

Crop Post-Harvest Research Programme Zimbabwe



PRA SURVEY REPORT FOR KAWERE
WARD, MUTOKO DISTRICT, ZIMBABWE, 10
TO 14 NOVEMBER 1997

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BACKGROUND

Mutoko district is approximately 409,250 square kilometres and is classified into Natural Region (NR) IIb III and IV, in proportions of 15.6%, 40.1% and 44.3%, respectively. The major proportion of communal lands falls in NR IV. The mean annual rainfall ranges from 700mm in the South to 650mm in the north and east. The soils are moderately shallow to deep brown coarse-grained sands; and loamy sands overlying strong brown fersiallitic loamy sands.

Mutoko district is divided into 29 wards each consisting of 6 villages with 1 000 people per village or 80- 120 families.

As a result of a Rapid Rural Appraisal (RRA) conducted on household food security in 3 communal areas (Mutoko, Chivi and Zimuto) in Zimbabwe (Donaldson *et al.*, 1996), the Crop Harvest Programme (CPHP) was formed in collaboration with DR&SS in 1996. The general objective of this Participatory Rural Appraisal (PRA) was to provide a framework for crop post-harvest research in Mutoko district.

The PRA survey was conducted in two ViDCos of Kawere Ward *viz* Menya and Kawere; Mutoko district in North Eastern Zimbabwe from 10 to 14 November 1997. A multi-institutional team consisting of an agronomist, soil scientist, research engineer, two entomologists and a post-harvest technology specialist (Appendix 1) in collaboration with AGRITEX field staff conducted the survey.

In order to learn more about and establish a good rapport with the community, the team stayed at a local farmer's homestead in one of the ViDCos throughout the survey period. Staying amongst the community made it easier to directly observe the socio-economic set-up and agricultural practices. In addition it provided an opportunity for the PRA team to hold discussions, amend the programme to the current situation and to compare notes on a daily basis.

The objectives of the PRA survey were to:

1. gain a full understanding of the agricultural systems and socio-economic structure of selected villages in Kawere Ward;
2. identify the major post-harvest constraints faced by the farmers;
3. describe the labour divisions by age and sex during post-harvest operations;
4. describe methods of grain treatments currently used by farmers (maize, sorghum, millets);
5. confirm social status of participating farmers in the maize storage monitoring trial and
6. enhance relations between the CPHP and farmers in the selected villages.

Data was collected through individual, group and key informant discussions employing the following PRA techniques:

- Mapping (area and social)
- Historical time lines
- Transect walks
- Seasonal and labour calendars
- Semi-structured interviews (individual/group level) focusing on general agricultural systems/constraints and post-harvest systems and constraints.
- Wealth ranking
- Pair-wise ranking and scoring of enterprises, and general agricultural post-harvest constraints.
- Feed back meetings with farmers (joint analysis of post-harvest constraints).

A provisional programme was drawn up to act as a guideline during the PRA and was amended during the survey week (Appendix 2)

Detailed background information on Mutoko district was collected (Appendix 3) and reviewed. The literature is available as a CPHP report (Mvumi *et al.*, 1997)

1. MAPPING

1.1' Area Mapping of Menya Village

Area mapping was conducted with a group of 12 men and 6 women from Menya ViDCo. The objectives of the exercise were clearly explained before conducting the exercise. Mapping was carried out on the ground and a stick was used for drawing.

Generally, the group concurred in placing topographical (mountains, hills, rivers and valleys) and infrastructure (shops, community meeting points, roads, clinics and household locations) features on the map; with the exception of one elderly headman who differed with others.

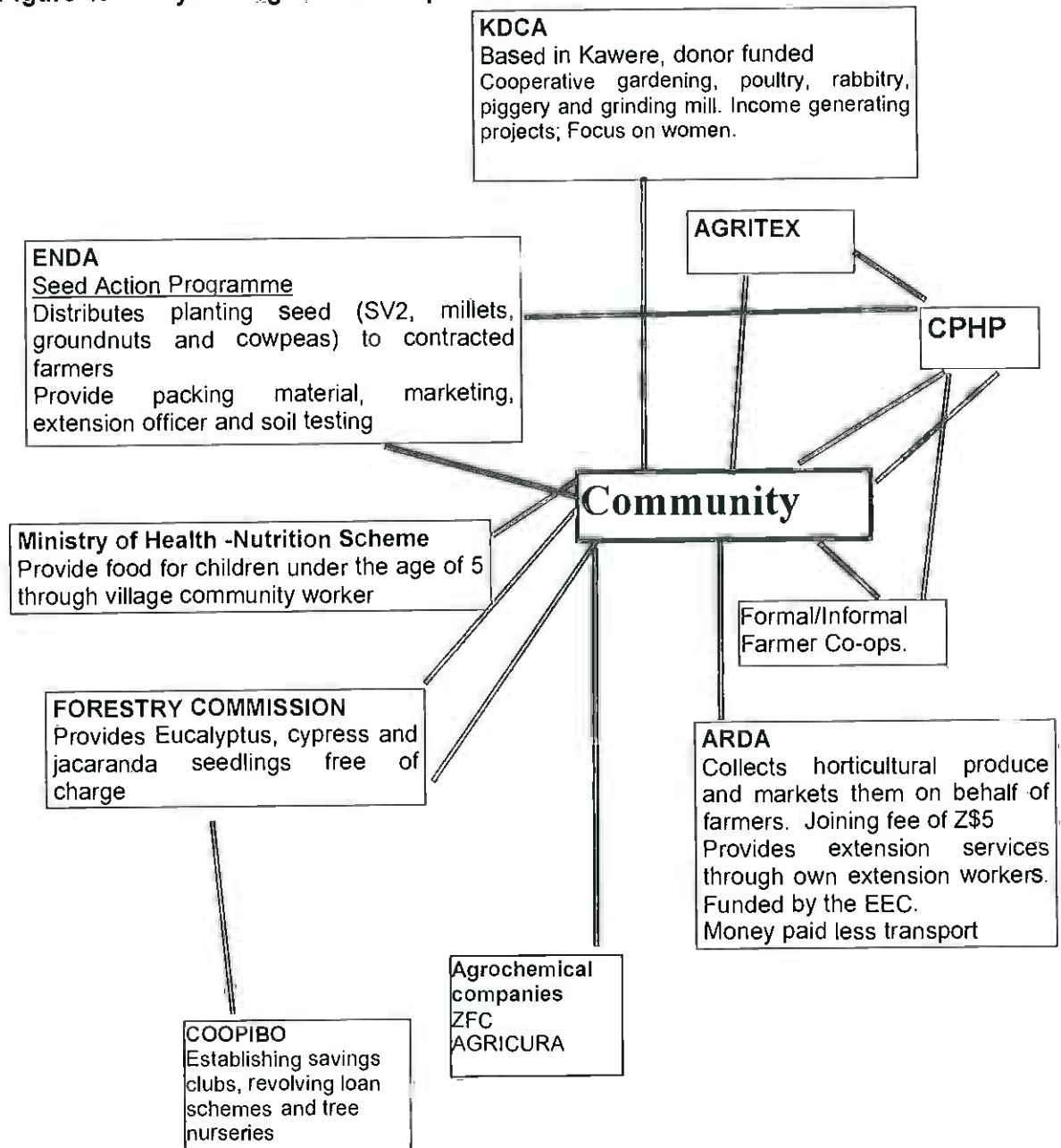
Women were not very participatory in the mapping exercise although efforts were made to encourage them to contribute and actively participate in the exercise. Their lack of participation may have been attributable to the fact that all the women were fairly young and were part of the community through marriage, they were not very familiar with boundaries between villages.

The mapping exercise was successfully combined with brief semi-structured interviews to verify points that came out of the discussion. Overall the group showed enthusiasm once they understood what they where supposed to do. After completion of the exercise a paper copy of the map was made. A feedback meeting with the farmers was held at the end of the PRA exercise and the Programme followed is outlined in appendix 4.

1.2 Social Mapping

The social mapping exercise was conducted with the same group of people who participated in the village mapping exercise. The social map showed linkages between the community and outside institutions, highlighting the social organisation within the community. A schematic diagram of the social map produced is displayed in Figure 1.

Figure 1: Menya Village Social Map



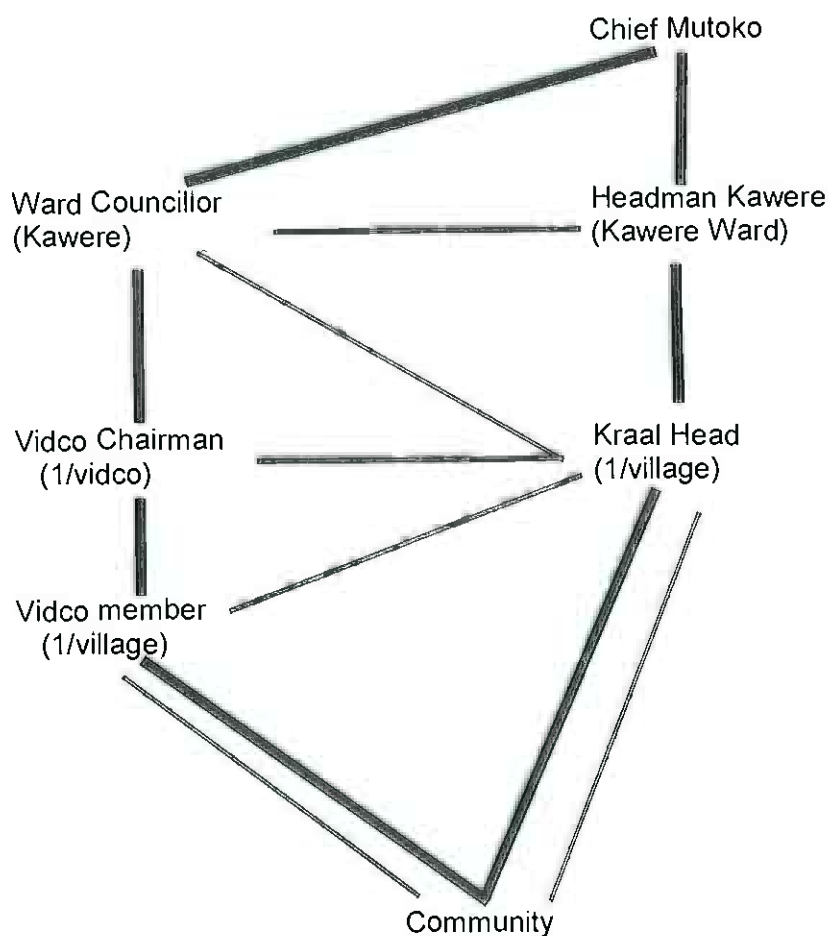
1.3 Social structures

An exercise was also conducted to indicate the social structures in Menya village. There are 6 villages in Menya VidCo with an average number of 100 people in 4 villages (listed as 1-4) and 50 people in 2 villages (listed as 5-6).

Village	Kraal Head
1 Kashiri	Nyepanai Kanyonganise
2 Ndemera	Pachena Ndemera
3 Dakwa	Rice Mukwembere
4 Mandebvu	Philemon Mandebvu
5 Chadziwamupata	Nelson Machabvunga
6 Jama	Jama Ndemera

The highest authority in the district is the chief is Chief Mutoko. Immediately below him is the Headman. The kraal heads reports to the Headman. There are 6 Wards (Menya, Kawere, Kuwirirana, Zambezi, Madimutsa and Kutogora) each with 6 Vidcos in Mutoko. There are 6 villages in Menya Vidco each with a kraal head and a Vidco. All the 6 Vidcos report to a Vidco chairman who then reports to a councillor. Heated arguments occurred while trying in trying to define the chains of command and interactions between the traditional leaders and developmental/political leaders. The chains of command are displayed below (Fig. 2). The group finally agreed that the chain of command is dependent on the issue at stake i.e. whether it is a developmental or social or a political issue.

Figure 2: Chains of command in Mutoko



2. HISTORICAL TIMELINES

The historical timeline exercise was conducted with 9 men and 3 women from Menya ViDCo. The informants were requested to recall important events that had taken place in the area. Semi-structured interviews were conducted concurrently to obtain some information. The elderly men were particularly good at recalling past events. Their information generated the historical time line shown below

Figure 3: .Menya Vidco Historical Timeline

<u>Date</u>	<u>Event</u>
1918	Outbreak of influenza First World War
1921	Construction of Kawere Primary School
1930	Construction of the first dip tank
1935	The main cultivated crops were sorghum, pearl millet, rapoko, groundnuts, Bambarra nuts and cowpeas Woven basket type granaries (Mhingwa/nhawa) Second World War
1942	Grading of Kawere road
1947/48	Locust outbreaks Major drought, draft animals and people died
1956	Construction of Ndemera Primary School Parents contributed to pay the teachers Maize introduced
Late 1950s	Introduction of maize and grinding mills Maize mainly consumed as green mealies
Early 1960s	Increased maize production Introduction of gardening (people consumed traditional vegetables) Natural grain protectants used as grain protectants Ndemera School closed because of lack of money to pay the teachers Construction of the first corrugated houses
1968/69	Major drought/Draft power perished
1972	First main road used by buses was constructed
1975/6	Severe armyworm out breaks First usage of synthetic grain protectants
1977	War of liberation intensified
1983	Fertilizer usage, slow uptake due to traditional beliefs Establishment of first AGRITEX office in Kawere
1984/85	Major drought-famine
191/92	Major drought
1994/95	Major drought Malaria outbreak

3. WEALTH RANKING

Wealth ranking was conducted in both Menya and Kawere villages. In both cases two informants did the exercise jointly and the exercise was then repeated.

The wealth ranking criteria employed did not differ between the villages. The wealth ranking characteristics can roughly be divided into 3 groups twice. The main wealth indicators were draft animals, farming implements (especially a mouldboard plough) and crop yield.

Wealth is also closely associated with the appearance of the homestead and livestock. Educational standards including the ability to send children to school, formal and informal employment and other enterprises i.e. ownership of cars, emergency taxis, tuck shops, stores and houses in urban areas were also linked with wealth.

There was no reference of remittance from children or relatives made.

Attendance of political or development meetings was cited in an isolated incidence as a wealth indicator. This may have been due to the fact that one of the interviewees was a political leader.

4. SEMI-STRUCTURED GROUP INTERVIEWS

11 November 1997. Menya ViDCo:GROUP INTERVIEWS

General Agricultural Systems

Maize is currently the staple crop in the area, although in the past millets and sorghum was the major crops. Maize does not store well compared to the smaller grains, and is more susceptible to insect pest infestation than small grains. Consequently, the crop is disposed of annually and generally consumed before the small grains. The informants stated that pearl millet could store for up to 3 years, and finger millet for more than 5 years without a significant loss in quality.

Other major crops included groundnuts, cowpeas, bambarra nuts, rice and sunflower. Additional crops grown are sweet potatoes, green/black gram and horticultural crops such as green beans, leafy vegetables, cucumbers, butternuts and tomatoes. Most households also kept cattle, goats and chickens.

The various farm enterprises were listed; the major objectives for agricultural production were identified as food security and income generation. Scoring according to the importance of the enterprises in terms of the afore-mentioned objectives then followed. The results are shown in Table 1

Table 1: Importance of farm enterprises according to food security and income generation in Menya ViDCo.

Enterprise	Food Security		Income Generation	
	Score	Rank	Score	Rank
Maize	11	1	6	3
Pearl millet	9	2	2	7
Sorghum	8	3	5	4
Livestock	-	-	7	2
Cowpeas	7	4	4	5
Finger millet	6	5	2	7
Bambarra nuts	5	6	3	6
Groundnuts	3	7	4	5
Sunflower	-	-	3	6
Horticultural crops (excl. fruits)	-	-	8	1
Fruits	-	-	5	4
Rice	1	8	1	8

Livestock sales are an important integral component of the farming system in Menya. The animals were ranked as (in order of decreasing income generation): cattle, goats, chickens, rabbits, pigeons and pigs.

Discussion Highlights

The following are some of the highlights of the discussion that transpired during the ranking and scoring exercise. The crops were ranked and scored based on their availability and yields. For example, most people did not have pearl millet in store at that time of the year yet most had sorghum in their stores.

Maize was considered the most important food crop mainly because of the high yields per unit area compared to other cereal crops. Pearl millet gives low yields but is drought tolerant and is less susceptible to storage insect pests than maize. Hence there is no need to use chemicals. It also has an important role in local culture mainly in beer brewing; beer was used to facilitate communication with spirit mediums and ancestors '*doro rechikaranga*'. Sorghum yields are better than pearl millet, although less drought tolerant, have poorer storage properties, and less cultural importance. Cowpeas are quick to fill the stomach and easy to cook, and if finances are limiting, cooking oil is not essential for relish preparation. Cowpeas can be consumed at different stages leaves, green pods and as dried beans, relish or snacks '*mutakura*'. Finger millet is easy to produce, easy to store (reportedly for up to 5 years without deterioration) and is also used for cultural purposes. The malt is more potent than that of pearl millet and can be mixed with left over *sadza* to brew sweet beer (*mahewu*) overnight.

Bambarra nuts store well and can be used both as snacks (*mutakura*) and relish. Groundnuts are consumed at any time as "fast food" which can be included in school children's lunch packs and roasted for visitors. They are also used to make peanut butter that can be sold locally. Raw groundnuts can be sold when necessary to obtain money for general upkeep of the household. At the time of the survey, the local price of groundnuts was pegged at Z\$60/20 l tin. Rice is grown in vleis and therefore has limited production because there are only few suitable fields for production. Rice is a high value crop, which can be eaten for breakfast or on its own at any time of the day. The peak demand is during festive seasons.

There was a heated debate as to whether livestock or crop activities generated more income. Emphasis was put on availability and quantities of whatever product. It was finally agreed that income from livestock is infrequent and not everyone has cattle for sale, while horticultural crops can be sold throughout the year and are therefore more important for income generation than either livestock or field crops.

Seasonal Calendar

A seasonal calendar describing the agricultural activities of Menya village was produced by a group of both men and women, responsibilities by age and gender were also indicated. The activities described were winter ploughing, planting, weeding, manure application, purchase of inputs (fertilizers and seed), harvesting, marketing, grain storage management and food sourcing.

Table 2: A seasonal calendar crop production in Menya ViDCo

		November	December	January	February	March	April	May	June	July	August	September	October
Planting	MAIZE	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	SMALL GRAINS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	PULSES	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	GNUTS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Weeding	ALL CROPS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harvesting	CEREALS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	B'NUTS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	G'NUTS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	C'PEAS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shelling		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Storage		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marketing		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Input acquisition		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gardening	HORT. CROPS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cattle Manure	DIGGING	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	APPLICATION	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

POST-HARVEST CONSTRAINTS

The post-harvest constraints identified are listed in Table 3

Table 3: Pair wise ranking of Post-harvest Constraints in Menya ViDCo

	Transport	Granary	Chemical protectants	Storage insects	Rodents	Score	Rank
Rodents	Transport	Granary	Chemical protectants	Storage insects	-	0	5
Storage insects	Storage Insects	Storage insects	Chemical protectants			3	2
Chemical protectants	Chemical protectants	Chemical protectants				4	1
Granary	Granary					2	3
Transport						1	4

Rank 1 = most serious problem

13 November 1997. Kawere ViDCo:GROUP INTERVIEWS

GENERAL AGRICULTURAL SYSTEMS

Maize is now the staple crop in the area; in the past, millets and sorghum were the major crops. However Maize does not store as well as compared to small grains and is more susceptible to insect pest infestation than small grains; consequently, the crop is disposed of yearly and generally consumed first before the small grains. Pearl millet can store for up to 3 years and Finger millet for more than 5 years without significant loss in quality deterioration.

Other major crops groundnuts, cowpeas, bambarra nuts, rice and sunflower. The main livestock common to most households are cattle, goats and chickens.

The various farm enterprises were then listed and the major objectives for agricultural production were identified as food security and income generation. Scoring according to the importance of the enterprises in terms of the aforementioned objectives then followed. The results are shown in Table 4

Table 4: Importance of farm enterprises according to food security and income generation.

Enterprise	Food Security	Income Generation
Maize	1	4
Livestock	6	6
Pearl millet	2	10
Finger millet	5	12
Rice	5	9
Cowpeas	3	8
Sorghum	4	7
Bambarra nuts	10	11
Groundnuts	7	3
Sunflower	-	2
Horticultural crops (excl. fruits)	8	1
Fruits	9	5

In the other group the ranking of the crops according to food security was more or less the same except that sorghum was considered more important than cowpeas but still less important than maize and pearl millet. Additional crops - Velvet beans and Green gram - were also mentioned as food security crops though placed at the bottom of the list.

Horticultural crops grown in the area are (in order of decreasing importance): tomatoes, rape, cabbages, onions, beans, peas, butternuts, cucumbers and okra.

DISCUSSION HIGHLIGHTS

Following are some of the highlights of the discussion that transpired during the ranking and scoring. Maize was considered the most important food crop mainly because of the high yields per unit area compared to other cereal crops. Pearl millet was the second most important food crop because it stores well and can be used for cultural purposes mainly beer brewing for example to facilitate communication with spirit mediums and ancestors (doro rechikaranga). Cowpeas were rated third because they can be used both as snacks (mutakura) and relish. Sorghum, finger millet and rice were also considered fairly important with finger millet being mainly used for cultural purposes and treating the very ill, especially when mixed with traditional medicines. Rice is consumed occasionally and is not a priority. Groundnuts are mainly used for making peanut butter to be used as cooking oil, adding to porridge and as butter. They can be eaten anytime as snacks.

The major source of income is horticultural crops such as vegetables, tomatoes, cucumbers, butternut, gem squash and baby marrow. Sunflower, groundnuts and maize are the most important field cash crops. Sunflower is sold to GMB and locally either for chicken feed or oil expression. The most important fruit crops sold are mangoes, bananas and papayas. One farmer in the group strongly felt that livestock (cattle) generates more income than crops on the market. The group members accepted it as a fact but they pointed out that not many people have cattle that they can sell whenever they need money. In the area, livestock production is on a free ranging basis and cattle are kept for other non-commercial purposes.

Seasonal Calendar

A seasonal calendar (Table 5) for maize was developed by the group to indicate when various activities are carried out and the responsibilities by age and gender. The activities were then ranked and scored according to labour demand. The results are shown in Table 6. However, it was pointed out that timing of the various operations are highly dependant on the timing of the rains.

Table 5: A seasonal calendar focussing on maize production in Kawere ViDCo

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Winter ploughing							***** ****	***** ****				
Manure application											***** *****	*****
Planting	***** ***** *	***** ***** *										
Weeding		***** *****	***** *****	***** *****								
Harvesting						***** ***** *	***** ***** *					
Shelling									***** ***** *	***** ***** *		
Chemical application									***** ***** *	***** ***** *		
Storage									***** ***** *	***** ***** *		
Gardening	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *	***** ***** *
Marketing											***** ***** *	***** ***** *
Input acquisition	***** ***** *									***** ***** *	***** ***** *	***** ***** *
Food sourcing	***** ***** *	***** ***** *	***** ***** *									

Labour Division by gender and age

All members of the household with the exception of a few carry out most of the farm operations. Winter ploughing is the responsibility of men and children (mainly male) when they are on school holidays. However, for widows they do it themselves. In grain storage, the husband purchases the chemical grain protectant and the wife applies the chemical with the assistance of children at loading. In other families the husband also participates in the grain treatment so that he knows how much has been put in the granary. The general management of the grain and granary is the responsibility of the woman. Men are in charge of repairing the structure in terms of re-construction and re-thatching while women do the re-plastering and cleaning.

Women and children perform most gardening activities with assistance from men. Marketing of agricultural produce is mainly done by men though women do have a greater role in marketing of horticultural produce; an all-year activity, depending on crop in season. Men procure agricultural inputs. In times of food deficit, men are responsible for sourcing the food or the money to buy food. There are few cases where involved in food sourcing.

Labour Demand by operation

The farmers were then asked to score and rank the activities listed in the seasonal calendar. The ranking is shown below with the most labour-demanding task at the top of the list.

Table 6: results of activities ranked and scored according to labour demand

Rank	Task
1	Weeding
2	Planting
3	Harvesting
4	Procurement of food
5	Horticultural crop production (especially watering)
6	Maize shelling
7	Winter ploughing
8	Manure application
9	Storage
10	Marketing and input procurement

GENERAL AGRICULTURAL CONSTRAINTS

The problems limiting agricultural production in Kawere ViDCo were identified and scored and ranked as follows

1. Lack of draught power
2. Stagnant producer prices
3. Poor soil fertility
4. Lack of transport (of all crops) to market
5. Exorbitant milling costs
6. Lack of water
7. Storage insect pests
8. Poor efficacy of chemicals
9. Red Spider Mite

Description of problems

1. Lack of draught power

There is a general shortage of draught power in the area. Most farmers rely on borrowed draught animals, which can only be released after the lenders are through with them. The consequence is late planting since the use of hoes is slow. The animals available are in poor condition.

2. Stagnant producer prices

The prices of inputs have increased drastically while those of producer prices have remained static. The costs of other basic necessities are escalating e.g. transport, education and clothing. This has made agricultural production non-viable.

3. Poor soil fertility

The soils are mostly sandy and are exhausted. There is inadequate supply of cattle manure while the fertilisers are too expensive.

4. Lack of transport to market

There is a shortage of vehicles to transport produce to the market (Mutoko, Harare). The available transporters are unscrupulous and charge exorbitant rates.

5. Exorbitant milling costs

The cost of hammermilling grain especially maize is too high. In addition the 20 l bucket is not standard; either it is deformed or the height has been reduced. The issue of differences in milling charges due to different sources of power (electricity versus diesel) was discussed but still others still felt that considering the same power source the hammer mills in Kawere Ward are still too high. The milling costs mentioned ranged from Z\$2.50/20l tin to Z\$4.50.

6. Lack of water

There are few boreholes and no dams in the Ward. The farmers need water for irrigation, domestic use and for livestock.

7. Storage insect pests

Storage insect pests are a problem as the crop matures right through the storage period. As a consequence of high insect infestation during storage, the flour develops a poor taste when prepared into "sadza" or porridge.

8. Poor efficacy of chemicals

The synthetic insecticidal dusts available for grain protection are not effective.

9. Red Spider Mite

This is a big problem in horticultural crops especially tomatoes.

In this group there were a lot of frank and interesting discussions between men and women touching on socio-economic issues. It was quite apparent that men are the decision makers and the financial controllers though women contribute significantly to income generation in the home. There were accusations and counter – accusations of laziness and financial mismanagement.

Another issue that emerged after the scoring and ranking of the Agricultural Constraints was the susceptibility of hybrid maize cultivars. Some cultivars found in this respect are Pannar group and R201. However the selection of cultivars to use is mainly based on yield and early maturity.

POSTHARVEST PRACTICES

Pre-storage

Semi-structured interviews at individual and group level were conducted in both Kawere and Menya villages to get an insight into the post harvest practices operational in Kawere ward.

At harvesting, maize plants are cut, stoked and dehusked after a few weeks. The cobs are ferried to the homestead where they are dried on a rock surface or a specially prepared surface (firm soil plastered with cowdung). Sometimes the cobs are spread the ground with maize stover laid beneath. Such a practice was known to attract termites. When dry enough, the crop is shelled and sold or treated and stored for consumption.

When harvesting small grains, the ears are cut and transported to the homestead where they are dried in a similar fashion to maize. The ears are then hand-threshed (mainly by women and children) and stored. Threshing and winnowing is done from June to August.

Timing of groundnut harvesting is dependent on planting date but usually this is done earlier than most crops. The harvesting involves lifting and windrowing maybe packed onto some form of "A" structure for further drying. The pods are then picked and sold to GMB. Alternatively, they are retained for domestic consumption or seed. Bambarra nuts are lifted by hand or by digging and the pods picked straight away and dried on the ground either on a rock surface or on a prepared surface. Harvesting of bambarra nuts involves women and children.

At and during storage

Maize is usually stored shelled whereas groundnuts, bambarra nuts and cowpeas are normally stored as pods and only shelled when the need arises. Bag and granary storage are common in the area. Empty fertiliser bags are sometimes used to supplement the normal 50 or 90 kg bags.

Grain treatment largely depends on the yield and the crop. Treatment is only done on grain intended for long-term consumption (6 months or more) and only maize is usually treated. Both synthetic and natural grain protectants are used in the area. The most common chemical grain protectant is Pirimiphos-methyl 2 % dust followed by Methacrifos 2 % dust. Natural protectants are millet trash and eucalyptus leaves. At winnowing, immediately after threshing millets, some of the trash is left in the grain and this is believed to prolong the insect free storage period. Eucalyptus leaves are applied as fresh in alternate layers with grain or scattered on top of grain. In some cases though rare, dry eucalyptus are crushed and applied as powder also in alternate layers. The powder is also applied to maize funnels for maize stalk borer control in the field during the production phase.

Pirimiphos-methyl and Methacrifos are admixed with grain and this group of farmers indicated that these chemicals are effective in storage insect pest control. However, in case insects are observed later during the storage period, all the grain is withdrawn from the granary, winnowed and spread out in the sun. Solar heating is considered an effective way of killing the pests; though most likely only the immature forms are killed while the adults fly away. There are rare instances when farmers consider it laborious to empty the granary even if infestation levels are high.

Marketing

Field crops are sold only when there is a surplus; which is rare for the majority of people in Kawere. However local trade involving small amounts is very common. For example the price of maize was given as Z\$20-30/20l tin. Most of the produce is sold to GMB and bags are also obtained from the same source. Transport arrangements are made as groups and the bagged grain is collected from a central point.

Processing

Maize shelling involves the whole family whereas women and children usually do primary processing of other crops. Women process groundnuts into peanut butter while sunflower seed is expressed using a manual ram press to produce oil. The machine is located at Kawere Township and the owner practices custom processing. Usually, the owner charges for the service in terms of the

product. For example, for every 3 x 750 ml of oil produced, one bottle is retained as payment for the service.

POST-HARVEST CONSTRAINTS

The post-harvest constraints are listed in Table 7.

Table 7: Pair wise ranking of Post-harvest Constraints in Kāwere ViDCo

	Moisture	Cheque encashment	Late payment	Transport	Rodents	Termites	Score	Rank
Labour	Moisture	Cheque	Late payment	Transport	Rodents	Termites	0	7
Termites	Moisture	Cheque	Late payment	Transport	Rodents		1	6
Rodents	Moisture	Cheque	Late payment	Transport			2	5
Transport	Moisture	Transport	Late payment				4	3
Late payment	Moisture	Late payment					5	2
Cheque encashment	Moisture						3	4
Moisture							6	1

Rank 1 = most serious problem

Description of the problems

1 Moisture in the granary

This is a major problem in cases where cement has been used in granary construction especially the floor. The problem is often noticed towards the bottom of the granary. Sometimes as much as 10 x 50 kg bags are rendered unfit for human consumption and diverted to livestock feed. This might be one of the reasons why farmers in this area have now resorted to bag storage rather than have proper granaries.

2 Late payment of delivered produce by GMB

Payment of produce by GMB sometimes takes as long as 2 months yet the money will be badly needed to start the new season.

3 Transport to market

Transport bottlenecks are usually in July to September. Grain bags can remain uncollected at pick-up points for 2 – 3 weeks. The transport problems are more critical in horticultural crops such as tomatoes and leafy vegetables because of their perishable nature.

4 Cheque encashment difficulties

There are no commercial banks in Mutoko to immediately encash the cheques. Encashment can be done at shops but there is pre-requisite to purchase goods

worth a certain value that may not necessarily be basic. Alternatively, one can deposit the cheque with POSB but it takes long (3 weeks) before the cash is available. This period added to the late payment of the produce exacerbates the problem of cash availability especially considering other things like school fees that have to be paid timely.

5 Rodents

Rodents are a problem in both bags and silos and it's a problem that persists throughout the year as long as there is food for the rodents.

6 Termites

The constraint applies to certain situations or specific homesteads. The termites attack crops while drying on the ground. The problem is more pronounced when maize cobs are spread out on maize stover.

7 Labour

The problem arises in years of bumper harvests when the yields exceed what the household normally handles. Labour shortage affects the elderly and widowed more than other households. In most seasons, labour is not a serious constraint because yields are inherently low.

PRA TEAM EVALUATION

1. Pre-planning team meeting

Conducting a meeting prior to conducting the PRA was found to be very essential. This was not done due to changes in travel plans. The meeting would have been very useful to familiarise the team members with each other and also to discuss the programme in a relaxed and unhurried manner. A meeting would have afforded an opportunity for team members who only had theoretical knowledge of PRAs to discuss various techniques to be employed in the field. The team recommended spending a night prior to the PRA at a nearby hotel.

2. Groundwork

Prior to the visit was highly recommended i.e. informing Agritex personnel and traditional leaders of the scheduled visit and programme so that time may be better utilised in conducting the PRA is not devoted to formalities.

3. Timely arrival

The PRA team of scientist arrived well after the time scheduled to hold a meeting with the community. The members of the community who had assembled had already dispersed. This disrupted the programme to some extent. The first meeting is very essential because the attendance is normally high, a number of exercises could be carried out and; opportunity is taken to outline objectives of the programme and extend an invitation to the feedback meeting.

4. Team rotation

Team rotation provided each person with a chance applies theoretical knowledge. Separating people experienced in conducting PRAs when forming pairs to conduct exercises was greatly appreciated by team. In addition, team members were switched from one pair to another to boost good team spirit.

5. Team spirit

There was a general consensus that throughout the course of the PRA good team spirit was demonstrated which made the work more challenging and interesting.

6. Conflicts

The need to enhance skills to deal with conflicts and disputes among members of the community when carrying the PRA were highlighted. A less experienced person in conducting PRA may have no knowledge in handling conflict. It was also agreed that community members who urge destructively with each other at every opportunity should be separated when conducting exercises.

7. Acquisition of Practical Skills

The team felt that the PRA granted them the opportunity to acquire skills of interacting with farmers and how to get useful information from farmers. More so the skills gained were applicable in programmes each team member does in their respective professions.

8. Feedback Meeting

The team unanimously agreed that a feedback meeting is very essential and should be the conclusion of a PRA. Team members were impressed by the reaction of the community to the meeting. This also makes the community respect the team members and it provide them with a chance to; cross check findings, jointly analyse the PRA results and air their views.

FEEDBACK MEETING

A feedback meeting with the farmers was held at Kawere Primary School on 14 November 1997. The main objectives of the meeting were as follows:

- Feedback from the farmers on the team's presentations on various topics.
- Joint discussion and analysis of post-harvest constraints.
- Identification of researchable areas.
- Establishing a good social relationship with the community.

Attendance

A total of 26 people (exclusive of the PRA team and Agritex personnel) attended the meeting

The programme of the meeting is in appendix II

Agricultural Systems.

There were no comments on the agricultural systems, seasonal calendars and labour division presentations. It was unanimously agreed by community members present that the outlined presentations were a true reflection of what transpired during the discussions held when conducting the PRA.

Agricultural Constraints

Agricultural constraints were outlined jointly for Kawere and Menya villages. The farmers mentioned the additional constraint of lack of engines at dip tanks. They also complained that the task of filling up dip tanks assigned to them was laborious.

Post-Harvest Practices

After the presentation the issue of re-treating infested grain was raised. The recommendation given was grain removal from the granary, winnowing, sun drying where possible and also cleaning and plastering the granary. It was also emphasised that grain could be re-treated after 9 months since the grain protectant would no longer be efficacious. The PRA team highlighted that the aim of grain treatment should be effective treatment using the recommended dosage, application method and store management practices. Farmers indicated that they required training on store management practices.

During the discussion it was mentioned that some farmers were being trained on vegetable processing at Ranch House.

Post-Harvest Constraints

- 1 Susceptibility of maize varieties to storage insect pests as discussed. Farmers indicated that field infestation of R201 is severe. There was a general consensus that PANNAR varieties, especially PANNAR 473 and 6549 are the most susceptible to storage insects.
- 2 Rodents were also considered as a problem.
- 3 Efficacy of grain protectants. The farmers generally agreed that Damfin was not very effective against storage insect pests.
- 4 GMB mode of payment. Farmers complained that GMB was not paying on time. In addition, it also paid in cheque form. Local supermarkets only changed the cheque after the bearer purchases groceries worth a certain minimum cost.
- 5 There was a discussion on the type of stores. The main points which came out of the discussion were as follows:
 - a) Traditional stores were abandoned because they had low capacities although they stored grain well.
 - b) Cement and corrugated iron stores were popular but have increased heat production.

AREAS NEEDING FURTHER INVESTIGATION

1. Relative susceptibility of different maize varieties to storage insect pests specifically *Sitophilus* spp. The seed maize industry has expanded greatly in the past decade. As a result, the number of varieties available to farmers is numerous. Very little work if any has been done on assessing the storability of the maize varieties that are being released. Farmers indicated that field infestation of R201 is severe. There was a general consensus that PANNAR varieties, especially PANNAR 473 and 6549 are the most susceptible to storage insects. The investigation can be split into two phases: (i) lab experiments and (ii) on-farm evaluations.
2. Relative efficacies of different grain protectants in various storage structures (traditional basket-type, brick-built granaries etc). Farmers generally agreed that Methacrifos was not effective against storage insect pests. Since most farmers indicated that they usually store in bags, it would be worthwhile to assess the efficacy of the different grain protectants in bagged storage too. Standard brick-built granaries being promoted by the Institute of Agricultural Engineering at the moment can also be incorporated in the investigation.
3. There is need to train farmers in recommended grain protectant application methods. Many of the farmers are not fully aware of the proper application methods leading to them over applying or having no confidence in the efficacy of the grain protectants.

The training should take into account the labour division among household members in grain storage management. Although in general men construct the granaries and procure the chemicals it is the women who normally treat the grain and monitors the general store management and grain consumption.

It is generally acknowledged that there has been an increased awareness in importance of post-harvest that encompasses storage among other things. However, at grassroots level crop production is still more dominant. An extension package should be produced.

4. Investigating the use of solar heating as a disinfection technique. Some farmers mentioned that when weevil infestation is very high, they empty the granaries/bags and spread out the grain in the sun. According to their observations, weevils disappear afterwards such that the grain they return to the granaries is clean. This would be a low-cost technique that does not require much technical know-how. As a way of trapping solar heat, black tarpaulin/polythene sheets can be used as under surfaces on which the grain is spread.
5. Transport to the GMB was cited as a major constraint during marketing. Establishment of GMB picking points at central places such as school should be investigated.
6. GMB mode of payment should be improved. The farmers generally receive their cheques after selling the grain and cash encashment is also a problem.
7. Sunflower oil is currently expressed in Kawere ward. The machine is located at Kawere Township and the owner practices custom processing. Usually, the

owner charges for the service in terms of the product. For example, for every 3 x 750 ml of oil produced, one bottle is retained as payment for the service. There is need to investigate the effectiveness of the machine and whether oil expression can be practised at a wider scale.

APPENDIX I: PRA TEAM COMPOSITION

Ms. Tafadzwa Marange
(Entomologist & Team Leader)

Plant Protection Research Institute
DR & SS

Mr. Brighton Mvumi
(Post-harvest Specialist & Team Leader)

Institute of Agricultural Engineering
Agritex

Ms. Joanne Mhunduru
(Soil Scientist)

Plant Protection Research Institute
DR & SS

Mr. Philip Mushayi
(Agronomist)

Crop Science Department
University of Zimbabwe

Mr. Lloyd Mautsa
(Research Engineer)

Institute of Agricultural Engineering
Agritex

Mr. Peter Chinwada
(Entomologist)

Plant Protection Research Institute
DR & SS

APPENDIX 2: PRA ACTIVITY SCHEDULE

Day	Activity	Facilitator
10/11/97	1 Travelling and Camping 2 Visit to Agritex District Office 3 Meetings with Community Leaders	All
11/11/97	4 Village mapping 5 Social mapping 6 Timelines	Tafadzwa Marange Philip Mushayi Llyod Mautsa
	7 General agricultural systems and constraints 8 Seasonal calendar 9 Labour division by age and gender	JoAnne Mhunduru Peter Chinwada Brighton Mvumi
	10 Semi-structured interviews with individuals	All (3 teams of 2)
12/11/97	11 Transect walk 12 Wealth ranking	Peter Chinwada Tafadzwa Marange
	13 General agricultural constraints 14 Post-harvest constraints 15 Semi-structured interviews with individuals	Philip Mushayi Llyod Mautsa JoAnne Mhunduru Brighton Mvumi
13/11/97	16 Wealth ranking	JoAnne Mhunduru Tafadzwa Marange
	17 General agricultural systems and constraints 18 Seasonal calendar	Philip Mushayi Brighton Mvumi
	19 Post-harvest practices and constraints 20 Semi-structured interviews with individuals	Llyod Mautsa Peter Chinwada
14/11/97	Feedback meeting with farmers mainly from Menya and Kawere ViDCos (see Appendix 2)	All

APPENDIX 3: BIBLIOGRAPHY/REFERENCE MATERIAL

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KDCA reports

ARDA reports

APPENDIX 4: PROGRAMME OF THE FEEDBACK JOINT ANALYSIS OF POSTHARVEST CONSTRAINTS

- | | |
|---|----------------------------|
| 1. Community introductions and opening prayer | Mr. Katiyo (Ward Chairman) |
| 2. Team introduction | T Jokonya & T. Marange |
| 3. CPHP background, Objective; expected output | T. Marange |
| 4. Agricultural Systems | Lloyd Mautsa |
| 5. Agricultural Constraints | Philip Mushayi |
| 6. Seasonal Calendars and Labour Division | JoAnne Mhunduru |
| 7. Crop Postharvest Practices | Peter Chinwada |
| 8. Crop Postharvest Constraints | Brighton Mvumi |
| 9. Agritex District's Comments | Peter Muyambo |
| 10. Vote of thanks | Tafadzwa Marange |
| 11. Comments by Chief's Aide | |
| 12. Comments by Chief Kawere | |
| 13. Comments by Mr. Jonga Kanyonganise (Headman, Host of the team in Menya) | |
| 14. Comments by Mr. Katiyo and Closing Prayer | |