

THE IDENTIFICATION OF SEASON AND PLACE OF MAXIMUM GRAIN LOSS

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INTRODUCTION: It is very easy to devote time and effort to the most spectacular source of grain loss or to a period or place which is particularly interesting. But this may not be where most loss occurs or where time and effort can most profitably be spent.

I shall look very briefly at a hypothetical situation which could exist in the tropics and see if it is possible to identify when and where control measures could be applied most effectively.

CONSIDERING THE SEASON: Let us assume that there is a grain crop of two million tonnes harvested in October and all consumed by the end of the following September. It is also assumed that consumption is uniform throughout the year and that loss through insect damage continues at a steady rate of 5% per month. As a rough approximation it is also assumed that when 5% of the grains have been damaged 0.5% of the produce will have been lost. The results of these assumptions is given in the table below.

It will be seen that half the total loss has already taken place by January, showing very clearly the importance of early application of control measures. It will also be seen that the total loss is 64,000 tonnes which is a little over 3% of the total production. This is a good deal less than might have been expected.

CONSIDERING THE LOCATION OF THE GRAIN: Initially grain is stored by the farmer. He has several thousand years of experience, trial and error to support the methods he uses. It is unlikely that those of us who are unfamiliar with his way of life and the resources at his disposal will be able to improve on what the best farmers do. We can best serve the farming community by learning from the best of them and encouraging the others to improve. Here and there innovation arising out of modern knowledge may occasionally be introduced. For the most part it will cost too much and the necessary material will not be readily available.

A hundred years ago our hypothetical state had two million people living in it and all but a few chiefs grew their own food. There would have been some exchange of produce between one area and another but no large scale marketing organisation. Now our state has five million people and only three million are farming, the rest live in towns and cities and have to be fed. This is a profitable occupation for many people. Grain is bought from the farmers and passed through the hands of four or five traders until

TABLE I. Hypothetical seasonal loss of grain when production is two million tonnes.

Month	Stock (,000 tonnes)	Damage %	Loss per month (,000 tonnes)	Cumulative loss (,000 tonnes)
Oct.	2,000	5	10.0	10.0
Nov.	1,833	10	9.1	19.1
Dec.	1,667	15	8.3	27.4
Jan.	1,500	20	7.5	34.9
Feb.	1,333	25	6.6	41.5
Mar.	1,167	30	5.8	47.3
Apr.	1,000	35	5.0	52.3
May	833	40	4.2	56.5
Jun.	667	45	3.3	59.8
Jul.	500	50	2.5	62.3
Aug.	333	55	1.7	64.0
Sep.	167	60	0.8	64.8

it reaches an urban centre where it remains until bought by the consumer. Each trader will keep it for as short a time as possible because he needs to make a profit and recover his investment to use again. He will try to anticipate the demands of the urban centres and not buy more than can be sold but inevitably grain will accumulate and new grain coming in will be better than that which has been there for some weeks and is likely to be sold first or at a higher price. So grain stocks will build up in these centres and there will be large pest populations. Traders and storekeepers hope to sell their stock for a good price tomorrow and so will be reluctant to spend money on control today. Here is a new situation in which there is no tradition and little experience. The successful traders are likely to leave the business for more reliable sources of income as soon as they have accumulated enough capital and their places will be taken by newcomers with no experience. This is an area where great losses can occur and where investigation may not be welcome.

The next stage is the consumer who sees good quality produce at the beginning of the season at a price which is bound to go up later. There is a great temptation to buy a stock of grain while it is cheap and keep it at home for later use. Rodents, insects and water will certainly cause much damage and after six months in a room in a compound the grain could be much worse than that being offered in the local market and the saving could be completely lost. This is another area where there is little or no experience and where substantial losses occur. Fortunately these people welcome advice and can be reached through the media, however they are mostly the "middle class" and higher priority may be given to helping those who are destitute or near it.

Finally the state will intervene and set up stores of grain to act as a buffer for price control, as a famine reserve and to hold stocks for export. This is an area where modern techniques can be used. Suitable methods and structures are well known and training is available for staff to operate the stores. It is a question of selecting the methods most suited to the situation and then ensuring efficient operation.

TO SUMMARISE: At the farmers' level there is a need to study what he does and extend the best techniques to others. The urban stores and markets are likely to be the most profitable areas for reducing grain loss but also the most difficult to deal with. Advice can be given to the consumer and will be welcomed by him. The most suitable methods need to be chosen for state stores and training provided for the personnel to run them.