2nd Draft -(not for citation)

Contribution of Participatory Farm Management (PFM) methods to Crops Post Harvest Programme (CPHP) PRA survey in Ward 21, Chivi District, Zimbabwe.

(15 - 19 September 1997)

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Introduction

The following report outlines the findings from the use of Participatory Farm Management (PFM) methods during a PRA survey in ward 21, Chivi District, specifically looking at crop post-harvest problems faced by communal farmers.

The study was undertaken as part of a research programme into the 'development of Participatory Farm Management (PFM) methods for improved needs analysis' by researchers at the University of Reading in conjunction with the Crop Post Harvest Programme(CPHP), Zimbabwe. This report will be used as aprt of the evaluation process of these PFM methods.

The team was made up of 7 researchers, 2 of whom were involved in the use of the PFM methods with farmers part of the time, while a third took notes.

The PFM methods were used in conjunction with traditional PRA methods, but this report attempts to restrict itself to information gained specifically through the use of the PFM methods. However, complete seperation is not possible as during the exercise information was shared amongst researchers and, traditional PRA methods such as scoring and ranking were often used as a basis from which deeper analysis could be undertaken using PFM methods.

Aims of the Study

1. Evaluation of PFM methods

This exercise was undertaken as part of the evaluation of the PFM methods, and specifically concerning their usefulness in comparison to existing PRA methods. The aim was to determine whether the use of PFM methods added any information to the study which would not have been gained from the use of traditional PRA methods. There are several aspects to this assessment.

a) This report, which concentrates on the information gained specifically from the use of the PFM methods, will be compared with the full PRA report which includes information from use of both types of methods. Independent reviewers will assess whether useful information was added to the study by the use of PFM methods or not.

b) Researchers involved in the field work were asked to evaluate the contribution made by PFM methods to the overall study. (see appendix A)

c) This field report will be compared with a PRA report for a different area in which PFM methods were not used, and a comparison made of the quantity, quality and type of information contained in each of the reports. An independent judgement will then be made as to whether the PFM methods have made a useful contribution to this study.

2. Aims of the Field Exercise

The aims of the fieldwork were to:

- investigate the farming system as a whole
- investigate the scale and nature of crop post-harvest problems faced by farmers in the area.
- determine the labour divisions by sex and age of crop post harvest activities.
- determine the socio-economic structure of the village / ward.
- assess whether farmers participating in CPHP trials are representative of farmers in the area in terms of their 'wealth' or access to resources.

PFM methods were used primarily to achieve the first three aims of the study.

General constraints identified by farmers

Procedure

This exercise was carried out by a group of 5 farmers (3 men and 2 women), including the headman of the Ward. Farmers first discussed their problems and listed them. They then scored the problems. From this list of problems a causal diagram was drawn, indicating the links between the problems, and adding additional causes and effects of problems. The part of the diagram directly relevant to post-harvest problems was then scored by placing 15 counters on 'post-harvest losses' and asking farmers to divide the counters between the 3 causes of this problem as illustrated on the diagram.

The researchers' role was to initiate the exercise and then facilitate as the farmers used the method. The discussion that occured while doing the exercise was considered as important as the final diagram.

Discussion

a) General problems (see Diagram 1)

The major problem identified by farmers was `lack of rain`. They considered that this problem resulted in the death of livestock and therefore `lack of draught power`. 'Lack of rain' also resulted in a lack of fodder resulting in `no manure`. `No manure` led to poor plants, and `lack of draught power` resulted in late planting and weeding causing low yields. 'Witch weed' (*Striga spps.*)also resulted in poor condition of plants and was caused by a 'lack of tools'as winter ploughing and cultivation was said

to control witch-weed infestation. However, it was not considered a major problem as it only occured in a few fields and affected a few crops. 'Lack of tools' also resulted in a small area being planted and was caused by 'lack of money'. 'Crop damage' caused by pests also causes 'sickly plants' and the distinction was made between field and post harvest losses, the latter being included on the diagram. However there was some discussion amongst the group as to whether post-harvest problems were important enough to be included.

b) Post-harvest problems

It was apparent that the farmers' primary concern were production constraints rather than post-harvest constraints. It is also possible that farmers included post-harvest problems as they knew that the researchers were working on post-harvest issues.

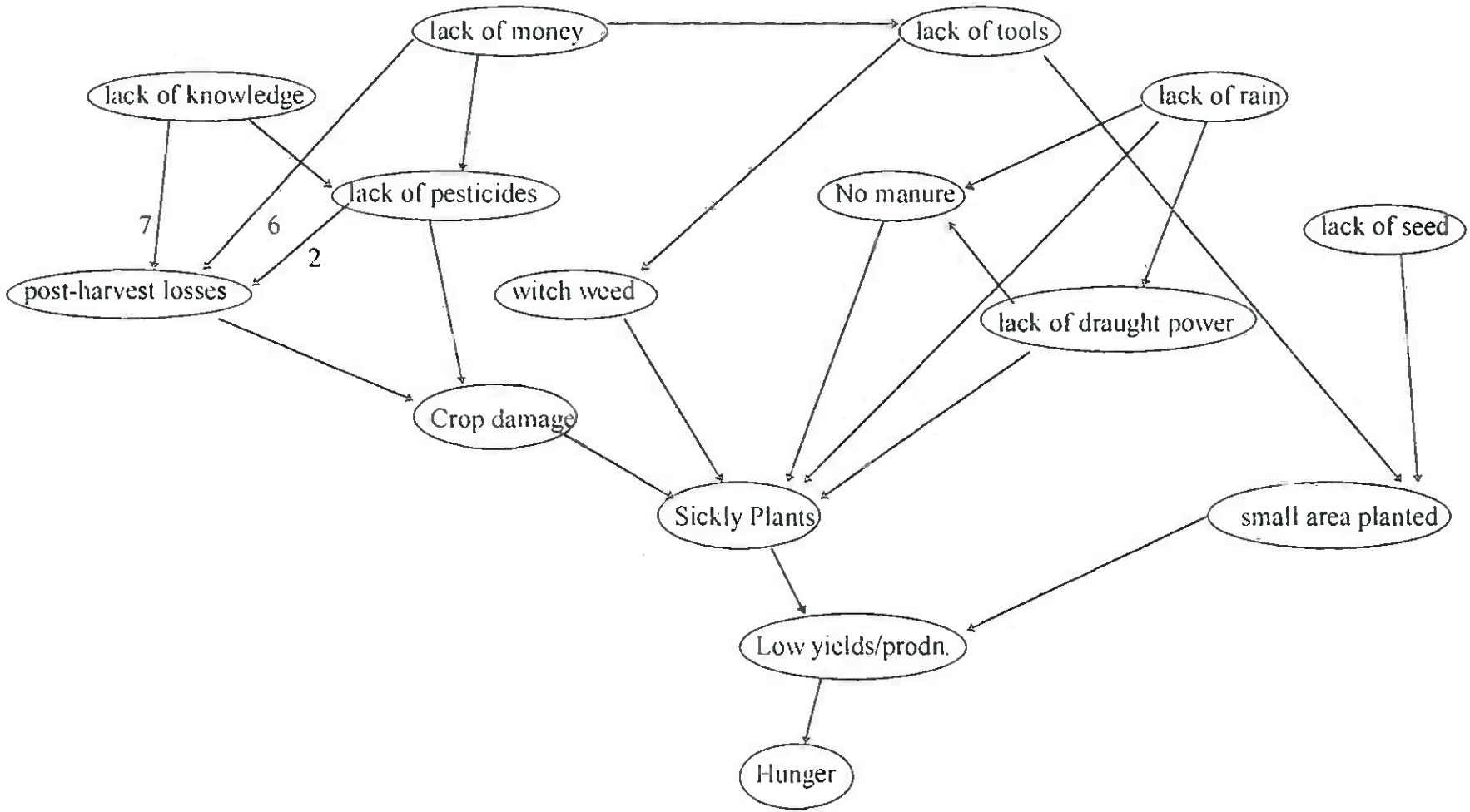
According to the farmers,'post harvest losses' were caused by three factors; ' lack of pesticides', 'lack of knowledge' and 'lack of money'. Scoring of these three causes (out of 15) resulted in 'lack of knowledge'(7) being considered the major problem, then 'lack of money'(6) as this resulted in problems of purchasing pesticides and other items , with 'lack of pesticides'(2) relating to the availability of pesticides, being given a low score. Two areas where knowledge was lacking were identified by farmers. Lack of knowledge on store design and construction, and lack of knowledge resulting in the incorrect use of pesticides. It is likely that farmers were again influenced by their perception of the researchers area of interest. On-going work being carried out in the area involves investigations into store construction and related losses, and members of the group were aware of this and therefore may well have given more emphasis to the problem than they would have normally.

Conclusions

From this exercise it was apparent that farmers were aware of post-harvest issues, but did not consider them as important as problems relating to the initial production of crops. This is emphasised by the scoring of problems in which post-harvest losses received the lowest score. It is likely that post-harvest losses were mentioned as the farmers were aware of this as an area of interest to the researchers. This was also the case for 'lack of knowledge' being given as the most important cause of post-harvest problems, though the identification of two areas where knowledge is lacking is interesting. The lack of financial resources (money) also appears to be a significant constraint to farmers, resulting in post-harvest losses. It is worth noting that marketing problems were raised as a problem but were not included by farmers in the diagram. These problems included the unavailability of markets and transport to the market.

It is apparent from this exercise that it is very difficult to gauge the importance of a subject to farmers (e.g. post-harvest issues) if they are already aware of the researchers' area of interest. They will inevitably be biased in their opinions by this knowledge. Scoring of the whole of the causal diagram, may have given a better indication of the relative importance of post-harvest problems to the farmers, but insufficient time was available to do so.

Diagram 1. Causal Diagram of general agricultural problems, as identified by farmers
(15 September, '97.)



General problems at different stages of the crop storage process.

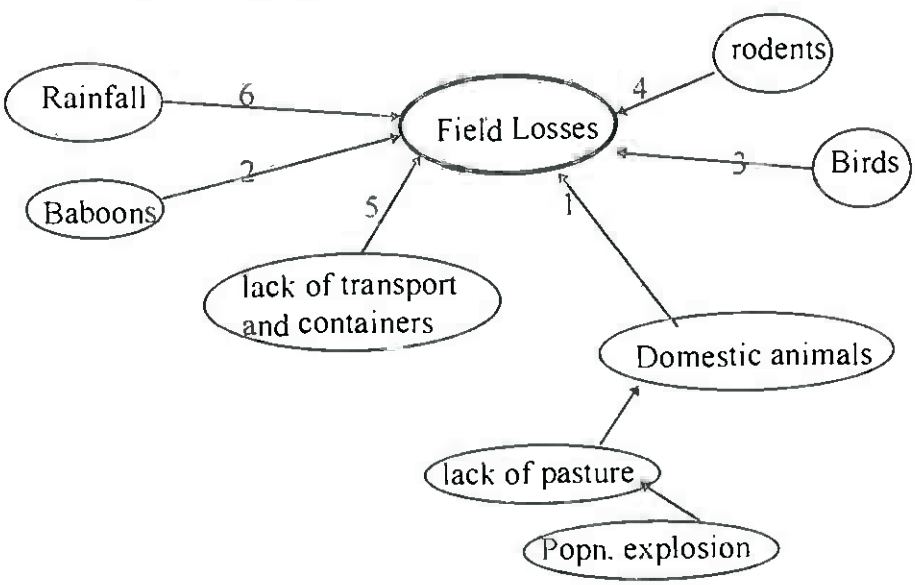
Introduction

A causal diagram was drawn by a group of farmers (approx 12 , 8 women and 4 men), looking at problems which occur specifically after crop maturity. No crop was specified for this exercise. On the diagram, farmers divided losses into those which occur in the field, in the temporary store (Tsapi) and in the permanent store (Dura). The causal diagram was also scored by farmers, to indicate the relative importance of the different problems and their causes. The method of scoring involved placing a particular number of beans on the central problem i.e. field losses, and then asking the farmers to divide those beans between the different causes of that problem. The more important the problem the higher the score it was given. The scores can then be taken back a further step to indicate the relative importance of the causes of secondary problems. To enable analysis, the diagram is not shown in full, but has been divided up into the three stages.

Discussion

After completion of the causal diagram the diagram was scored. Scoring revealed that farmers consider losses in the field, after maturity of the crop, and losses in the permanent store to be equally serious (21),and temporary store losses (9). This section will deal with each of the stages seperately.

Diagram 2.1 Causal diagram for field losses

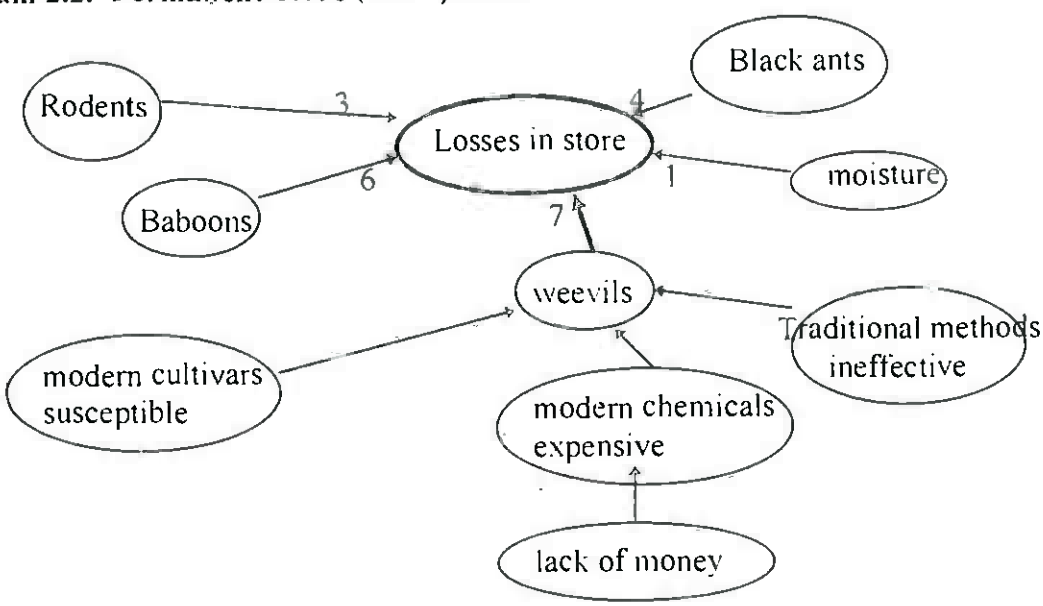


The most significant losses that occur after crop maturity, occur in the field and in the permanent store. Field losses include losses after maturity but prior to harvest, and losses incurred after harvest but prior to the crop being stored e.g while it is still in the field. These losses are exacerbated by the problem of transporting the crop from the field to the temporary store i.e. lack of scotch-carts and containers in which to transport the crop.

The major cause of loss in the field is rainfall occuring at or prior to, harvest. This results in the rotting of the crop. However the scale of this problem may have been accentuated due to heavy rains the previous year and may not be representative of an average year in this area. Rodents, birds and baboons also cause field losses, in that order of severity. Losses from pests are greatest once the crop has been harvested and is piled or stooked in the field, as the crop is concentrated in one place and is more accessible to pests.

A minor cause of loss is damage by domestic animals. This occurs if harvesting is delayed either due to late planting or labour shortages. It is the headman's responsibilty to decide when domestic animals no longer need to be herded but can be left to graze freely. This results in animals entering fields and causing damage to late crops which have not been harvested. Lack of pasture was given as the cause of this loss, as once available pasture is exhausted and animals become weak, there is pressure on the headman to release the animals early on in the season. Furthermore, the labour involved in herding them is very high. Lack of pasture was given as being the result of a 'population explosion', resulting in pressure on land and reduced area and quality of grazing.

Diagram 2.2. Permanent Store (Dura) Losses

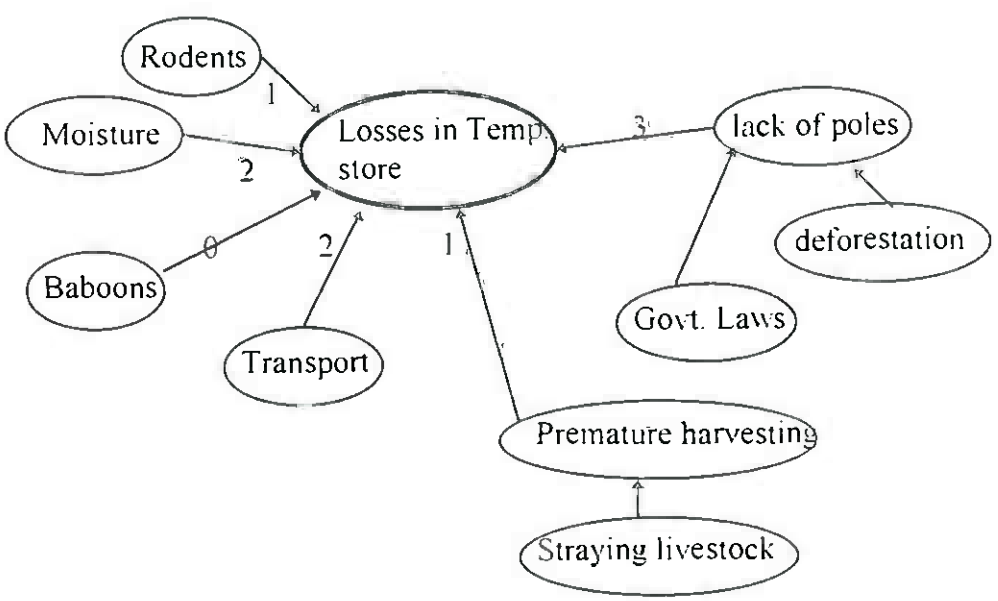


Losses in the permanent store (dura) are considered as important as losses in the field. The most significant cause of loss in the permanent store is considered to be weevils. This weevil damage occurs as traditional methods of protecting stored products, including the use of eucalyptus leaves, finger millet husks, and leaves from an indigeneous tree species, 'mutovhoti' (*Spirostachys spps*), are not very effective, combined with the fact that modern cultivars are more susceptible to weevil damage than traditional varieties. Farmers do not use modern chemicals as they are too expensive.

In the past, weevils were considered to be less of a problem. The explanation given for this by one farmer was that cereals used to be (it is not clear wen exactly) dry planted very early and germinated with the rains and therefore by the time the previous crop was infested by weevils the new crop was ready for harvest. Therefore weevil damage was not considered to be important, as by the time it occured they already had the new crop. This may have been the case, though it would seem more likely that traditional landraces were more resistant to weevil damage than modern varieties and therefore lasted longer.

Baboons were considered the next most important cause of losses in the permanent store, though this problem is only pronounced during drought years when there is a lack of wild foods for them. Black ants (not termites) were the third most important cause of losses in permanent storage. Although their occurrence was not very common, when they did occur , all the contents in the granary could be destroyed. Rodents also cause losses in store, and moisture was considered to be a minor cause of crop damage in the store and associated with poor design and / or construction.

Diagram 2.3 Temporary Storage losses



Losses in temporary store were considered minor compared with those in the field and permanent store. Of the causes of losses sustained while the crop is actually in the store, moisture is the most important factor. This occurs primarily from water running over the surface of the rocks that the stores are built on, and into the bottom of the granaries. This can be avoided by 'damp-proof coursing' the granary. Rodents are also considered a problem in temporary stores, and baboons also cause losses. Premature harvesting, caused by the release of livestock, as explained above also results in losses in storage as this increases the susceptibility of the grain to insects.

However, the most serious constraint related to temporary storage structures is the lack of poles for store construction. If temporary stores cannot be built, the crops remain in the field for a longer period of time and are more susceptible to damage as they are exposed to rain and pests. Lack of poles results from a shortage of trees due

to deforestation and resulting Government legislation prohibiting the cutting down of trees.

Transport of the crop from the temporary store to the homestead is also a problem. Temporary stores are built close to the fields, often on or near to rock surfaces on which threshing of millet and sorghum can be done. Only once these crops are threshed is it transported to the homestead. Delays in transporting the crop can increase losses.

Specific Post-production problems for Pearl Millet and Sorghum.

Introduction

The causal diagram was drawn up and scored for the specific post-production problems experienced by farmers when cultivating pearl millet. This exercise was carried out with a very large group of farmers (32) approximately half men and half women, however only 5-6 members of the group were able to participate fully. Discussion during the drawing and scoring of the diagram clarified the reasons for, and relevance of, the connections and scores.

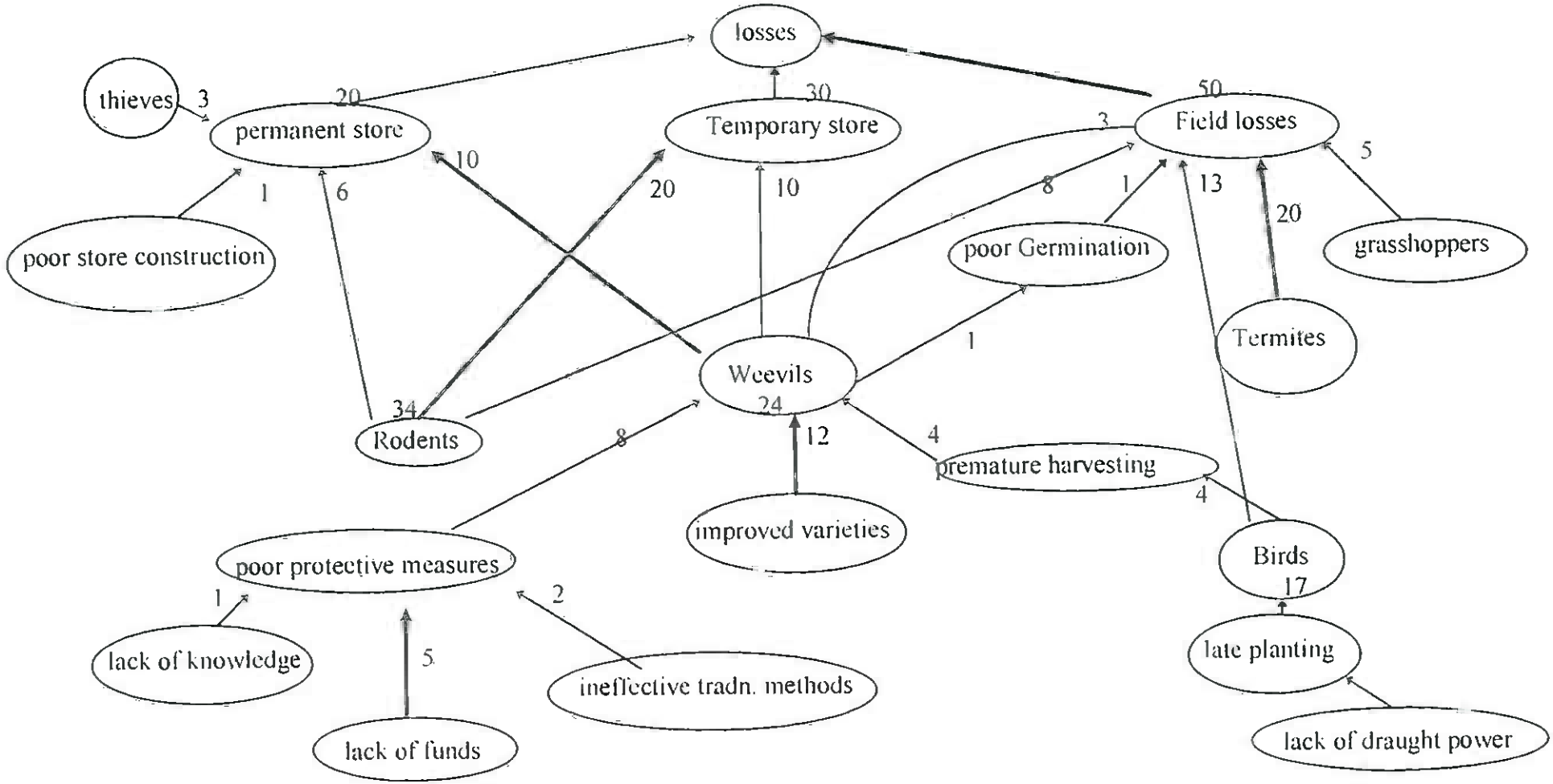
Relative importance of crop losses

Crop losses after maturity of the crop were divided into losses which occured in the field, in the temporary store and in the permanent store. Field losses (50)were considered to be the most important, then losses in the temporary store (30) and finally losses in the permanent store (20) as least important. It is interesting that this group were in agreement that most losses occur in the field, however they felt that more losses occured in the temporary store than the permanent store. It may be that this is explained by pearl millet being more resistant to weevils than maize and legume crops which where also considered in the general post-harvest constraints causal diagram.

The major cause of field losses is through pests in the following order of importance: termites (20), birds (13), Rodents (8), grasshoppers (5), and weevils (3). All these pests damage the crop once it is harvested and piled in the field. Weevils also cause indirect field losses by reducing seed germination. Temporary store losses are caused primarily by rodents (20), but also by weevils (10). Weevils are the major cause of loss from permanent stores (10), with rodents being less important (6). Thieves (3) and poor store construction (1) were also seen as causing losses from permanent storage. Poor construction involved poor siting and poor construction of the roof resulting in losses from moisture. However farmers felt that the primary cause of poor construction was laziness and that if the farmer wanted to overcome these construction problems he could easily do so. Lack of knowledge was not considered to be a constraint resulting in poor store construction. Losses also occured during the transporting of the harvest from the field to the temporary store, and during threshing.

Diagram 3. Causal Diagram for Post-maturity problems in Pearl Millet and Sorghum

.NB. The higher the score the more important the problem



Pearl Millet is used as a staple food as well as for brewing beer. The quality of the staple food (sadza) and the beer significantly deteriorates through the season with an increase in pest infestation. Eventually, the quality of the grain is so poor that it does not germinate when placed in water to make malt, and so cannot be used for brewing.

Rodents

Rodents cause major losses from the temporary storage structures (20) and the field (8), with less important loss from permanent stores (6). Reasons given for this were that permanent stores are of better construction and close to the homestead, where cats are often kept to control rodents. Temporary storage structures are far from the homestead, and often built on rocky outcrops where a lot of rodents are present. When the crop is in the field there is no protection against rodent damage. There are apparently no traditional methods of rodent control.

Weevils

Weevils cause damage at all three stages of the storage process and particularly in the permanent and temporary store, with less damage occuring in the field. The major cause of the high damage caused by weevils is given as the susceptibility of 'improved varieties'(12) to weevil damage. Ineffective traditional methods (2) and the cost of chemical treatments (5) resulting in a lack of protective measures being taken. Lack of knowledge (1) is also given as a minor cause of the lack of protective measures taken. Weevil damage is exacerbated if premature harvesting occurs. Early harvesting is carried out to avoid bird damage. During discussion of the importance of weevil damage, some farmers felt that weevil damage once the crop was in the granary was not important as they could still eat the grain even if it was damaged. This highlights the problem of farmers perception of post-harvest problems. Often the problem may be more serious than the farmer realises. If this is the case then trials done with farmers to assess weight loss during storage etc. can be very useful in assessing, together with the farmer, the seriousness of the problems.

Adding-up and comparing the total scores for weevils and rodents, rodents appeared to be the most important problem primarily due to their major effect on temporary storage losses. However when farmers were asked for clarification on this point, there was some dispute with a number of farmers saying that weevils were in fact more important than rodents.

Seed storage and selection

Weevil damage was identified as a cause for poor germination in the field. This resulted in a brief discussion of seed selection and storage. Some farmers select seed after storage of the crop prior to planting. When this is done problems of germination occur. However, most farmers grade the crop in the field and select seed heads for size and maturity. Seed heads are then stored in the roof of the kitchen unthreshed. For groundnuts, seed selection occurs once the crop is shelled just before planting, however farmers stressed the importance of keeping the crop away from rodents.e.g. by storing in sealed earthenware pots.

Relevance to other crops

The causal diagram was drawn specifically for Pearl Millet (Mhunga) but participating farmers also felt that it was relevant for Sorghum which has similar post-harvest problems to Pearl Millet. However it was noted that Sorghum is more prone to weevil infestation than Pearl Millet. There is also a type of moth which is more often present in Sorghum than pearl millet. This is possibly the larvae of *Euphestia* or *plodia spps.* as the 'worm' was said to cause a lot of webbing.

Production and post-production activities and related labour requirements for Pearl Millet and Maize.

Introduction

The aim of this exercise was to determine the labour requirements for different activities associated with the production, harvesting and processing of pearl millet and to determine how activities are seperated by age and gender. The methodology used involved the construction of a 'participatory labour budget' for pearl millet, indicating activities undertaken in each month, with different types of beans representing the no.of people involved in each activity and the number of days that the activity took. Two respondents were used, one who had access to draught power and one without access to draught power. Due to the more quantitative approach used in looking at labour, the participants acted as case-studies with general principles highlighted by the case studies being clarified and discussed by the group as a whole. A third respondent who had access to draught power then did a labour budget for maize. Care has been taken when comparing the labour requirements for different case-studies as the exact size of fields were not known. Also the second respondent often grouped crops together ,as field activities e.g. weeding for several crops is done at the same time.

Pearl millet labour requirements.

Size of family and access to draught power are the two key factors influencing labour availability. Field activities such as land preperation and weeding are much more labour intensive for families without draught power (D.P), however group labour is often used for field activities if there is no access to draught power. In the case studies, group labour was used for the second weeding by the household without access to draught power. Weeding is often not completed even by those with access to draught power, as many other crops require labour at this time. Completion of weeding is a particular problem for small families, however it does coincide with school holidays therefore children are available to assist in the fields. Bird scaring in March and April is very time consuming and children are not available to do this work as they are at school.

Harvesting, involving the cutting of the pearl millet heads, is a labour intensive activity and often labour groups are used. Threshing is also very labour intensive and labour groups are again often utilised. Draught animals are used for treading out the grain if they are available to the group, but groups with no access to draught animals do this work by hand using flails. Winnowing takes place at the same time if group labour is used and then the grain is transported to the permanent granaries. Transport is easier for those with access to draught power.

A comparison of maize and pearl millet labour requirements for families with access to draught power (case-studies 1 & 3)shows that maize has a lower labour demand than pearl millet. The main differences being that no bird scaring is required with maize. Harvesting and threshing of pearl millet also takes longer and is much more labour intensive than de-husking and shelling of maize. Group labour is also used for the de-husking of maize. The major difference in post-harvest processing between the two crops is the very high labour requirement involved in threshing of millet, as compared to maize shelling. Shortages in labour can result in a delay in threshing of a crop, with the crop spending more time in the temporary store, unthreshed. An example of this is short-term sorghum varieties (e.g.SV2) which have a much shorter growth period than pearl millet, and are normally harvested in February. Sorghum is stored from February to July unthreshed and then threshed together with pearl millet. This occurs as there is a labour bottle-neck in February as many other activities also occur at this time. This has important implications if more losses occur in temporary storage than in permanent storage, as suggested earlier in this report.

Labour divisions by age and sex

The primary source of labour is from immediate family members resident in the home. Hiring of labour is only common amongst the better-off farmers. Labour groups are a important source of labour for the majority of farmers.

Children do not play as important a role as might be expected as they are only available during the school holidays and in the late afternoon after school. Therefore, activities such as bird-scaring which would have been done in the past by children, are now done by adults. However, they are involved in field and post-harvest activities when available. Activities involving the use of draught power, for example ploughing and cultivation are carried out by both men and women but men are responsible for the draught animals.

Threshing is generally done through the use of labour groups incorporating both sexes. Men participate more in group threshing accompanied by beer drinking, than in group work without beer. Winnowing is done by women, and men are responsible for the transport of the grain to the granary. Men are responsible for the construction of the main frame of both the permanent and temporary storage facilities with women being responsible for the plastering and subsequent annual re-plastering. The repairs, mainly involving roofing are done by men while the women manage the day to day up-keep of the granary and the grain. Beer brewing is the womens responsibilty, and a major source of income for women. Maize de-husking and shelling is generally the responsibility of women and children.

Diagram 4. Production and post-production activities and related labour requirements for pearl millet (with and without Draft Power) and Maize (with draft power)

OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
Activities Pearl Millet Dry planting	Planting and weeding (thinning)	Weeding		2nd weeding	Bird scaring,	Bird scaring' Harvesting	Harvesting (winter ploughing)	tsapi (temporary granary)	threshing, permanent storage, brewing	Threshing, permanent storage, Beer brewing	Threshing, permanent storage, Beer brewing
Family 1 (with DP) 3 days 2 people (5)	thinning 5 days 2 people (10)	Cultivation (2 days) Hand weeding 6 days 5 people (30)	(0)	second weeding 2 people 10 days (20)	bird scaring 2 people 30 days (60)	bird scaring 2 people 30 days (60)	Harvesting 2 people 15 days (30)	harvesting and transport 2 people, 15 days (30)	Threshing (group labour) 20 people 1 day (to granary)	(threshing) Brewing	 Brewing 1 person 4 days (4) (per brew)
family 2 (no DP) Dry pl. 3 people 30 days (90)	 Dry pl. 3 people, 15 days (45)	Weeding 3 people 30 days (part of the day) (90)		2nd weeding 20 people 1 day (group) (20)	bird scaring 2 people 30 days (60)	bird scaring 2 people 30 days (60)	harvesting 20 people 1 day (group) 2 people 1 day (finish off) (22)		Threshing 2 people 3 days (6) Winnow 3*2 = (6) Transport to granary (2*1 = 2) (14)	Brewing	Brewing
Maize with DP.	planting behind plough 3 people 2 days (6)	cultiv. & weeding 3 people 2 d weed 2 d cult (12)	Weeding 3 people 3 days (9)			Harvest, cutting and stooking 3 p * 4 d (12)	dehusking (group) 10p*1d (10) Transport 3p*1d (3) (13)			Shelling and storage 2 days * 4 people (8)	

Figures in brackets (9) represent approximate man-days calculated by multiplying no.of people by no. of days. This was done by researchers after completion of the labour budget.

Conclusions and Recommendations.

Summary of Constraints

Despite the many post-harvest constraints facing farmers in Chivi Ward 21, post-harvest problems are apparently not a priority area for farmers in the area. Farmers are more concerned about production constraints, however they are aware of the causes of losses after crop maturity and harvest. Overcoming some of the post-harvest problems that are facing them, could have a significant beneficial impact on farmer's livelihoods. Although farmers perception of post-harvest losses are that they are minor, it may be that they are more important than farmers realise.

The most severe post-maturity crop losses occur in the field prior to storage. These losses occur prior to harvesting and while the crop is stored in the field. Causes of losses include exposure to rain resulting in rotting, insect pests (particularly termites), rodents and birds. These losses are exacerpated by the lack of scotchcarts and draught power to transport the crops from the field, and also by the shortage of building materials, particularly poles for the construction of temporary granaries.

The primary cause of losses in temporary storage structures are from rodents and insect damage. Poor construction can result in moisture damage. The major losses in permanent storage are due to weevils. Losses from weevils are more serious than in the past, as modern varieties are more susceptible to weevil damage than traditional landraces and the traditional protectants used are not effective. Chemical treatments are not generally used as they are too expensive. Poor construction and design of permanent granaries was not considered to be a major problem.

The major use of labour in post-harvest activities involves the threshing of small grains. Often labour groups are utilised for this activity. Delays in threshing result in crops spending more time in the temporary storage structures where high losses can occur.

This study has focused on the causes of grain damage and loss, rather than problems relating to the marketing and processing aspects of the post-harvest process. However the marketing constraints facing farmers in the area should not be overlooked.

Areas for further Research

The following areas of research would be of value in further assessing and overcoming farmers post-harvest constraints:

- quantification of the losses sustained at different stages of the storage process to verify farmers perceptions.

- assessment of the effectiveness of traditional protectants, particularly 'mutovhoti' tree (*Spirostachys spps.*), in comparison with chemical treatments and

possible new natural protectants e.g. *Azidirachta Indica* (vs insects), *Gliricidia Sepium* (vs rodents).

- assessment of the suitability of *Azidirachta Indica* (Neem), and *Gliricidia Sepium* species to the relevant agro-ecological zone.

- basic improvements in the design and construction of temporary stores.

- design of a simple 'thresher' to reduce labour involved in threshing of millets and sorghums, and assessment of the effect of introducing this technology on traditional labour groups

- investigate varietal susceptibility of crops to birds (for small grains) and storage insect pests (for maize and small grains)

Developmental recommendations

A number of the post-harvest constraints facing farmers in this area could be overcome by developmental activities rather than research. Possible areas of activity could include:

- improvements to temporary storage structures including rodent proofing,

- community forestry projects to provide timber for store construction. This could be combined with introducing new natural pesticides such as neem (*Azidirachta Indica)* and Gliricidia (*Gliricidia sepium*) for the control of insects and rodents respectively.

- increasing availability of low cost transport devices e.g.carts, for transport of crops from the field.

- improving access to chemical protectants and advice through extension and credit programmes.

- extension on seed selection and storage methods to increase quality of home stored non-hybrid seed.

Appendix A: Evaluation of Methods by Researchers

At the end of the fieldwork, the researchers involved were asked to comment on the PFM methods used (primarily causal diagrams) in terms of their usefulness, ease of use and disadvantages. The researchers comments are summarised below.

Usefulness of the methods

Researchers felt that the methods were generally useful in terms of their ability to identify the connections and relationships between different issues, constraints and problems within the farming system. Scoring also gave an idea of the relative scales of different problems. It was also noted that the more specific the topic tackled the better, as more general diagrams could become very confusing. However the wider context highlights less obvious connections which may be more important. This method also enables identification of the root problems, or initial causes of problems which need to be tackled if the problem is to be solved. This was felt to be of specific benefit to the farmer, paticularly if solutions were discussed.

Ease of use

Researchers commented that farmers at first found the concept difficult but after a clear explanation were able to use the method confidently themselves, and found it interesting. It was noted that the researcher or facilitator of the exercise had to be competent in the use of the methods and in communicating with the farmers including asking the right questions. Poor facilitation could result in the exercise being of little benefit to researchers or farmers.

Disadvantages

The main disadvantage identified by the researchers was that the methods were time consuming. At least two hours was required to complete one causal diagram. If the group is too large, or the subject of little interest to the farmers this might result in the participants getting bored.

Conclusion

The researchers felt that the methods had made a positive contribution to the study as a whole , however the real test of these methods is whether the researchers involved in this exercise use the PFM methods again in subsequent fieldwork. All the researchers expressed an intention to use the methods in subsequent fieldwork.