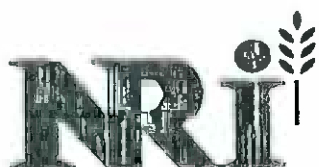




University of
Zimbabwe



**Crop Post-Harvest
Research Programme
Zimbabwe**

*Participatory Rural
Appraisal of Chemuonde
Village, Buhera District,
17 to 21 February 1997*



*Report on a Participatory Rural Appraisal
(PRA) Survey of Chemuonde Village, Buhera
District, 17 to 21 February 1997*

*Donaldson T.J.¹, Marange T.¹, Mvumi B.M.²,
Chivandi E.³, Marunda I.³ and Thomas M.⁴*

- 1. Plant Protection Research Institute (PPRI), Department of Research and Specialist Services (DR&SS).*
- 2. Institute of Agricultural Engineering, Agritex*
- 3. Training Branch, Agritex*
- 4. Natural Resources Institute, Chatham, UK*



*November 1997
Project A0549*

PRA SURVEY OF CHEMUONDE VILLAGE, BUHERA DISTRICT, 17 to 21
FEBRUARY 1997

List of Contents	i
Background	1
Methodology	1
Objectives of the Survey	2
Description of the agricultural system	2
Results	3
Initial meeting	3
Mapping	3
Social map	3
Time line	6
Transect walks	7
Seasonal calendars	8
Wealth ranking	10
Ranking of household remittances	11
Ranking of the importance of field crops	12
Maize budgets	13
Ranking agricultural constraints	13
Cause and effects of the major problem faced by Chemuonde farmers	14
Post-harvest practices	15
Post-harvest constraints	15
Final meeting with farmers	17
Recommendations	18
Annexe 1: Programme for PRA workshop (12 – 14 February 1997)	20
Annexe 2: Team composition	21
Annexe 3: Survey Programme	22
Annexe 4: Background information on Buhera District	23
Annexe 5: Seasonal calendar of crop production (extension worker)	24
Annexe 6: Results of wealth ranking exercise	26
Annexe 7: Summary of post-harvest characteristics and operations presented at the final meeting with farmers, 21 February	27

Background

The Crop Post-Harvest Programme (CPHP) was initiated in Zimbabwe during 1996, following the publication of a country framework document (NRI, 1995), preliminary field work in selected Districts (Donaldson *et al.*, 1996), approval of a Memorandum of Understanding by the Department of Research and Specialist Services (DR&SS), and Government of Zimbabwe approval of two initial projects.

The CPHP consists of a series of commodity research studies. Each is implemented by a multi-institutional and multi-disciplinary team working to a clearly defined output. The research methodologies vary, but a common theme is that farmers from communal areas of Natural Regions III, IV and V participate in the research process. This means that there is a need for each activity to involve farmers and thus the Programme requires a farmer focus as well as its commodity focus.

The farmers focus is achieved through concentrating village level activities on a limited number of Districts and villages. Through consultations with the major Zimbabwean institutions involved with agricultural research, extension and development, three Districts were initially chosen for the field sites. These are Buhera, Chive and Mutoko. Individual village(s) were then identified as initial foci and in 1996 it was recommended that participatory rural appraisal (PRA) surveys of the villages be conducted. This report is the first of three PRA survey reports conducted during 1997.

Methodology

Many researchers and extension workers in Zimbabwe are aware of PRA survey techniques, but had little formal experience. The CPHP organised two PRA workshops at DR&SS to provide training to 24 scientists from DR&SS, Agritex and the University of Zimbabwe (UZ) (many NGOs in Zimbabwe are already using PRA methods in their development work). Of those attending the workshop, 12 have conducted surveys during 1997. The first workshop was held on 12 – 14 February and the programme is shown in Annexe 1.

The main techniques covered were:

- Semi-structured interviews
- Mapping
- Time lines
- Transect walks
- Seasonal calendars
- Wealth ranking
- Ranking
- Scoring

A preliminary visit was made to the village on 6 February to make logistical arrangements, introduce the aims of the survey to the villagers and set a time for the initial meeting with farmers.

Objectives of the Survey

The objectives of the survey were agreed by the team members (Annexe 2) on 14 February. These were to:

- establish an effective working relationship between Chemuonde Village and the Crop Post-Harvest Programme
- gain a good basic understanding of the villagers' household farming systems
- investigate and analyse post-harvest systems and constraints identified by the farmers
- identify key individuals and groups for future research activities

A provisional programme was drawn up which was used as a guideline for the survey and was amended during the week as the survey progressed (Annexe 3).

Secondary literature was collected (Annexe 4) and reviewed and is available as a CPHP report (Mvumi and Donaldson, 1997).

Description of the agricultural system

Buhera District is over 5,300 km² with equal proportions of land falling under Natural Regions III, IV and V. The 1992 population census gives a total population of 204,000 (in 34,000 households) with 50% being under 15 years of age.

Chemounde Village is in Natural Region III at the northern end of the District, bordering the tarred road from Chivhu to Mutare. The village consists of 340 households with a population of approximately 1,500 people.

Rainfall records (1990/94) at Buhera town give an annual mean of 540 mm (the national classification of NR III is 650 – 800 mm), but like most of Zimbabwe, this is highly variable between years. The major crops grown are maize, sorghum, pearl millet (mhunga), finger millet (rapoko), groundnuts, Bambara nuts, sweet potato and beans/cowpeas. Other crops grown include sunflower, pumpkins, rice and small quantities of vegetables/fruits (tomato, onion, mango and guava).

The predominant livestock species is cattle, with some donkeys and few sheep and goats kept by households. Poultry species reared include chickens and turkeys. Cattle manure is generally applied on the fields during September and October.

The cropping season falls during the months of November to April and the majority of farmers use their harvests for home consumption. Local sales of (small quantities of) all crops is common and households with surpluses tend to market their crops at the Grain Marketing Board (GMB) depot in Buhera, some 20 km distance.

Traditional social structures are maintained in the village with Chief Makumbe (who does not live in the village) overseeing a Headman and 11 Kraal heads. About a third

of all households are members of two Zimbabwe Farmers' Union (ZFU) affiliated Farmer Groups.

There is an elected Village Development Committee (ViDCo) chairperson who sits on the local District Rural Council, based at Murambinda, some 15 km away.

The Agritex District office is based at Buhera and the village has one Extension Worker living 5 km to the west of Chemuonde.

Results

The team conducted the survey from 17 – 21 February and stayed at the homestead of the Chairman of the Shambavarongo Farmer's Club, Mr Mawire, which allowed for informal discussion as this was a central point of contact with villagers.

Initial meeting

An initial meeting was held with 15 farmers on the team's arrival at Chemuonde village on 17 February. This was to introduce the objectives of the PRA to the farmers and plan some of the activities. Since February is a time of labour demand for weeding, it was stressed that the team would work in a flexible manner and that not all farmers would be required during the whole five days of the survey. However, all farmers who were available, were invited to a final meeting, scheduled for 10 am on 21 February.

Mapping

Following the initial meeting six men and four women took part in a lively construction of a village map using sticks to draw the features on a swept mud floor. The combined efforts of all the farmers produced a map that was transcribed onto paper and is shown in Figure 1. The map was subsequently used throughout the week to cover as broad an area of the village as possible.

Social Map

During the morning of Wednesday 19 February, one of the team members spent two hours with various small groups and individual farmers constructing a social map of the village. This was an informal exercise with men and women coming and going at will and assisting in the diagram. It was done using post-its on a flip chart within a circle drawn to represent the village. The method proved excellent as there was a lot of debate and moving of post-its, and finally lines were drawn to link the various social groups. The final diagram was copied and left with one of the Chairmen of the Farmer Groups and the second copy is illustrated in Figure 2.

During the map construction, it became obvious that all of Agritex's work in this village is through the Farmer's Groups and that farmers themselves viewed future developments along the lines of new groups. A recent example of a new group was the Poultry Group (of 15 farmers), linked to the Mabvadzura Farmers Group, which

Figure 1: Map of Chemounde village

were trying to gain access to funds for building poultry pens and a supply of day-old chicks.

Time line

A time line was constructed during a discussion with 12 men on the afternoon of the first day of the survey, 17 February. The line began in 1915 and is summarised in Table 1. Events of particular significance (in the authors' opinion) are highlighted in bold.

Table 1: Time line of major events in Chemounde village 1915 – 1995

1915	Makumbe Mission Built Moldboard Ploughs Introduced – Villagers using it, used the hoe before that.
1930	Buhera Hospital built – old site (Chani)
1931	Prior to 1931 – Major cattle disease (Rhindepest ?) Cattle were rounded up in pens for up to a month. Cattle market sale pens built at Mwerari Major locust infestation up to 1935 Major problem with wild dogs – a pack of up to fifty dogs – destroyed a lot of livestock. Up to 1958, there were very few homesteads and people practiced shifting cultivation. Major crops grown: Pearl millet, Finger millet, Sorghum, Uninga (Sesame?) Groundnuts, Bambara-nuts, Rice, Tsenza (root crop), Sweet potato. Each household produced 80-100 bags of finger millet and/or pearl millet.
1933	Macheru Primary School was built Major tragedy at cattle market. Two people died – tree collapsed as full of spectators dancing
1940	Current Buhera Hospital was built. Opened by Rev Barrios (Makumbe Mission)
1946	Scotch-carts were introduced. The farmers previously used sledges Up to 1948, there was a major de-stocking of cattle by the government in order to match livestock numbers with available grazing. This angered the people a lot.
1947	Dzarova dip tank was built Rodgers Road was constructed – this linked Chatsworth to Nyazura Major drought – drought relief- maize seed was scattered on the ground to be picked up.
1955	Terrible floods and crops did badly. The only harvest was from termite mounds.
1956	Marenga Business Center was established
1957	Cattle market was transferred from Mwerari to Mharadzano (Marenga) because Mwerari was too far and transport was difficult Matuba Business Center was built
1958	Farming area organized into portions by land development officer responsible resulting in permanent land allocation – the people were not happy – reason being population pressure

	There was a marked reduction in small grain production as maize was introduced. This was also because there was little land to grow small grains.
1961	Maize became the dominant food crop.
1967	Major drought, a lot of cattle perished.
1977	Area was hit by the liberation war. People worked in fields. They hid in the hills – it was a difficult time
1980	Year of Independence
1981	The whole community was happy as the GMB depot at Buhera was established.
1982	Tarred road was opened which meant faster and more reliable transport.
1984	Major drought - Crop failure and livestock died resulting in severe draft power problems.
1985	Mamunyadza Secondary School was established – the name comes from four previous schools
1992-93	Major drought - livestock loss, crop failure. People were given food handouts from the government. Food for work programmes.
1994-95	Failed to build dams because of a lack of finances.

Farmers described the area as being a productive one with shifting cultivation practised in the past (low input, low output). There were sufficient cattle to provide adequate draft power and the predominant crops were small grains; sorghum, mhunga and rapoko. Changes began in the 1940s and 50s, when government ordered a large cull of cattle, worried about overgrazing. Then land was apportioned to individual households and the practice of shifting cultivation disappeared, because homes did not have enough land to rotate crops.

Land allocation and recent depletion of cattle numbers following the 1992/93 drought have led to increased food insecurity. Planting cannot always be completed at the best time and the soil has declined in fertility. Although maize is now the preferred staple (and marketed) crop, farmers recognise the need to fertilise it for good yields, but many cannot afford the inputs and continue growing the crop every year (low input vs high output). There is recognition that it is a 'hungry' crop and that other crops grown after maize perform badly due to the poor soils.

Compared to other communal lands, there is little importance attached to growing garden crops (vegetables/fruits) for market. Those grown are primarily for home consumption and none are marketed further than the immediate vicinity (as local sales). It appears that garden crops have never received much attention by farmers historically.

Transect walks

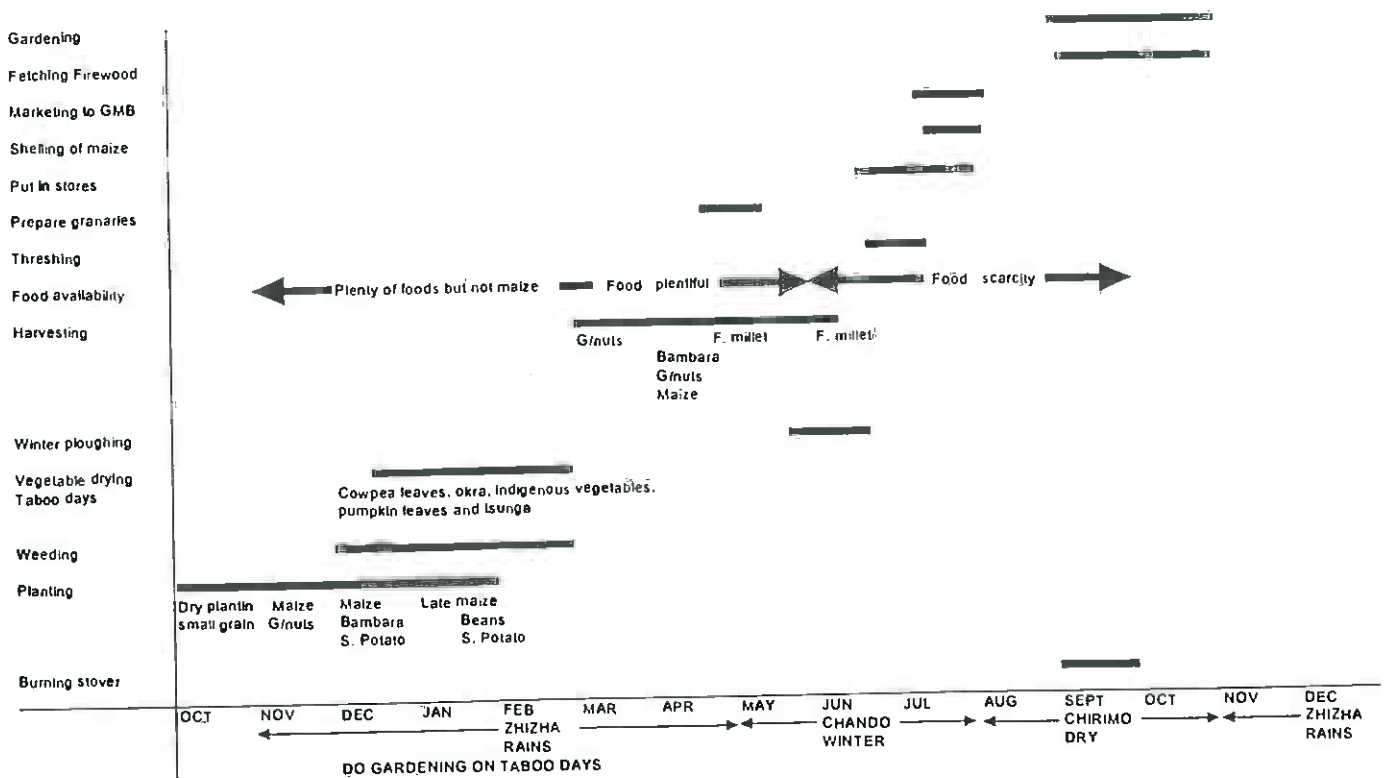
On 18 February, the team split into two and accompanied by two/three farmers each made a transect walk of the village. The walks took four to six hours and broadly

followed the gradient from the tarred road to the river (see Figure 1). Both groups found similar characteristics in the farming systems and one of the walks is illustrated in Figure 3.

Seasonal calendars

Seasonal calendars were constructed by a group of women farmers on 17 February. The group decided that the calendar should start in October, indicating the start of the production cycle. The resulting calendar is shown in Figure 4.

Figure 4: Seasonal calendar of agricultural practices (womens group)



A second calendar was also constructed by the Extension Worker, Mr Tseurai who has been working in this village for 3 years. This detailed calendar is shown Annexe 5.

Two groups (one of men and one of women) were asked to draw labour calendars. These are shown in Figures 5 and 6.

Figure 5: Labour calendar compiled by womens group

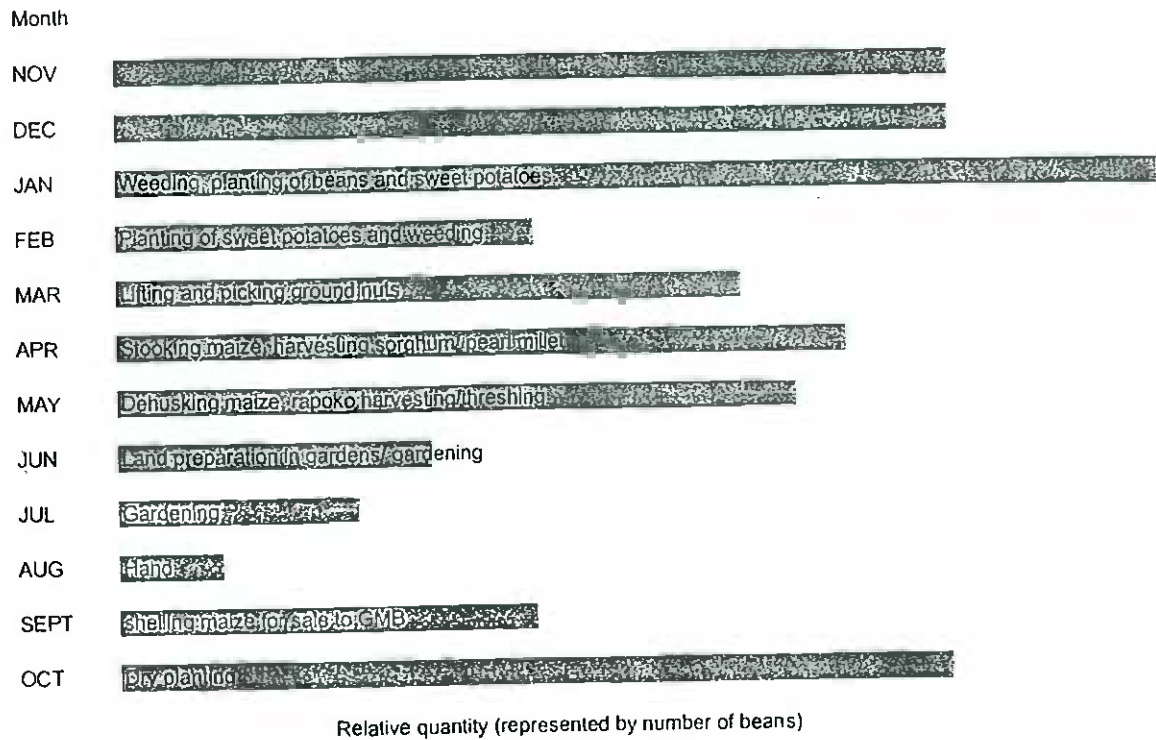
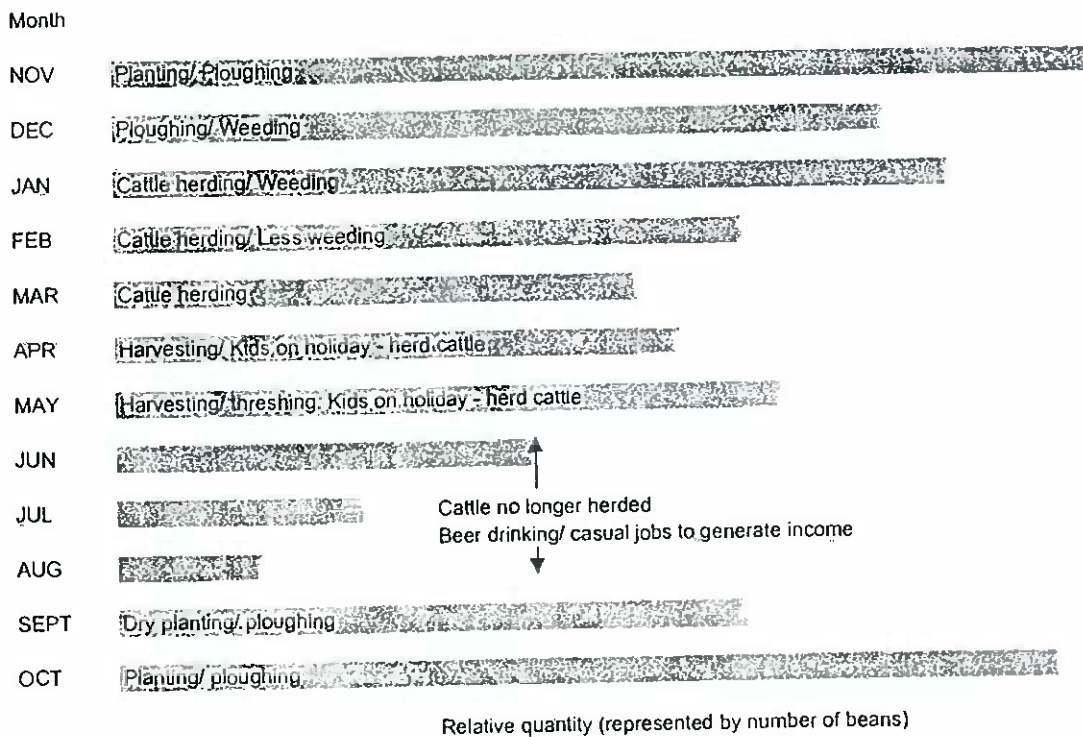


Figure 6: Labour calendar compiled by mens group



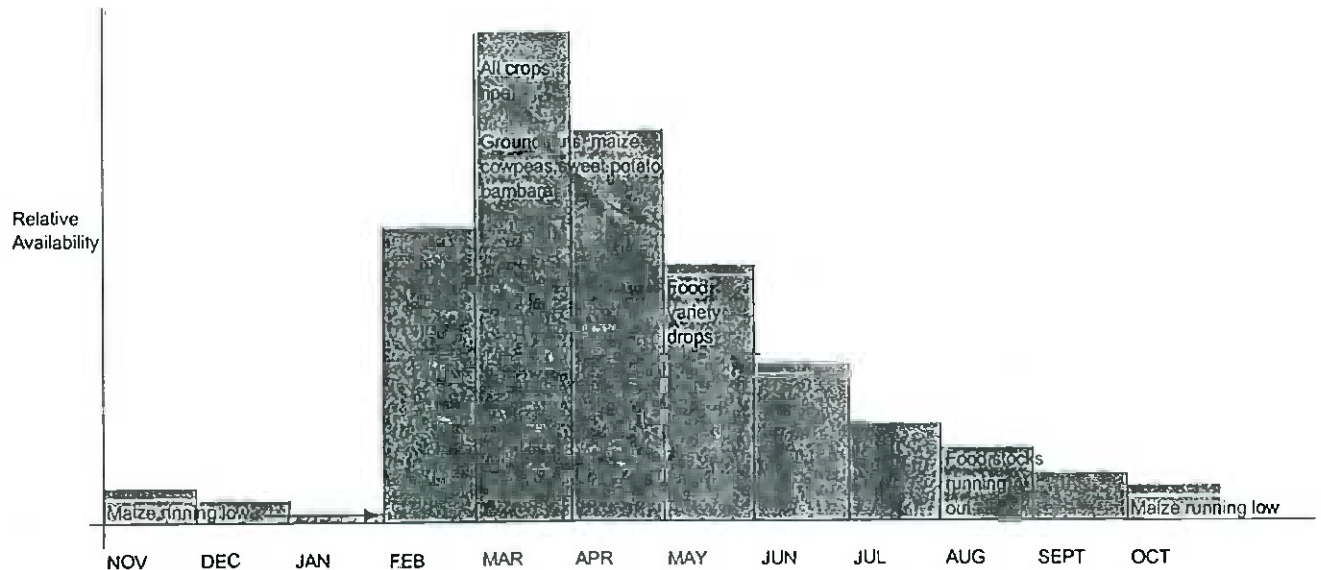
The calendars show that both work peaks are during the months of October to January. Women are involved in more activities than men throughout the year. The heavy jobs (such as ploughing) are done by men, but during interviews it emerged that

women also do these jobs, although rarely, and this was the reason they did not mention them on the calendars.

When children are on holiday, they contribute to other activities, largely relieving the men of herding duties.

Figure 7 illustrates the availability of food during the year. The diagram was constructed by a group of women on 17 February.

Figure 7: Food availability calendar



The calendar illustrates the 'lean' months (in terms of food). These are also the months of greatest labour demand and the hottest part of the year. Clearly, these months are the most demanding on households, and a time when good storage becomes critical as both the quantity and quality of stored maize decline.

Wealth ranking

Chemuonde village is a large village of some 340 households. It was decided to concentrate the wealth ranking on two of the largest kraals in the village and lists of households were provided by the extension worker. Each kraal was ranked according to farmers' criteria, by three individuals within the kraal. A typology of the wealth ranking criteria used was assembled by the authors and is shown in Table 2.

Table 2: A typology of wealth ranking criteria used by Chemuonde farmers

Wealth status ¹	Farm criteria	Off-farm criteria	Social criteria
1	<ul style="list-style-type: none"> • Enough cattle for draft power • Have woodlots/fruit trees • Have implements • Sell to GMB • Have surplus 	<ul style="list-style-type: none"> • Run small businesses • Are in professional employment • Have a pension • Own other assets 	<ul style="list-style-type: none"> • Employ casual labour • Able to look after family members • Large family • Condition of homestead
2	<ul style="list-style-type: none"> • Own some cattle • Do not produce surplus • Use some purchased inputs 	<ul style="list-style-type: none"> • May have relatives working in towns 	<ul style="list-style-type: none"> • Medium sized family • May receive remittances
3	<ul style="list-style-type: none"> • No cattle • Own few implements • Do not use chemical fertiliser • Food deficit 	<ul style="list-style-type: none"> • Do not own any other assets 	<ul style="list-style-type: none"> • Work for others or depend on others • Disabled, old or ill • Small families, often headed by widowers • Location of residence

The results of the ranking are shown in Annexe 6. These are useful for categorising the families currently working with the CPHP in a storage monitoring trial and can be used for CPHP projects to identify households for future activities.

Ranking of household remittances

A group of eight women ranked the main remittances made to the household (18 February). In order of priority, they were:

- Remittances from family members working in towns
- Woodlots – sale of eucalyptus
- Beer brewing
- Brick moulding
- Fetching firewood
- Casual labour
- Small businesses (selling grains and vegetables at local markets)
- Ploughing

¹ A wealth status of 1 reflects the wealthier households, of 3 the least wealthy households.

Ranking of the importance of field crops

On 17 February, a group of eight women constructed the following chart showing the importance of field crops and the uses of each (Table 3).

Table 3: Ranking of the importance of field crops

Crop (in order of importance)	Responsibility	Marketed	Uses and characteristics
1. Maize	Men	GMB	Staple food
2. Groundnuts	Women	GMB	Cash crop, storability, nutritious. Relish substitute
3. Finger Millet	Men	Local sales	Used for traditional ceremonies, cash crop
4. Bambara nuts	Women	Local sales	Relish, storability, cash crop
5. Pearl Millet	Men	Local sales	Used as a substitute for maize
6. Cowpeas/beans	Women	Local sales	Intercropped, susceptible to storage pests
7. Sweet potato	Women	Local sales	Short lived crop
8. Pumpkin	Women	Local sales	Intercropped
9. Rice	Women	Local sales	Would like to grow more but don't have flat ground
10. Sorghum	Women	Local sales	Processing tiresome, storage pest problems
11. Sunflower	Men	GMB	Cash crop, too labour intensive, can't eat the crop (the team felt that some women were unaware how the crop was processed)

The women in this group explained that they were responsible for storage of all crops (and any storage treatments). They were only able to sell maize, millets and sunflower with the permission of their husbands, but could sell the other crops when

they liked, without approval of the husbands. They are also responsible for looking after the cash from sales of all crops but not for the use of cash obtained from sale of 'men's' crops.

It was acknowledged by the women and researchers that if men had constructed the table, it would have been different.

Maize budgets

During semi-structured interviews, maize budgets were discussed with several farmers. One example, from a farmer in wealth class 1, is shown in Table 4.

Table 4: Maize budget of farmer with surplus maize to sell

INPUTS	Details	Zimbabwe \$
Fertiliser D	2 bags @ \$98/bag	196
Fertiliser AN	7 bags @ \$87/bag	609
Seed	2 x 50kg @ \$257 and 3 x 10kg @ \$74	736
Transport to GMB	80 bags @ \$5/bag	400
Insecticide	2 tins @ \$32.99/tin	66
Shelling	Labour	150
Weeding	16 days labour @ \$20/day	320
Total		2,477
OUTPUTS		
Sales to GMB	80 bags x 50kg @ \$1,200/tonne	4,800
Home consumption	10 bags x 50kg @ \$1,200/tonne	600
Total		5,400
PROFIT/LOSS		2,923

This budget was based on the 1995/96 cropping season which was above average (in terms of rainfall). It does show that, given a good year and the ability to buy inputs and pay for labour, that maize can be a profitable crop. This, however, is not the case for the majority of farmers in Chemounde village.

Ranking agricultural constraints

On 18 February, a group of farmers was asked to rank the major constraints faced in the production of food crops. In order of priority, their list was:

- Soil fertility
- Lack of rainfall
- Lack of draft power
- Cost of inputs (fertiliser and seed)
- Transport (of goods to market)
- Shortage of land
- Striga
- Low prices and late payment (by GMB)
- Lack of water for irrigation
- Baboons
- Soil erosion
- Termites
- Storage pests
- Lack of labour for post-harvest practices (especially threshing/dehusking small grains)

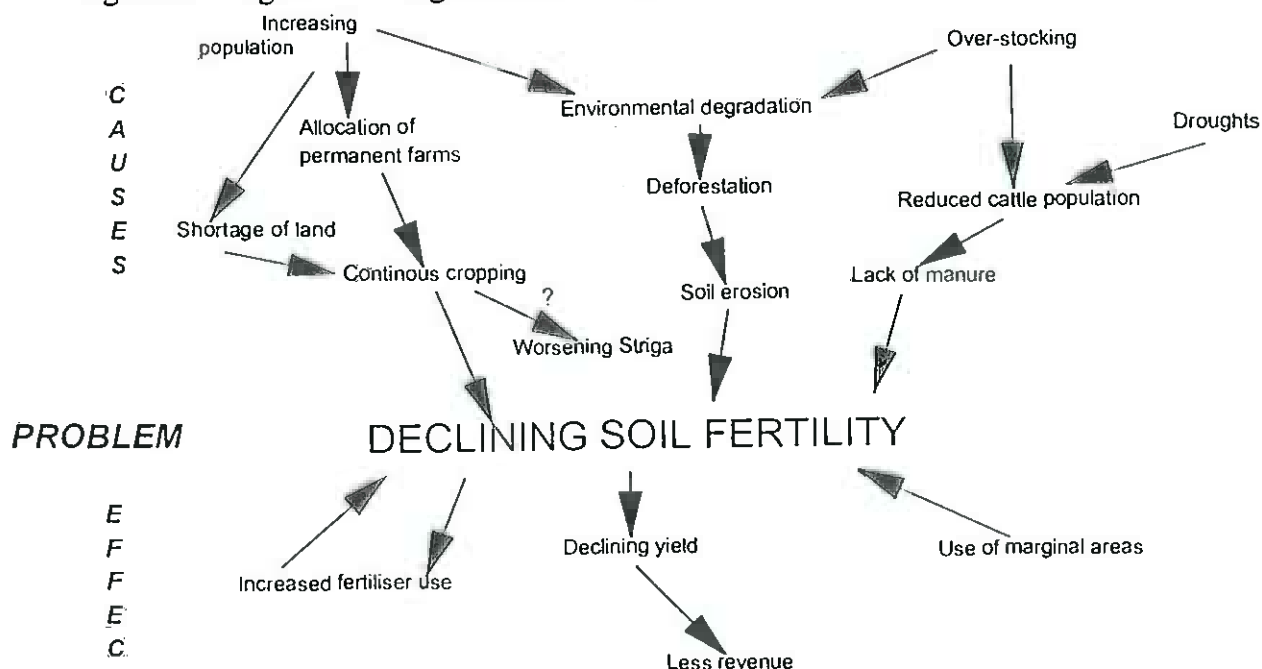
While production constraints, such as lack of rainfall and poor soil fertility, are most evident to farmers, post-harvest constraints were also a priority issue in all cases. The PRA focussed on these constraints towards the end of the survey (see below).

Cause and effects of the major problem faced by Chemuonde farmers

The major constraint repeatedly mentioned by farmers was the low fertility of soil. A diagram was constructed to determine the causes and effects of declining soil fertility shown in Figure 8.

The diagram links five of the constraints ranked by farmers in the previous exercise. The issue of Striga was repeatedly mentioned and debated with some farmers blaming it for declining soil fertility, others recognising it as an effect of the fertility decline.

Figure 8: Diagram showing causes and effects of declining soil fertility



Post-harvest practices

The post-harvest practices used by farmers were described by the team graphically (Table 5), based on 10 semi-structured interviews with a range of farmers.

Table 5: Post-harvest practices described by a range of Chemounde farmers

Process	When	How long	Who	Where	How
Stooking	April – June	3 weeks	Men & Women	In the field	Usually in conical piles
De-husking	May - June	3 weeks after stooking	Men & Women	In the field	
Drying	May - August	2 – 3 months	Men & Women	In cribs or on rocks	Usually on the cob
Preparation of granaries	May - June		Women	At the homestead	Clear out old grain, plaster inside with mud or mud/cow dung mixture, some dust with insecticide
Transporting to homestead	July - August		Men, Women & Children		By hand or using a scotch cart, if available
Shelling	August – Sept		Men, Women & Children	At the homestead	By hand to achieve Grade A from GMB, using flails on floor or on a platform ²
Winnowing	August – Sept		Women	At the homestead	By hand with winnowing baskets
Treatments			Women		Ash (of wood/cobs) layered, Shumba layered, fresh gum leaves on top

The table shows the significant labour inputs made by women in all post-harvest activities. The contribution of children to these activities may have declined over the years (although not in terms of time) since children now regularly attend schools. However, children are often on holiday during August and early September and provide a source of labour during these periods.

Post-harvest constraints

Most of the identification of post-harvest constraints were identified through semi-structured interviews and ranking exercises with farmers. Problems highlighted by farmers included:

² Damaged grains are kept back for home consumption

- Lack of transport (or expensive transport) to market crops
- Rain damage to cobs when they are stoked in the field
- Lack of transport for carrying the cobs from the fields to the homestead
- Labour intensity for threshing the grain
- Expensive grain protectants (linked to)
- Universal presence of weevils

Perhaps the most commonly sited problem was that of marketing (primarily maize, finger millet, pearl millet and sunflower). There is only one GMB depot in Buhera District, situated about 15 km from Chemuonde village. If selling to GMB, farmers shell their maize by hand, which is 'very laborious'. Availability of sacks is a problem, as is transport of grain to the depot. Some farmers have experienced rejection by GMB early in the season due to high grain moisture content, others of downgrading by GMB because the grain is too dry later in the season (presumably because of shrivelled grains).

Private traders have begun operating in the area but they require fixed quantities of grain for collection, which many farmers cannot provide individually. Prices paid by these traders tend to be lower than GMB's, but payment is in cash. The best prices for maize are achieved at local markets during the period January to March. The disadvantage is that only small quantities are sold, the unit usually is a 20 litre tin.

Other crops marketed at the GMB depot include groundnuts and sunflower, although some women said they sold peanut butter as far as Chivhu.

There are three hammermills within 5 km of the village and women usually take their maize to these³. However, they stated there was a definite lack of processing technologies for other crops, especially the small grains.

The post-harvest specialists spent some time with farmers discussing grain treatment. Whilst the 'wealthier' farmers buy the insecticide 'Shumba' (2% pirimiphos methyl dust, costing approximately Z\$35) or Damfin (2% methacrifos dust, costing approximately Z\$30), there appears to be widespread misapplication of the chemical. Some farmers described how the chemical is overdosed, but more commonly, farmers will only buy one container for the entire crop and spread it thinly, thus underdosing. The treatments are the responsibility of women.

Some of the farms visited used eucalyptus leaves as a form of natural protectant, and the general feeling of these farmers was that it was better than nothing, but insects were still a problem when it was used. 'Poorer' families use shelled cobs as firewood and some households use the ash to mix with maize as a protectant. Women respondents said that their husbands were responsible for buying Shumba, but if they did not, they decided whether to use ash.

Where a household did not have a grain store, maize is often stored in bags. Commonly, the first month's supply of maize is not treated.

³ old grain is usually dehulled before it is milled

Farmers perceptions of maize varieties

The following chart was compiled from semi-structured interviews with eight farmers and presented at the final meeting.

Variety of maize grown in 1996/97	Farmer perceptions of varietal characteristics
SR52	Long season
R201	Short season, shorter cob, smaller grains, good response to low fertiliser application
R215	Less susceptible to storage pests than R201
SC501	Needs more rain than R201
Pannar 473 & others	Very susceptible to storage pests, poor yields
CG4141	Good yields (2 cobs per stem), better than R201 in drought years

The conclusions of most farmers were that they would always grow more than one variety if possible, since this was a means of reducing risk in dry years. Since 1992, drought packs have been distributed to the more food insecure families, recently Pannar varieties were handed out and there was a general feeling that they were inferior to the more established varieties (e.g. SR52 and R215). It was difficult to establish whether this perception was justified or a result of drier (and even wetter) years when the crop did not yield well (or became waterlogged).

Final meeting with farmers

A final meeting with farmers was well attended by over 70 people on 21 February. The team presented results of the survey findings and invited comments from the audience to verify the results and clarify the main conclusions. Annexe 7 summarises the major characteristics of post-harvest operations. The major constraints were also presented and are summarised below, by commodity.

- Maize
 - There are varietal differences in terms of storability. However, farmers are not always able to obtain their preferred choice of variety

- During storage there are always insect problems, even if insecticide is used. Natural protectants are largely ineffective, but perceived to be better than using nothing at all.
- Hand shelling is time consuming process, but essential to achieve top grade at GMB
- Transport to the main markets (GMB) is a problem. Not many families have their own scotch cart and the price paid for transport is \$5 per bag (or 8.5% of the value of the crop)
- Late payment for sold produce (by GMB). Farmers market any surplus from July/August to raise money for school term fees (due in September), exam fees (due in June/July for November) and other major farming implements (e.g. ploughs, prior to the next cropping season in October/November). For families with several children at school, educational expenses (including school uniforms) are the major expenditure. Private traders offer immediate payment, but pay less than GMB (one figure quoted was \$800/tonne or 67% of the GMB price)
- Cowpeas
 - This crop is always attacked by insects in store. Farmers in this village do not use any protectants
- Pearl millet
 - Birds cause losses in the field and insects are a major problem during storage when traditionally not protectants are used. The major constraint, however, is the time taken to process the crop (threshing, dehulling and milling)
- Groundnuts
 - As this crop is kept unshelled, there were few reports of storage problems (crows were stated as problem). Peanut butter is a tradable commodity but takes time to prepare manually
- Sorghum
 - Sorghum is a labour intensive crop for processing. This may be why a lot of sorghum grown in Chemounde is sweet sorghum, grown for the sweet stalks rather than for the grain. Birds cause losses in the field

Recommendations

Following the survey, the team highlighted the following areas for future research and development to overcome farmers problems.

- Investigate varietal differences for storability. This has been done in the early 1980s, but there are now many new varieties on the market with the introduction of new seed companies in Zimbabwe. The work should be in collaboration with CIMMYT and complement any work being undertaken by that organisation.
- A major awareness campaign on the correct use of synthetic insecticides is needed to target women who are largely responsible for treatment. Men should not be

isolated in this campaign, but included to support their wives. This will be an important precursor to the treatment for LGB, once it enters the area.

- Investigate the introduction of low cost drying cribs. Maize is stored shelled, but is on the cob for up to 3 months after harvest. The consequences of damage by storage insects, and specifically LGB after its introduction, are serious in post-harvest losses of the major food staple, especially during the periods of low availability.
- A participatory study to design a locally made hand sheller to speed up this process, without decreasing the quality of shelled maize, both for sale and for storage
- Investigation of effective use of natural protectants for use by families unable to afford insecticides.
- Transport remains a universal problem – although Chemounde is relatively close to a GMB depot. A study of the precise nature and underlying causes of the constraints on increased entry into the small-scale and communal area transportation subsector, and means for lifting constraints, could have a major impact on the efficiency of grain markets and producer and consumer prices. This research would also inform the development of horticultural markets and other rural economic subsectors.
- Investigate the methods for storing cowpeas and other beans to reduce insect losses. This study would look at a range of treatments in relation to types of store (sacks, pots etc.). The identified solutions will need to be low- or no-cost solutions to benefit the poor members of society.
- Development of simple threshers/dehullers to reduce the labour demand in processing small grains. This work should build on work already completed by DTC and ITDG and will probably centre on the CPHP focus villages and neighbouring communities
- Development of affordable peanut butter machines for use at village/household level. The work must complement previous studies by DTC.
- Investigation of an integrated storage management package for promotion for food deficit families to increase household food security. The study will provide recommendations for all Agritex field staff for dissemination to farmers through the most effective channels (e.g. ZFU Farmer Groups) and may include a pilot study of a small inventory credit scheme in Buhera/Murambinda, a predominantly maize growing area.

All the above activities will target the full range of households found in Chemounde, as characterised by the wealth ranking, to ensure that the poorest households are assisted and food insecurity is alleviated. The results, however, will be applicable to neighbouring areas and to other parts of the country, which have shown similar constraints. There is also potential to deliver the outputs of these research ideas to other countries in the SADC region.

Annexe 1: Programme for PRA workshop (12 –14 February 1997)

Wednesday 12 February

Introduction
History of RRA/PRA
Interpretational/analytical skills
Communication skills
Semi-structured interviews

Thursday 13 February

Mapping
Season calendars
Transect walks
Ranking
Scoring
Wealth ranking
Planning a PRA survey

Friday 14 February

Planning meeting for team to agree objectives and make logistical arrangements

Annexe 2: Team composition

The team composition for this PRA survey was:

Mr Eliton Chivandi (training and livestock specialist)	Training Branch, Agritex
Mr Tim Donaldson (post-harvest systems)	Plant Protection Research Institute, DR&SS/NRI
Ms Tafadzwa Marange (entomologist)	Plant Protection Research Institute, DR&SS
Mrs Immaculate Marunda (training specialist)	Training Branch, Agritex
Mr Brighton Mvumi (post-harvest specialist)	Institute of Agricultural Engineering, Agritex
Mr Mark Thomas (social scientist and team leader)	Natural Resources Institute, UK

Annexe 3: Survey Programme.*Monday 17 February*

9.00 am	Arrive Buhera Agritex Office
10.30 am	Arrive at Chemounde Village
12.00 pm	Initial meeting with farmers
1.15 pm	Mapping exercise (10 farmers)
	Visit to Chief Makumbe's house
2.15 pm	Time line (12 farmers, Group A)
	Ranking of important crops (8 farmers, Group A)
	Visit to Buhera Rural District Council (Mr Dube)
3.00 pm	Seasonal calendars (8 farmers and extension worker, Group B)
4.30 pm	Meeting with Councillor, Ward 6 (Mr Nyawo)
5.00 pm – 6.30 pm	Writing up

Tuesday 18 February

8.00 am	Semi-structured interviews (5 farmers and extension worker, Group A)
8.30 am – 2.30 pm	Transect walk (Group B)
9.15 am	Semi-structured interviews, maize production budgets, ranking and scoring of maize post-harvest constraints (6 farmers, Group A)
12.30 pm – 4.30 pm	Transect walk (Group A)
5.30 pm – 7.00 pm	Writing up and planning

Wednesday 19 February

8.00 am – 10.00 am	Social map
8.15 am – 2.30 pm	Wealth ranking (3 farmers separately, Group A)
8.30 am – 4.00 pm	Wealth ranking (3 farmers separately, Group B)
12.30 pm	Meeting with Chairman and Secretary of Shambavarongo Farmers Club
5.00 pm – 6.30 pm	Analysis and planning

Thursday 20 February

8.45 am – 2.45 pm	Ranking and scoring of post-harvest constraints with individual farmers (Group A)
9.00 am – 1.00 pm	Semi-structured interviews focussing on post-harvest issues with individual farmers (Group B)
3.00 pm – 10.00 pm	Analysis of information by PRA team

Friday 21 February

10.00 am – 12.30 pm	Feedback meeting with 70 farmers at Mr Mawire's homestead
2.30 pm	Evaluation of the workshop and survey by PRA team

Annexe 4: Background information on Buhera District

Bary F. (1994). An agricultural socio-economic study in Wedza and Buhera District concentrating on some priority crops selected to be the focus of biotechnology research and development projects Parts 1 and 2. COOPIBO. Harare, Zimbabwe.

Chinyemba M.J. (1993). Reporting on baseline data survey workshop by both implementing and control districts. Proceedings of the AGRITEX/NORAD women in extension project held at Hunyani Hills Hotel; 17 - 18 February 1993; p12 - 15. AGRITEX Training Branch, Harare, Zimbabwe.

ENDA - Zimbabwe. Sustainable Agriculture

Gunby D. (1992). Buhera District Integrated Rural Development Plan: Summary report and recommendations. Planafric (Pvt) Ltd.

Hansen H. (1990). Needs assessment survey of Buhera District, Zimbabwe. Report on consultancy carried out for Danish Volunteer Service. Harare, Zimbabwe.

IFAD dryland farming project - info available from Johan de Vart at the Dutch Embassy. Tel. : 731428/734528

Jambawo L.M. (1990). Small grains milling systems: case studies in Zimbabwe. ENDA-Zimbabwe. Paper presented at the small scale milling systems workshop organized by IRDC. Dakar, Senegal. November 14-16 1990. 28pp.

Mudimu G., Mwanda C., Chigume S. and Govere J. (1988). Household food insecurity in low-rainfall areas of Zimbabwe: Initial findings in Mudzi, Mutoko and Buhera Communal Lands p217-233. In: Rukuni M. and Bernsten R. H. (editors). Southern Africa: Food security policy options. UZ/MSU Food security research in Southern Africa Project. Dept. of Agricultural Economics and Extension, University of Zimbabwe. Harare, Zimbabwe.

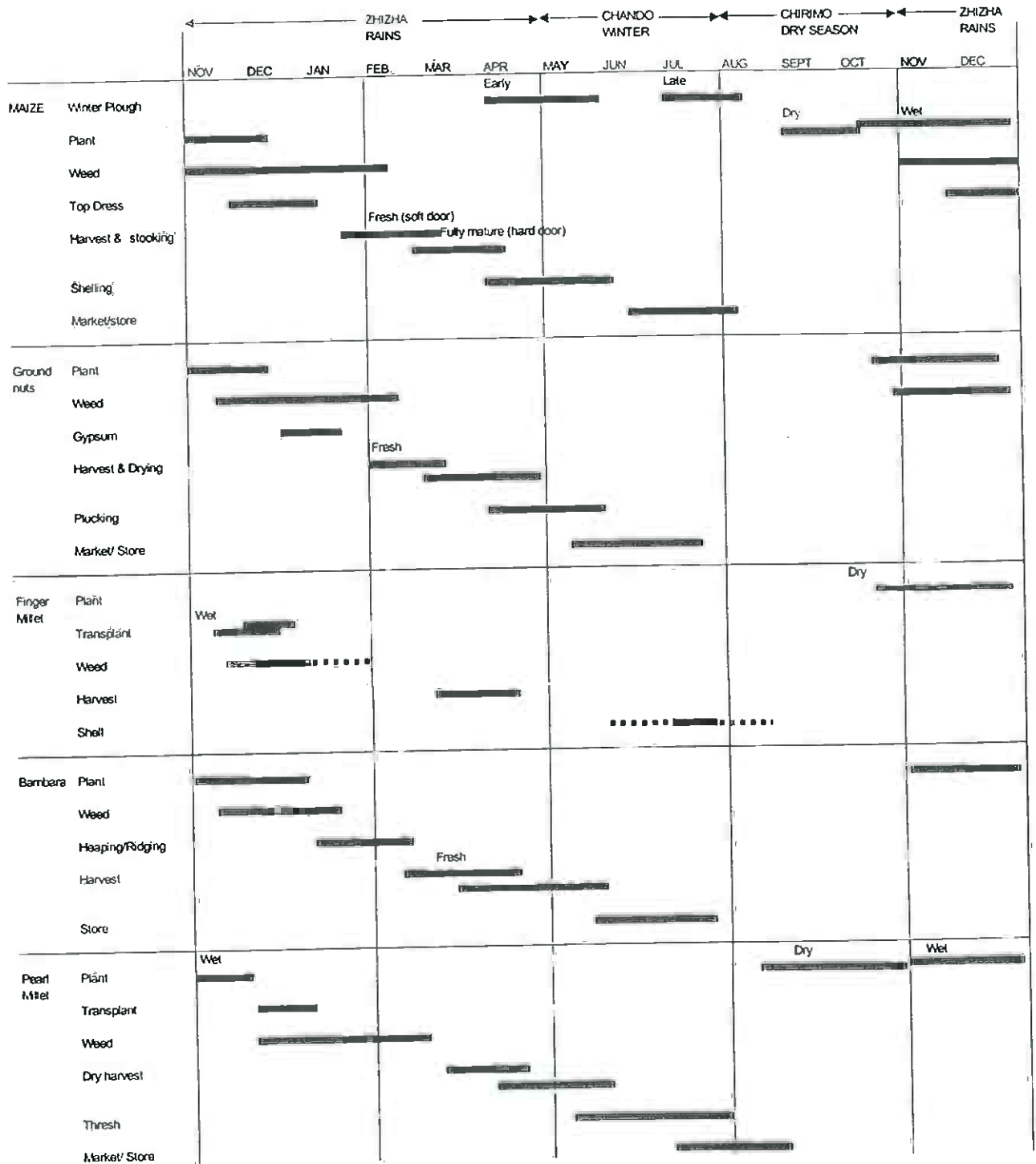
Mudimu G., Chopak C., Chigume S. and Govereh J. (1989). Household income, food production and marketing in low-rainfall areas of Zimbabwe: Status, constraints and opportunities p169-190. In: Rukuni M., Mudimu G. and Jayne T. S. (editors). Southern Africa: Food security policies in the SADCC region. UZ/MSU Food security research in Southern Africa Project. Dept. of Agricultural Economics and Extension, University of Zimbabwe. Harare, Zimbabwe.

Mvumi B., Donaldson T.J. and Mhunduru J. (1996). A report of baseline data for Buhera District, Manicaland Province. CPHP - Zimbabwe report.

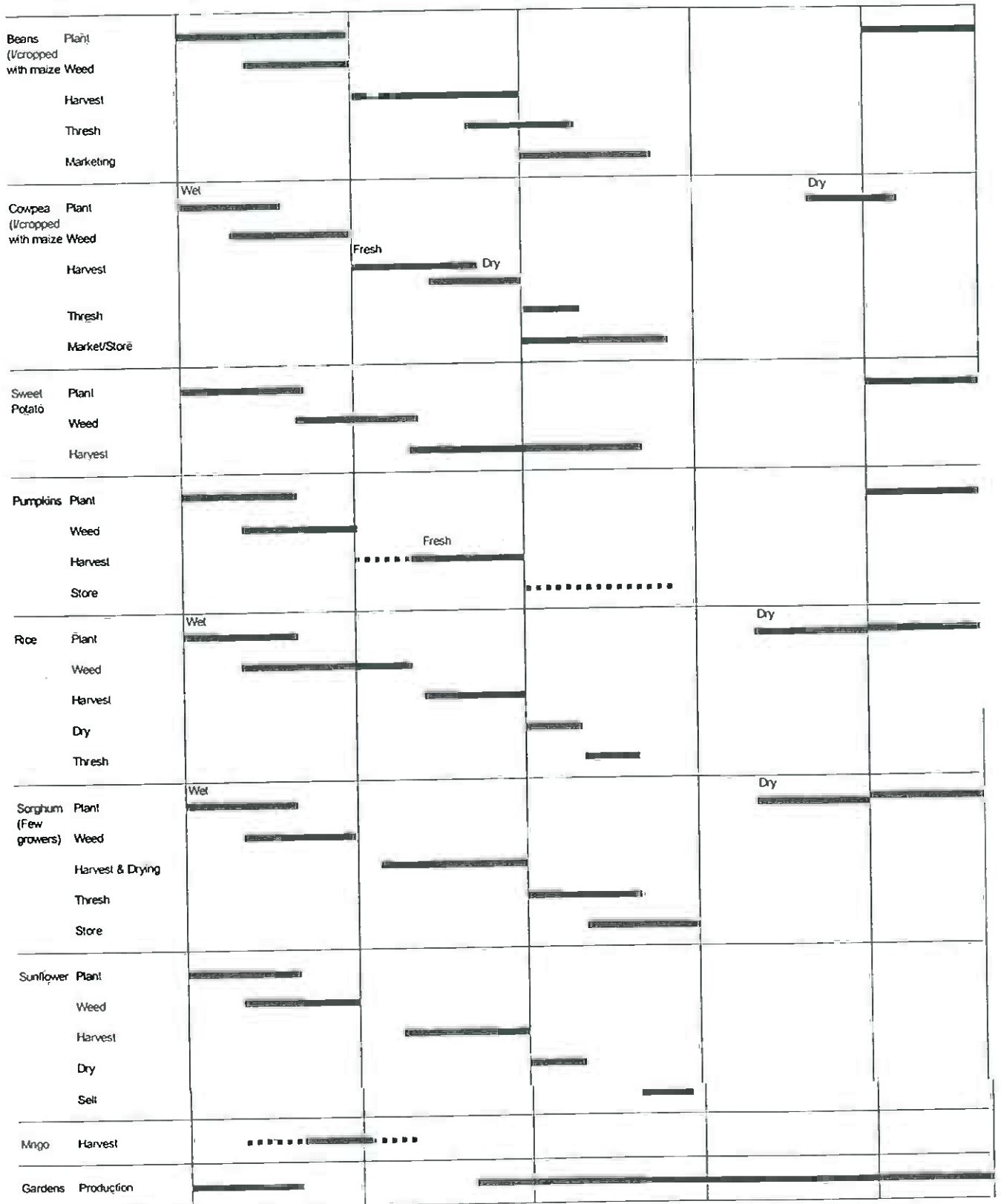
UNDP/Ministry of Natural Resources environmental assessment of Ward 14 Aug/Sept 1996

University of Edingburgh (1995-1996). An integrated model of the food system in a region of Zimbabwe. Research projects in the area: EC DGXII University of Edinburgh and UZ on maize marketing and nutrition of selected Wards.

Annexe 5: Seasonal calendar of crop production (extension worker)



Continued.....



Annexe 6: Results of wealth ranking exercise

Annexe 7: Summary of post-harvest characteristics and operations presented at the final meeting with farmers, 21 February.

Structures

- Thatched roof with inadequate overhang
- Several compartments (3 to 4) under one roof
- Ceilings to each bin (made of wattle and mud)
- Access holes not sealed
- Raised on stones with wood or stone cross supports
- Some brick stores with underfloor ventilation
- Walls of wattle and mud
- Also used as a store for seeds and implements
- Termite and rodent damage obvious
- Can last for 30 years or more
- Shortage of traditional materials – there is a move to brick structures
- Cribs are rare and cost Z\$ 150 for collecting materials and construction (usually paid for with beer)
- Preferred timbers for store/crib construction are *Mususu* and *Mukavati*

Maize

- The main varieties grown are SR52, R201, R215, SC501, Pannar 473 and CG4141. Most farmers grow more than one variety.
- The crop is cut between April and June and stooked for 3 weeks in the field
- Maize is dehusked in the field and can be dried in the field or at the homestead
- Shelling is largely by hand at the homestead. All the family assist in this activity
- Women are responsible for cleaning the grain, by winnowing and putting into the store
- The granaries are repaired by men and prepared by women prior to storage.
- Insecticide dusts, or natural protectants are used to treat the store (in some cases) and mixed with the grain. However, insects are widespread
- Maize is sold both to GMB and in local markets. In recent years private buyers have been buying grain.

Groundnuts

- 2 local varieties grown (red, early podding; white, predominant)
- harvesting by hand lifting in March (germinating kernels is a problem), drying in the field for a week in windrows, picking of pods in March – April.
- Stored in unshelled form in the maize store, no grain protectants are used, but rodents are a major problem
- Marketed to GMB in unshelled form. Low prices by GMB has led to more retention on farm and increased local sales (Z\$ 40-50 per 20 litre tin)

- Groundnuts are also processed into peanut butter by hand/stone and sold in town as well as consumed. The selling price is Z\$ 15 per 500g container and it costs Z\$ 25 to hire labour to produce a 5 litre tin.

Other crops - Pearl millet and finger millet

- Traditional and improved cultivars (PMV1 and PMV2) are grown
- Heads are cut and dried on rocks, then threshed by hand or by using animals to trample the heads
- The grain is winnowed prior to storage
- Pearl millet is stored using rapoko chaff on the top and bottom of the grain but is often badly infested with moth webbing
- Finger millet is stored without any treatment and there are no insect problems
- Dehulling of both crops is very laborious