survey in the field.

"In evolving a policy design — incorporating production, trade, pricing, and storage policies – we were looking at various government objectives, such as stabilizing prices, reducing fiscal expenditures, and minimizing imports," he said. "The problem is that some of these may be conflicting objectives. For instance, imports can be reduced, but domestic prices may rise. Thus, it was necessary for us to evaluate trade-offs between different objectives."

Initiated in November 1985, these two IFPRI studies will be completed by the end of November 1987. The final report will be submitted to the government in January 1988. A household food security survey in the rural areas is also underway and will be completed by June 1988.

Food Losses *(contd. from page 3)*

B. STORED FOOD LOSSES

Some 4 million metric tons of wheat are stored by the provincial food departments until it is redistributed into the wheat deficit areas. A recent survey of vertebrate pest infestations at provincial grain storage centres undertaken by the VPC project staff at NARC revealed that infestations were rarely severe and were minor in most cases. The most common rodent was the house mouse. Birds were usually found feeding on grain spilled outside the storage area. The overall losses from both rodents and birds were estimated to be not more than 0.2 percent of total wheat in storage. *(Editor's note: The VPC survey was reported in the October 1986 issue of The Econogram.)*

At least another 6 million metric tons of wheat are retained at farm and village level. It is stored under a variety of conditions and in several types of containers or jute bags, many of which are subject to attack by rodents, mainly house mice and roof rats. Precise estimates of losses at farm and village level are yet to be made, but a conservative estimate, based on studies of losses at farm and village level in India and Bangladesh, would put the amount lost throughout the country annually at 1 percent to 2 percent of stored quantity.

A summary of the economic value of crop and stored food losses per annum in Pakistan is given in the table on page 3. The annual toll – and this listing is incomplete – comes to over Rs. 5,000 million, or over US$ 220 million, based on 1983 commodity prices.