

## **APPENDIX - IV**

### **LIVESTOCK**

## APPENDIX-IV

### Livestock

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## 1. Kudu Dam Irrigation Project

### 1.1 Livestock in the Study Area

#### 1.1.1 Livestock Population and Holding Size

Some form of livestock are kept by most farmers in the Study Area and the livestock held by the farmers include, of primary importance, cattle and goats, and, of significantly lesser importance, donkeys, sheep, pigs and poultry, whilst a few locally (especially Gokwe North) kept turkeys, guinea fowl and pigeons. The population of cattle in the project related 10 wards are estimated at some 41,100 heads and that of goat is at 29,000 heads as shown in Table 1. The total population of livestock is some 28,600 LUs as summarised in the following table.

**Livestock Population in the Study Area**

Area	Livestock Population (heads or LUs)				
	Cattle	Goat	Others	LUs	Stocking Rate
Communal Area Wards (9 Wards)	32,726	25,161	2,118	22,835	3.5 ha/LU
Resettlement Area Ward (1 Ward)	8,379	3,880	839	5,767	14.9 ha/LU
Project Related Wards Total	41,105	29,041	2,957	28,602	5.8 ha/LU

Note: Stocking rate = grazing stocking rate (grazing area / LU); Others include donkey and sheep

The grassveld types found in the Study Area are predominantly *Heteropogon*-other species grassveld and patches of sodic grassveld (Table 2). The former is characterised by the dominant presence of the grass *Heteropogon contortus* (spear grass, *tsine*) and has a potential grazing capacity of about 1 LU:5 ha (where 1 LU is a beast of bodymass 500 kg) on a year-round basis. The latter is characterised by being found on sodic soils and is very sensitive to heavy grazing. It has a potential grazing capacity of about 1 LU:12 ha on a year-round basis. Whereas the *potential* grazing capacity of most of the range lands in the Area is about 1 LU:5 ha, much of the lands are in a deteriorated condition and a *current* grazing capacity of about 1 LU:8-12 ha would seem to be more applicable. Accordingly, the overall grazing stocking rate of 1 LU: 3.5 ha in the project related communal areas indicates that the livestock population in the areas is more than twice of the current grazing capacity.

The average holding sizes of livestock per household in the Study Area are estimated based on Table 1 at cattle 2.6 heads, goat 1.8 heads, others 0.2 heads and 1.8 LUs as shown in the following table.

### Average Livestock Holding Size per Household in the Study Area

Area	Holding Size (heads or LUs/household)			
	Cattle	Goat	Others	LUs
Communal Area Wards (9 Wards)	2.3	1.8	0.1	1.6
Resettlement Area Ward (1 Ward)	5.8	2.7	0.6	4.0
Project Related Wards Total	2.6	1.8	0.2	1.8

The holding sizes in the project related communal areas show the similar to the Study Area and the holding size is estimated at 1.6 LUs per household. Findings of the separate "Household Survey", however, indicate the skewness of holdings of cattle, goats and other livestock in the Area.

#### 1.1.2 Livestock Breeds

The great percentage of cattle, goats and sheep held in the Study Area are of indigenous breeds, with some limited crossbreeds being present mainly in cattle. Exotic blood is mainly Brahman and Afrikander in cattle and Boer goat in goats. There are more exotic bloods in the livestock of the small-scale commercial farms than in the communal and resettlement areas. Farmyard chickens are mainly common stock, but purchased broilers and layers are hybrids (such as the Goldline and Lohman Brown layers, Cob and Crest broilers). Pigs are of exotic breeds as are the sheep (Persian Blackhead), donkeys and turkeys - (ostriches), guinea fowls, pigeons and rabbits are of indigenous breeds.

#### 1.1.3 Herd Composition and Livestock Uses

From the Livestock Questionnaire Survey conducted by the JICA Study Team, the composition for cattle herd and goat flock in the Study Area is approximated as shown in the following table, although there is considerable variation in the composition of individual herds and flocks depending on their size.

#### Approximated Composition of Cattle Herd and Goat Flock

Cattle Herd			Goat Flock		
Age	Class	Proportion (%)	Age	Class	Proportion (%)
Adults	Bull	3	Adults	Buck	10
	Cow	35		Does	48
	Oxen	25		Kapatas	7
Growing	Bull	5	Young	Buck	14
	Heifer	13		Does	19
	Steer	7		Kapatas	2
Calves	Bull	3			
	Heifer	9			

Source: Livestock Questionnaire Survey, JICA Study Team

Noticeably, there are far fewer bulls and bucks than cows or does - one sire can

service a number of dams. In the composite herd and flock, there are approximate ratios of 1 bull:12 cows and 1 buck:5 does. In fact the situation on an individual herd or flock basis is different as 53 per cent of cattle herds and 45 per cent of goat flocks are without a sire. In case of cattle herds, there are a comparatively large number of adult castrates (oxen and steers) which are used for draft purposes.

In the Livestock Questionnaire Survey, sample farmers were asked their two main reasons for keeping livestock. The results are shown in the following table.

**Primary and secondary Reasons for Keeping Livestock**

Livestock	Primary Reasons	Secondary Reasons
Cattle	Draught 67 %; breeding 18 %; Investment & savings 13 %	Investment & savings 46 %; food 23 %; Breeding 17 %; selling/cash 14 %
Goat	Food 74 %; breeding 15 %; investment Investment & savings 5 %; selling 5 %	Investment & savings 46 %; food 23 %; Breeding 17 %; selling/cash 14 %

From the table, it is quite clear that cattle are kept primarily for draft power and secondary for investment. Goats are primarily for food and secondary for investment. While, cattle are held also for reasons of security in times of drought and hardships, and to an extent for cultural and traditional purposes. The uses are multiple and relate to various crop and household needs as well as the commercialisation of livestock keeping. It is clear that there is an intimate relationship between crops and livestock, especially with cattle and crops. Farmers try to increase their holdings to benefit as much as possible from keeping them, despite their effects on the range land environment.

Working rates for draft animals (mainly oxen and donkeys) are affected by a number of factors including the speed of walking, width of the implement, efficiency of working, turning time, obstacles in the field, soil conditions, size of oxen, oxen condition and level of feeding of oxen. The following table shows the work rates of teams of four donkeys or four small oxen, working for five to six hours per day with rests in between. Bigger oxen can operate in teams as pairs (single span) or foursomes (two spans) and they will work faster and longer than single span pairs.

### Draft Animal Work Rates (two-spans)

Operation	Swath Width (m)	Efficiency (hr/ha)
Ploughing	0.2	14 - 16
Cultivation(single pass)	1.0 - 1.2	4 - 6
Harrowing(single pass)	1.0 - 1.5	5 - 8
Planting	0.9	2 - 3

#### 1.1.4 Livestock Production

The statistical information on the livestock production in the Study Area was not accessible. While, the results of the Livestock Questionnaire Survey indicate that some 60 per cent of cattle holders in the Area milk their cows (the remainder mainly leaves the milk for the calf), and milk yield varied from 1 to 20 l per day per household. However, only one third of these households sold products and volumes varied from 0.3 to 17 l per day. Meat sales by farmers from slaughtered livestock were very low in the Area (only 2 out of 54 respondents in the Questionnaire). The main reasons given for not selling were that there was no surplus or that there had been no slaughters for selling meat. It appears that the farmers sell the whole animal (live) rather than slaughtering and selling meat; the reason for the apparently lower than normal level of meat sales was not clear.

On the basis of a composite herd, Barrett (1992)<sup>v</sup> has calculated the total value of economic output from a herd of 100 communal cattle. Using this same model but with adjustments in prices of outputs for the Study Area, the gross average value of annual output per animal is calculated to be Z\$ 1,169 per animal as shown in the following table.

**Estimated Total Output from a Herd of 100 Communal Cattle (after Barrett, 1992<sup>1/</sup>)**

Output	No. of Animal	Annual Output	Unit Value (Z\$)	Amount (Z\$)	Proportion (%)
Draft	40	1,200 animaldays	45	54,000	46
Milk	30	3,375 litters	5	16,875	14
Manure	100	150 cartloads	45	6,750	6
Off-take (local)	3	480 kg meat	35	16,800	14
Off-take (CSC)	2	2.5 head	5,000	12,500	11
Herd Growth	2	2 head	5,000	10,000	9
Total Value of Outputs				116,925	100

1/:Barrett, J.C., ODI Pastoral Dev. Network Paper No. 32b, Overseas Development Institute, London, U.K.

Assuming the average livestock unit equivalent of a beast is 0.6 LU, the output of 60 LU equivalents would be about Z\$ 116,925 or about Z\$ 1,949 per LU. At a stocking rate of 1 LU:5.7 ha, cattle therefore would give a return of about Z\$ 342/ha. At a stocking rate of 1 LU:15 ha (as in the Resettlement Areas at present), the return would be Z\$ 130/ha (although in reality the output per animal

at this stocking rate would be expected to be much higher - if 50 per cent higher, then returns could be up to approximately Z\$ 200/ha).

From this it can be seen that the value of cattle keeping in the communal areas is not in commercial off-take, but in the value it adds to the standard of living to the family and its contribution to the overall farming system in addition to its cultural and asset values.

Similar sorts of calculations for goats, allowing an off-take of 15 head per 100 for slaughters and gifts, sales at 8 head per 100 and 50 head per 100 head flock increase all valued at Z\$ 300 per head, give a total return for the composite goat flock of about Z\$ 21,900 per 100 head or Z\$ 219 per head, or Z\$ 1,535 per LU (where the livestock unit equivalent of one goat in the flock is taken to be 0.1 LU). If the value for each return per head is taken to be a more conservative, Z\$ 250 instead of Z\$ 300, these total return values become, for the 100 head composite flock, Z\$ 183 per head or Z\$ 1,279 per LU. At stocking rates of 1 goat:3 ha, their returns would be Z\$ 73/ha (at Z\$ 300) or Z\$ 61/ha (at Z\$ 250).

#### 1.1.5 Livestock Production System

##### (1) Animal Breeding

Generally, farmers keep their male and female animals together, sometimes separating young stock from older stock (e.g. heifers and bulls) in the Study Area. Farmers use their own (not always scientific) criteria for sire selection and, as there is no segregation, breeding is generally unregulated. Although there is a relatively high bulling rate in the composite herd (1 bull:12 cows), there is none-the-less a high number of herds are without bulls (53 %). Similarly with goats, there is 1 buck:5 does in the composite flock, but 45 per cent of flocks have no buck. Some of the bulls are kept for religious reasons (the *Mudzimu* bulls) which explains the high numbers of these animals relative to cows.

Artificial insemination is not practised under the extensive types of livestock production systems found in the Area - the problems of maintaining a cold-chain for keeping semen make this difficult as do the fact that the spotting of animals coming into oestrus is a problem and farmers live mainly away from the Business Centres and Growth Points. A few farmers do buy "improved" crossbreed bulls from commercial farmers, or obtain specially bred chickens and pigs if they are going into bacon-pork or poultry-egg production.

##### (2) Animal Feeding

Animals are kept under extensive, low input, almost ranching conditions at relatively high stocking rates in the Study Area. They rely in summer on range



(veld) grazing and in winter on crop residues (especially stover), range grazing in vleis (waterway areas) and browse (especially in spring). Very limited amounts of homegrown grains or purchased salt and supplements are fed, except when farmers are pen fattening cattle or doing broilers and layers.

For range animals, grazing is mainly to be found in the foothills of the Mafungabuzi Plateau in the southwest, the Chinwavaenzu Hills in the west, in the centre of the Sanyati Communal land on poor soils in the north, and throughout the resettlement areas in the east. In the south, in the two Kwekwe District Wards the grazing is mainly between the Empress Mine and along the Ngondoma River away from the Munya River. All these areas, except the resettlement areas, appear overgrazed.

The main sources of purchased feed inputs are from the animal feed companies based in Gokwe, Kadoma, Kwekwe or Sanyati. In time it is expected that there would be outlets developed at Nembudzia where farmers could purchase feed concentrates and supplements, along with such necessary inputs as salt. Most livestock cash expenses incurred by farmers are towards the cost of the limited amounts of supplements and medicines.

During the busy summer crop growing period, and sometimes even in the dry season, the animals are allowed out of their kraals for only a small part of the day. Whilst this reduces the amount of energy they use for walking and foraging, it also restricts the amount of time the animals have for feeding (perhaps to a single gut-fill in a day sometimes) and selecting for high quality feed. Their individual performance as a result suffers (growth rate, milk production, draft capability, manure production, etc), overall productivity of the area is lowered if this happens to sufficient animals, and household income is thus likely to be less than optimal from livestock.

#### 1.1.6 Livestock Production Resources

The livestock essentially feed in the rangeland grazing areas during summer. These areas are mainly non-arable areas, often in hilly areas where these are adjacent to cropped land. During summer, there are usually pools and streams from which livestock can drink. In winter, the livestock feed off such crop residues as remain on the land and which have not been gathered and stored on platforms beside the livestock kraals for feeding on at night and turning into manure and compost. Drinking water for many of the animals is a serious problem and many have to move closer to the main river (Munya River) and its major tributaries - in drought years, even the pools in these dry up and farmers have to rely on a few reliable boreholes. In the dry season animals are able to

stray or are stolen and lost when they search for water.

Traditionally, there existed forms of range management that helped to maintain the rangeland in good condition. However, along with the breakdown of traditional societal structures and the integration of people from different areas together into "new societies", these traditional practices have tended to fall away.

The Study Area, in the less disturbed and uncultivated areas, is covered by the grassveld type vegetation, though a number of different vegetation types are observed as described in Section 1.1.1. There are only very small areas of isolated patches of planted pastures grown with exceptions being the dairy development plots in Gokwe and one or two other isolated cases.

#### 1.1.7 Animal Health

The major health problems affecting livestock in the Area include a number of tick-borne diseases, internal and external parasites. The major pests and diseases are shown in the following table.

**Major Diseases and Pests of Livestock in the Study Area**

Livestock	Diseases & Pests
Cattle	Anaplasmosis(gallsickness), Babesiosis(redwater), Cowdriosis (heartwater), Brucellosis (contagious abortion), quarter-evil or black leg, Theileriosis, rift valley fever, Vibriosis (vibrio), various roundworm, liverfluke, mastitis, senkobo skin disease
Goat	Rift valley fever, Enterotoxaemia (pulpy kidney), roundworm, tapeworm, orf skin infection, mange, skin mites
Poultry	Newcastle Disease, fowl pox, heat stress, predators

Note: Foot-and-mouth disease is not found in the Study Area

Relatively little inputs are provided for animal health, although vaccines are available for a number of the diseases, these is relatively little use made of them - they are expensive and often difficult to store before use. An obvious method of control of at least the tick-borne diseases is to control the ticks on the animals - however, the dips are not working efficiently, either because there are no chemicals (the Department of Veterinary Services has responsibility for the dips but has a very limited annual budget) or because there is no water for the dips (due either to dry rivers and wells or boreholes having broken down and not been repaired). There is only limited purchase of alternate acaricides, anthelmintics and vaccines to control ticks, worms and diseases by farmers.

#### 1.1.8. Livestock Marketing

There are fairly low levels of off-take, part of which is locally consumed, especially goats and chicks. Cattle are sold as and when required to meet large

family or farm expenses, whilst goats and chickens are sold to meet lesser expenses. There is only limited commercialised off-take. The Cold Storage Commission (CSC) set up a series of sales pens throughout the country at which they held cattle sales on a routine well advertised basis, the running of these pens has been subsequently taken over by the Livestock Development Trust. Farmers generally sell direct to the CSC in Bulawayo (the CSC paying for transport if more than 15 head are sent at a time by farmers collaborating in the transport of their animals) or to CSC or other buyers at the CSC sales (where prices are lower). In the case of the Study Area, there is a private abattoir in Kadoma to which farmers can and do sell their animals as well. Occasionally they also sell to neighbouring commercial farmers who then fatten and sell to an abattoir later.

A number of different systems of cattle marketing prevail in the area and include the fattening of old oxen and cows animals off the rangeland (veld) and crop residues using supplements and usually timed to sell between July and September, and the fattening of young (and sometimes old stock) on whole or near whole rations in pens and usually timed to sell when market prices are highest (around late winter through to mid summer).

Goats and sheep are sold locally or occasionally at Business Centres. Main customers are local farmers, local and travelling civil servants and occasionally commercial travellers. There is no sale preparation (like fattening) as such in the sale of goats and sheep and selling tends to be whenever it is mutually convenient to both the producer and buyer - often when school fees have to be paid.

Milk is usually sold by prior arrangement to a regular customer such as a clinic or school. There is a Dairibord Zimbabwe Limited (DZL) factory in Kadoma which takes milk produced by local commercial farmers. Unfortunately, it was not possible to determine the spare capacity of the factory, and its ability to absorb and process further milk produced. The DZL factory in Kadoma specialises in the production of various cheeses.

At Gokwe, a small holder dairy scheme has been set up. Milk is obtained by the producer cooperative partially from farmers from areas surrounding the town and partially from a few peri-urban producers. The milk is all sold locally either fresh, as "Lacto" (a soured product) or yoghurt. Producer cooperative members receive the basic DZL price for their milk and get a dividend depending on how much milk is sold fresh or processed.

Milk production is usually timed to allow animals the maximum amount of time on fresh fodder, namely in the summer months. There is usually a truncated lactation period of about 240 days rather than the conventional 305 days.

There is a difference in prices between local sales and selling to the formal market. Farmers are aware of the differences between local prices and formal market sector prices, but are unable in many cases to afford the extra cost of inputs required to produce a "quality" product or in other cases are not sure of how to produce that "quality" product which receives the premium prices. There is sometimes dissatisfaction and some resentment due to the price differentials between prices paid to small-scale producers and large-scale commercial producers.

#### 1.1.9 Livestock Sub-sector Support Services

Support services required by the livestock sub-sector in the Study Area include the following provision of services:

#### **Livestock Sub-sector Support Services**

<b>Input Supplies (feeds, veterinary supplies, breeding animals, equipment, etc.)</b>	
<b>Providers</b>	-All except breeding animals available through Farm and City and Agricura depots at Gokwe, Kadoma, Kwekwe and Sanyati,
	-Cattle breeding stock only available from commercial farmers and Heifer International Project; point of lay and day old chicks from Crest Breeders International and Irvine's Day Old Chicks in Harare or outlets in Kadoma (on order)
	-Vaccines are available from the Department of Veterinary Services either at the Animal Health Centres or from Harare
<b>Credit (credit services for inputs, capital for breeding stock &amp; sires, marketing, etc.)</b>	
<b>Providers</b>	-Agribank (draft cattle), ZFU, CSC (breeding cattle)
<b>Research (on nutrition, breeding, health, husbandry, fodder production, etc.)</b>	
<b>Providers</b>	-Departments of Research and Specialist Services (DR&SS), AGRITEX, VET, University of Zimbabwe, Pig Industry Board (PIB) (Harare)
<b>Extension (extension services on all aspects of livestock production)</b>	
<b>Providers</b>	-AGRITEX, Livestock Development Trust (Harare)
<b>Health (advice &amp; assist on health issues; control of specified diseases, etc.)</b>	
<b>Providers</b>	-VET ( Animal Production and Health Centre & Animal Health Inspectors)

From the above description of the availability of service providers it is apparent that they are usually far from the farmers. This means that to get these services either farmer must visit the service providers or vice versa - whichever way it is, there will be extra costs that the producer will have to bear one way or another.

#### 1.1.10 Livestock Research

Research relevant to livestock development in the Study Area include research into the areas of nutrition, breeding, health, range management & improvement and pasture production. Most of this research has been conducted on-station at Grassland, Henderson, Makaholi and Matopos Research Stations by the DR&SS and the Faculty of Agriculture at the University of Zimbabwe and has primarily been aimed at the commercial farming sector. In addition AGRITEX has undertaken quite considerable amounts of on-farm research, particularly in the past. In the past most of the research has been aimed at cattle, and rather less at small stock. Animal health research has been carried out by the Department of Veterinary Services, but again mainly on-station.

The Pig Industry Board (PIB) has done some pig production research. Most "formal" poultry research has been done at the Poultry Research Unit at Henderson Research Station in Mazowe, although the commercial poultry producers have done their own (unpublished) research.

Most of the livestock research undertaken has been of a technical nature and much of the applied results of this research can be found in the locally published Beef, Dairy and Sheep Production Manuals. Production manuals for some forms of livestock keeping in small-scale sector have also been prepared (e.g. milk and beef production) (in English rather than one of the native languages). There have been relatively few studies of small-scale livestock production systems.

At present, the Faculty of Agriculture, University of Zimbabwe, has a study site near the Sanyati Business Centre where animal feeding preferences, seasonal herbage quality and animal performance data are being gathered. In addition, some data are being gathered on milk production at the Agricultural and Rural Development Authority's Dairy Development Programme site just outside Gokwe Business Centre.

The DR&SS, based at Grassland Research Station, is looking at the provision of forages for small holder dairy schemes in the high rainfall parts of the country, based on *Pennisetum* spp. and legumes such as lablab. In addition, based at Matopos Research Station, there is a project looking specifically at the feeding of cross-bred animals for milk production in the small holder sector using home grown forages such as fresh-cut bana grass or one of the other recently produced

*Pennisetum* hybrids and conserved silage. Trials are both on- and off-station. At Henderson Research Station there are trials looking at the conservation of fodder such as maize-legume silage specifically for the small holder dairy sector.

#### 1.1.11 Constraints to Livestock Production

Problems relating to all types of livestock production are found to be extremely diverse, with low grazing capacity of range lands and over grazing, water availability in dry spells and health in particular being a critical issue. The range of issues identified by the Study Team and raised directly by farmers themselves as problems are shown below.

##### Constraints to Livestock Production in the Study Area

Issue	Constraints/Problems
Health	General malaise, mortality, disease, disease and pest control, parasites, lack of dips or dipping, lack of dosing, lack of health facilities (dips, crushes, races, equipment, drugs and medicines, veterinary assistants)
Breeding & Reproduction	Poor sires and dams; poor genetic stock generally, uncontrolled breeding, poor hatching, low reproductive rates
Management & Husbandry	Improper herding, onerous herding tasks, stock straying, laying away from the coop
Inputs	Lack of cash/loans/credit for inputs
Marketing	Lack of a market; lack of a market place, insufficient sales, poor prices
Nutrition	No or insufficient grazing and browse or feed in general, (high) cost of supplementary and concentrate feeds
Social/Cultural	Thieves
Water Availability & Drought	Drinking water in the dry season (especially), erratic rains
Information and Skills	Information and skills in general, disease knowledge in particular
Natural Resources and Pastures	Poor management of grazing land, poor quality grazing (especially in winter), wild fires in grazing areas
Infrastructure	Poor housing and kraals (corrals), no fencing or paddocking
Land Pressure	Small grazing areas; need for extra grazing, resettlement opportunities
Land Use Planning	Lack of rationalised land use
Transport	For inputs from business/shopping centres, for livestock products to market places

With respect to farmer perceptions of how health, breeding, marketing and feeding of their animals could be improved, farmers collectively showed a relatively deep and broad understanding of how to do this, although on an individual farmer basis

this was not so apparent. This is important as it shows the potential strength or benefit that could be obtained by adopting a group approach to addressing the problems, for implementation and training.

## **1.2 Livestock Development Plan**

### **1.2.1 Development Approach**

The livestock sub-sector is the second most important economic activity next to crop production in the Study Area and the sub-sector has substantial potentials for further development. However, for the realisation of such potentials, there are a number of constraints to be tackled with; including animal health, nutrition, breeding, water availability & drought, poor management of grazing land, marketing and others as discussed in Section 1.1.11. Accordingly, the development options of the sub-sector will have to be directed toward improvement of animal health, nutrition, genetic resources, water availability, grazing management, marketing and so on.

In the present Project, however, the improvement of water availability and management of grazing land are envisaged as approaches for the development of the sub-sector in considerations of:

- Approach to avail water resources developed through irrigation development for livestock sub-sector in some way,
- Approach to be demonstrative of what can be done in general terms,
- Approach in which significant contributions of beneficial communities to ensure "ownership" of development as community development and involvement is a key to the success of livestock development,
- Approach contributing to irrigated agricultural development plan under the Project, and
- Approach to introduce irrigated fodder production is not recommended because it is economically less attractive to crop production.

The livestock development plan proposed accordingly in the present Project consists of the livestock water development scheme and grazing area development pilot scheme as discussed in the following section.

### **1.2.2 Livestock Development Plan**

#### **(1) Livestock Water Development Scheme**

The poor availability of water sources for livestock in grazing areas is one of the most serious constraints restricting the efficient utilisation of range resources in the Study Area. The scheme aims to construct water troughs for livestock along the main and secondary canals. The provision of water for livestock in range

lands along the canals will enable efficient use of grazing resources and result in labour saving for watering/herding animals, and also allow animals to extend the length of their grazing in an area. Especially in the dry season, this will have great advantage of enabling farmers to continue to use grazing areas otherwise inaccessible due to shortage of drinking water. The scope and components of the scheme are as follows;

### Scope and Components of Livestock Water Development Scheme

Scope	Construction of water troughs along main & secondary canal	
Components	Size of a trough	3 m <sup>3</sup> (length 6 m, width & depth 0.7m)
	Specification	Brick made with cement lining
	Volume of works along main canals	36 units (approx. 5km interval)
	Volume of works along 2ry canals	36 units
	Total volume of works	72 units

The anticipated benefits of the scheme are approximated as follows;

### Anticipated Benefits of Livestock Water Development Scheme

Anticipated Benefits	Approximation
Labour Saving in Watering/Herding Livestock	Saving 20 labour-days/year/household Beneficiary/water trough: 40 households - 20 days/year x Z\$38.5/day x 40 households = Z\$ 30,800/trough/year

### (2) Grazing Area Development Pilot Scheme

The low grazing capacity of range lands and the over grazing are another most serious constraint in the sub-sector in the Study Area, which cause the degradation of range resources and erosion in the Area. The scheme aims to establish the fully fenced pilot grazing areas in the project related 10 wards and to introduce controlled grazing management in pilot scale in the Area.

The anticipated benefits of the grazing area development scheme are:

- It will greatly reduce the amount of time farmers have to spend in herding their animals,
- By the introduction of controlled grazing management, losses of surface soils from erosion will be reduced and erosion deposition in the irrigation canals will also be reduced, as much of the grazing areas in the Study Area is above the currently proposed irrigation area contour,
- The scheme could be used not only to improve the current grazing capacity of the range lands from its rather low level up to its potential capacity, but will help ensure that the range land is at less risk to



overgrazing. Thus, there could be an overall improvement in carrying capacity from current 1 LU: 8-12 ha to 1 LU: 5-9 ha,

- It would be possible in a few years to establish grazing in equilibrium with range environment and avoiding a loss in productivity of livestock and range resources later through adequate management of grazing areas and by controlling stocking, and
- Animals can be put in grazing areas for longer periods than at present, which will result in improved productivity of them.

The scope and components of the scheme are as follows;

#### **Scope and Components of Grazing Area Development Pilot Scheme**

Scope	Establishment of fully fenced grazing blocks with water troughs	
Components	Size of a block	600 ha/block
	Length of fencing/block	Boundary-6km; internal-11km; total-17km
	No. of blocks	10 blocks (1 each for project related wards)
	No. of troughs	10 troughs (1 each for a block)
	Total volume of works	10 blocks

The anticipated tangible benefits of the scheme are approximated as follows;

#### **Anticipated Benefits of Grazing Area Development Pilot Scheme/Block**

Anticipated Benefits	Approximation
Labour Saving in Herding Livestock	Labour saving: 4hrs/herd/day; 1 herd/20 ha - 4 hrs/herd/day x 365days x Z\$19.25/4hrs=Z\$7,026/herd/year - Z\$7,026/herd/year x 30 herds = Z\$210,780/year/block
Surface Soil Conservation	Z\$240/ha/year x 600 ha = Z\$144,000/year/block

### 1.2.3 Estimated Costs

The implementation of the livestock development plan consisting of 1) livestock water development scheme and 2) grazing area development pilot scheme is scheduled to be implemented consistently with the progress of irrigation works.

The estimated cost for the livestock water development scheme is Z\$1,440 thousand and the same for the grazing area development pilot scheme is Z\$3,600 thousand. The overall costs for the livestock development plan are estimated at Z\$5,040 as estimated below.

### Estimated Costs for Livestock Development Plan

Scheme Components	Volume of Works	Unit Rate (Z\$)	Amount (Z\$ 1,000)
<b>1. Livestock Water Development</b>			
- Water Troughs along Main Canals	36 units	20,000	720
- Water Troughs along 2ry Canals	36 units	20,000	720
Scheme Cost			<b>1,440</b>
<b>2. Grazing Area Development Pilot Scheme</b>			
Scheme Cost per Block			
- Fencing of Grazing/Block	17 km	20,000	340
- Water Trough/Block	1 unit	20,000	20
Total/Block			360
Scheme Cost	10 blocks	350,000	<b>3,600</b>
<b>Estimated Costs for Livestock Development Plan</b>			<b>5,040</b>

## 2. Nyarupakwe Pilot Project

### 2.1 Livestock in the Pilot Project Area

#### 2.1.1 Introduction

The study on livestock sub-sector in the Pilot Project Area has been focused to the villages located in the areas where there exist chances to avail water resources developed through the irrigation development under the Project, in accordance with the considerations taken to establish the development approaches in the livestock development plan in the Kudu Dam Irrigation Project (the former part of of this report). Accordingly, four villages of Magonyo, Hlamba, Murandu and Sekema villages are selected as the target areas for livestock development in the present Pilot Project.

#### 2.1.2 Livestock Population and Holding Size in the Pilot Project Area

The primary important livestock in the Pilot Project Area are cattle and goats, although other livestock such as poultry, sheep and pigs are kept by farmers to a lesser extent. The population of livestock in the Area is partly obtained by way of the livestock inventory survey in the three villages (Magonyo, Hlamba and Murandu) and the same on the remaining 12 villages are estimated based on the results of the "socio-economic environment survey" conducted by the Study Team as shown in Table 3 and summarised below.

### Estimated Livestock Population in the Pilot Project Area

Village	Livestock Population (heads or LUs)			
	Cattle	Goat	Others	LUs
Magonyo, Hlamba & Murandu	614	193	22	325
Other 12 Villages	4,137	3,746	-	2,356
Pilot Area Total	4,751	3,939	22	2,681

The total population of livestock expressed in LUs in the Pilot Area is estimated at some 2,700 and the grazing stocking rate is calculated at 3.0 ha/LU, which is at the similar level to the rate of 3.5 ha/LU in the communal areas of the Study Area of the Kudu Dam Irrigation Project.

The average holding sizes of livestock per household in the Area are estimated at cattle 4.6 heads, goat 3.8 heads and 2.6 LUs based on Table 3 as shown in the following table.

### Average Livestock Holding Size per Household in the Pilot Area

Area	Holding Size (heads or LUs/household)		
	Cattle	Goat	LUs
Target 4 Villages	3.3	2.5	1.9
Other 11 Villages	4.9	4.1	2.8
Pilot Area Total	4.6	3.8	2.6

#### 2.1.3 General Characteristics of Livestock Production in the Target Villages

All the target villages for the development of livestock sub-sector under the Pilot Project, Magonyo, Hlamba, Murandu and Sekema villages, are located along the proposed irrigation main canal and the proposed dam site for the irrigation development is in Sekema village.

The types of livestock held by the target villages include cattle primarily, and secondarily goats. Most households keep chickens for household use (with one or two doing broilers for sale in winter) and also a very few farmers keep donkeys and pigs. The numbers of livestock held by the four villages is shown in Table 3 and summarised below.

### Livestock Population in the Target Villages

Village	Livestock Population (heads or LUs)			
	Cattle	Goat	Others	LUs
Magonyo	227	59	5	120
Hlamba	140	92	17	77
Murandu	247	42	-	127
Sekema	165	385	-	116

The three villages of Magonyo, Hlamba and Murandu share a common grazing

area to the south of their fields and the north of the Nyarupakwe River (Murandu and Magonyo Villages) and to the east of the Hlamba Village area and north west of the Nyarupakwe River . The villages, on their own initiative, raised money from their own resources to build the wall of their Mahacha Dam. This dam covers about 11.5 ha when full. Village members have also subsequently stocked this dam with some fish for the enjoyment of recreational purposes.

The grazing areas in the target villages are vegetated with such trees as *Acacia* spp., *Colophospermum mopane*, *Combretum* spp., *Commiphora* spp., *Brachystegia boehmii* (on heavier textured soils) and grasses such as *Urochloa trichopus*, *Setaria pumila*, *Heteropogon contortus*, *Chloris pycnonthrix*, *C.virgatus* and *Sporobolus ioclados*. They are found mainly on light coloured sandy to reddish sandy loam sodic soils or soils prone to sodicity - these sodic soils are typically characterised by the presence of *Colophospermum mopane* trees and *Sporobolus ioclados*, *Chloris pycnonthrix* and *C.virgatus* grasses. Erosion, typical of that found on sodic soils leading to gully formation, is found throughout where the soils have become unstable. Noticeable in the gullied areas is that the animals have been licking at the soil for its salty flavour.

In terms of grazing value, the potential grazing capacity for these areas is of the order of 1 LU:5 to 7 ha, whilst in their present condition and with an excess of tree shrubs the current grazing capacity is about 1 LU:8 ha on the better areas and about 1 LU:10 to 12 ha on eroded areas or areas where there is little grass. These grazing areas in the past have been the source of timber for the construction of houses, livestock kraals, fuel wood and other tree products. However, the larger mopane and other useful trees have been largely used up and a plethora of small scrubby specimens have grown in their place in competition with the herbaceous species. Apart from a reduction in useful timber, the amount of grass for grazing has been reduced, and especially on the sodic patches, there has been a steady increase in the amount of erosion and gully formation, and the erosion, which may cover quite extensive areas, sometimes threaten infrastructure such as roads etc. Villagers are concerned at the reduction in the amount of useful timber.

The members of Murandu, Magonyo and Sekema villages make use of the dip at the Nyarupakwe Centre whilst members of Hlamba Village dip their animals at the Ganyungu Centre. The dips are about 4.5 km from the villages in each case. There is the start to the formation of Livestock Development Committees, based around the villages using each dip tank.

The building of the Mahacha Dam was a repeat of an earlier attempt to ensure security of a water source within the grazing area by the three villages - this time

apparently successful, as the dam wall has remained intact. The building of this dam was the accomplishment of the first phase of a collaborative project between the three villages. The second phase of this collaborative project is the development of a fenced grazing scheme in the grazing area shared by the three villages - to this end, a couple of years ago AGRITEX produced a preliminary draft paddocking plan for the grazing area. The third phase is to develop a water reticulation system, which would provide water not only for Murandu Primary School, but also for livestock in the grazing area, by pumping water from the dam to a centrally located reservoir. The final stage is to develop irrigated fields using the pumped water from the reservoir for horticultural gardens, pastures and feedlots.

In order to complement these efforts, plans for other livestock projects have been prepared by the villagers, and include the building of a piggery for 34 sows - at a then estimated cost of Z\$ 68,000 in 1995. Other thoughts, but not yet planned, included the setting up of a dairy (starting first by producing milk for the Gokwe Dairy Development Group, and the production of broilers and eggs (especially by women and unemployed youths during the winter dry season period).

Sekema Village would like to develop a grazing scheme in its grazing area to the north of the Nyarupakwe-to-Nyamacheni Road and west of the stream leading from this road past St Paul's School to the Nyarupakwe River.

#### 2.1.4 Villagers' Perceived Needs

The perceived needs for livestock development of the target villages are identified through the interview and discussion with the village leaders, representative of farmer groups, individual livestock farmers, FAEOs and field staff of VET as shown in Table 4, along with some of the villagers' comments about livestock development options.

In crude terms, farmers have listed their livestock development needs as being of either "high" or "medium" priority; all other livestock development needs, whilst being listed of "low" priority by comparison, are still needs which require to be worked on in the future nonetheless the categories of high, medium and low indicate the immediacy of the perceived needs.

In broad terms, the lack of credit facilities that would allow the timely purchase of inputs was perceived to be a major drawback to development generally, including livestock development, in the area. Lack of knowledge and extension was also a drawback - "organised field days with visiting farmers coming to speak" or "farmers visiting other areas where there are developments were said to be good ways of passing information to local farmers.

## **2.2 Livestock Development Plan**

### **2.2.1 General**

In accordance with the approaches for the development of livestock sub-sector in the Study Area of the Kudu Dam Irrigation Project, which have been established in considerations of availing water resources developed through irrigation development for livestock development and contribution of livestock development plan to the irrigated agricultural development under the Project, the implementation of the grazing area development scheme and the livestock water development scheme on pilot bases are proposed under the present Pilot Project. In addition to the schemes, the fishery development scheme in the proposed dam reservoir is proposed as such a development activity has been initiated by the villagers of Magonyo, Hlamba and Murandu in the Mahacha Dam.

The grazing area development scheme is to be in the communal grazing areas of Magonyo, Hlamba and Murandu villages and the livestock water development scheme is to be implemented in the target four villages.

Other development options perceived by the target villages including beef fattening, pasture & veld establishment and agro-forestry development are proposed to be implemented as demonstration activities and are accommodated in the strengthening plan of agricultural support services

### **2.2.2 Grazing Area Development Scheme**

The grazing areas of Hlamba, Magonyo and Murandu villages are becoming increasingly eroded, in part due to past poor grazing management but this has also been exacerbated by the fact that the grazing area is essentially on sodic soils which is very prone to sub-surface erosion in turn resulting in topsoil slump and gully formation. The grazing area development scheme aims to establish the fully fenced pilot grazing areas of some 860 ha extending mainly along the proposed irrigation canal and to introduce controlled grazing management system.

The anticipated benefits of the grazing area development scheme are:

- It will greatly reduce the amount of time farmers have to spend in herding their animals,
- By the introduction of controlled grazing management, surface run-off and erosion in the areas will be mitigated,
- Improvement in carrying capacity of the grazing areas, and
- Animals can be put in grazing areas for longer periods than at present, which will result in improved productivity of them.

The components of the scheme are as follows;

### Scope and Components of Grazing Area Development Scheme

Scope	Establishment of fully fenced pilot grazing areas of some 860 ha	
Components	Fencing	29 km
	No. of paddocks fenced	5 paddocks

The anticipated tangible benefits of the scheme are approximated as below.

### Anticipated Benefits of Grazing Area Development Scheme

Anticipated Benefits	Approximation
Labour Saving in Herding Livestock	Labour saving: 4hrs/herd/day; 1 herd/20 ha
	- 4 hrs/herd/day x 365days x Z\$19.25/4hrs=Z\$7,026
	- Z\$7,026/herd/year x 43 herds = Z\$302,118/year
Surface Soil Conservation	Z\$240/ha/year x 860 ha = Z\$206,400/year

The locations of the proposed water troughs are shown in Fig. 1

#### 2.2.3 Livestock Water Development Scheme

The limited availability of water sources for livestock in the grazing areas in the target villages is one of the most serious constraints restricting the efficient utilisation of range resources. The scheme aims to construct a water trough for livestock to ensure water in the proposed fourth grazing paddock of the grazing area development scheme of the Hlamba, Magonyo and Murandu Villages and to build a trough for the grazing areas of Sekema village. The provision of water for livestock in rangelands will enable efficient use of grazing resources and result in labour savings for watering/herding animals, and also allow animals to extend the length of their grazing in an area. Especially in the dry season, this will have great advantage of enabling farmers to continue to use grazing areas otherwise inaccessible due to shortage of water.

The scope and components of the scheme are as follows;

### Scope and Components of Livestock Water Development Scheme

Scope	Construction of 2 water trough with water supply pipelines	
Components	Water trough (3 m <sup>3</sup> )	Brick made with cement lining
		1 unit for 3 villages
		1 unit for Sekema village

The anticipated benefit of the scheme is approximated as shown below.

### Anticipated Benefit of Livestock Water Development Scheme

Anticipated Benefits	Approximation
Labour Saving in Watering/Herding Livestock	Saving 20 labour-days/year/household Beneficiary/water trough: 40 households - 20 days/year x Z\$38.5/day x 80 households = Z\$ 61,600/trough/year

The locations of the proposed water troughs are shown in Fig. 1.

#### 2.2.4 Fishery Development Scheme

The scheme aims to introduce fish farming in the proposed Nyarupakwe Dam. The Dam will cover an area of approximately 47 ha when completely full; at its low level it is expected that the surface area will be about 10 ha. Within these extreme changes of surface area, there will be widely fluctuating potentials for fish populations. Thus, for calculation purposes, an average seasonal water area of 20 ha is assumed.

The scope and components of the scheme are as follows;

#### Scope and Components of Fishery Development Scheme

Scope	Establishment of fish farming in the Nyarupakwe Dam	
Components	Water surface for fish farming	20 ha
	Fish species	Bream
	Induction of fish fingerings	20 kg/ha; 400 kg/20 ha
	Fishing boat & net	1 set

The anticipated benefit of the scheme is approximated as follows;

#### Anticipated Benefit of Fishery Development Scheme

Anticipated Benefits	Approximation
Fish Production	Production: 3,500 kg/year - 3,500 kg /year x Z\$60/kg =Z\$210,000/year

The fishing operation in the Dam will be done by a fishing group who would use nets for catch, however, fish resources in the Dam will be kept open also for the Pilot Area communities as a recreational facility using a rod and line.

#### 2.2.5 Estimated Costs

The implementation of the livestock development plan is to be implemented consistently with the implementation schedules of irrigation works. The estimated cost for the grazing area development scheme is Z\$ 580 thousand. The same for the livestock water development and the fishery development scheme is respectively Z\$ 40 and 55 thousand. The overall costs for the livestock



development plan are estimated at Z\$ 675 thousand as shown below.

**Estimated Costs for Livestock Development Plan**

Scheme Components	Volume of Works	Unit Rate (Z\$)	Amount (Z\$ 1,000)
<b>1. Grazing Area Development Pilot Scheme</b>			
- Fencing Grazing Areas (890ha)	29 km	20,000	<b>580</b>
<b>2. Livestock Water Development</b>			
- Water Troughs	2 units	20,000	<b>40</b>
<b>Scheme Cost</b>			
<b>3. Fishery Development Scheme</b>			
- Fish Fingerings	400 kg	50	20
- Fishing Boat & Net	1 set	35,000	35
<b>Scheme Cost</b>			<b>55</b>
<b>Estimated Costs for Livestock Development Plan</b>			<b>675</b>

## ***TABLES***



**Table 1: Livestock Population in the Study Area 1/**

District	Ward No.	Type of Settlement	Area (ha)	Grazing Land		Livestock Population (No.)				LU's 3/	Stocking Rate (ha/LU)	No. of Household	LU's per Household	Grazing Area per Household (ha)
				(ha)	(ha)	Cattle	Goat	Donkey	Sheep					
Kadoma	K 17	R	92,637	86,000	8,379	3,880	536	303	5,767	14.9	1,437	4.0	59.8	
	K 20	C	6,557	3,148	1,847	3,844	102	46	1,558	2.0	1,525	1.0	2.1	
	K 21	C	6,173	2,963	2,262	2,783	52	158	1,683	1.8	791	2.1	3.7	
	K 22	C	8,589	4,123	2,370	1,310	16	25	1,565	2.6	798	2.0	5.2	
	K 23	C	10,123	4,859	3,226	2,472	60	102	2,229	2.2	1,868	1.2	2.6	
	K 24	C	13,458	6,460	2,630	2,557	99	94	1,903	3.4	1,368	1.4	4.7	
	Sub-total 4/		137,537	107,553	20,714	16,846	865	728	14,705	7.3	7,787	1.9	13.8	
	Sub-total 5/		44,900	21,553	12,335	12,966	329	425	8,938	2.4	6,350	1.4	3.4	
Gokwe North	GN 11	C	13,452	8,871	3,589	1,350	130	80	2,374	3.7	2,117	1.1	4.2	
	GN 12	C	16,186	9,200	3,381	6,015	132	330	2,742	3.4	1,528	1.8	6.0	
	Sub-total		29,638	18,071	6,970	7,365	262	410	5,116	3.5	3,645	1.4	5.0	
Gokwe South	GS 23	C	51,694	29,052	6,982	3,636	210	202	4,699	6.2	2,336	2.0	12.4	
	GS 24	C	21,266	11,951	6,439	1,194	142	138	4,082	2.9	1,949	2.1	6.1	
	Sub-total		72,960	41,003	13,421	4,830	352	340	8,781	4.7	4,285	2.0	9.6	
	Total 6/		240,135	166,627	41,105	29,041	1,479	1,478	28,602	5.8	15,717	1.8	10.6	
	Total 7/		147,498	80,627	32,726	25,161	943	1,175	22,835	3.5	14,280	1.6	5.6	

Source: AGRITEX

1/: Livestock population in the 10 project related wards

4/: Livestock population in the 6 project related wards in Kadoma district

5/: Livestock population in the 5 project related communal wards in Kadoma district, excluding a resettlement area ward of K 17

6/: Total livestock population in the 10 project related wards

7/: Total livestock population in the 9 project related communal wards in the Study Area, excluding a resettlement area ward of K 17

3/: R = resettlement area; C = communal area

2/: LU's = Livestock Units

**Table 2 Grassveld Types of the Study Area**

<i>Heteropogon - Other Species Grassveld</i>
<p>Heteropogon-other species grassveld is characterised by the presence of the grass <i>Heteropogon contortus</i> (spear grass, tsine) and occurs at medium altitudes (approximately 750 to 1200 m). Broadly it reaches maximum development in the 500 to 650 mm rainfall zone. Mean annual temperature ranges from 20 to 24°C. It merges somewhat imperceptibly into <i>Hyparrhenia</i> grassveld at the top end and into either <i>Aristida</i>-other species or <i>Eragrostis</i>-other species grassveld at the bottom end.</p> <p>It is associated with a woodland which is characterised by different genera of trees. In some parts <i>Brachystegia boehmii</i> (Prince of Wales feathers, mufuti, mufuti) is the dominant tree and in others where conditions are warmer and drier <i>Terminalia sericea</i> (mangwe) or species of <i>Combretum</i> or <i>Acacia</i> (thorn tree, muungu) might be dominant. Where the woodland is dense the grass cover is sparse, whilst where the woodland is sparse, the grass cover can be quite dense.</p> <p>On granite sands, associate grass species include <i>Pogonarthria squarrosa</i>, <i>Stereochlaena cameronii</i>, <i>Eragrostis chapelieri</i>, <i>E.gummiflua</i>, <i>E.superba</i>, <i>Schizachyrium semiberbe</i>, <i>Trachypogon spicatus</i>, <i>Andropogon schirensis</i> and <i>Trichoneura grandiglumis</i>. On the heavy fertile red clay soils, <i>Themeda triandra</i> may become a co-dominant and <i>Cymbopogon plurinodis</i> may sometimes be associated especially with <i>Acacia</i> woodland or thornveld which consists largely of <i>Acacia karroo</i>, <i>A. benthamii</i> and <i>A.rehmanniana</i> and contains the grasses <i>Eragrostis jeffreysii</i> and <i>Bothriochloa insculpta</i> (pinhole grass).</p> <p>In granite vlei (seasonally wet run-on areas, dambos) areas that do not become too wet, <i>Hyparrhenia</i> spp. often predominate, whereas in wet vleis <i>Loudetia simplex</i> becomes the dominant species. On drier margin areas the grasses <i>Schizachyrium semiberbe</i> and <i>Tristachya rehmanni</i> may become common.</p> <p>Under heavy grazing conditions, on granite sands <i>Eragrostis rigidior</i> (curly leaved lovegrass) replaces <i>Heteropogon contortus</i> and on light sands derived from sandstones a perennial <i>Aristida</i> sp. takes over.</p> <p>Typically this veld type can be described as a mixed veld with more of the sour grass species than sweet ones. (Note: sour species are species which lose palatability as the growing season progresses and which are unable to carry livestock through the dry season without much loss in bodymass, whereas sweet species tend to retain their palatability and livestock are able to maintain and sometimes even gain bodymass slightly during the dry season.)</p> <p>Potential grazing capacity of this veld type is 1 LU:5 to 7 ha (where 1 LU is a livestock unit equivalent to a beast of bodymass 500 kg).</p> <p>Whilst this grassveld type can withstand a certain amount of heavy grazing (four or so years on granite sands but maybe only two years or so on heavy red soils), it will break down, lose perennial plants and deteriorate in condition under prolonged heavy grazing, especially on the red soils. Recovery can take many years on the red soils whilst is relatively quicker on the sandy soils before the perennial species again become dominant.</p> <p>Typical ("increaser") species predominant in <i>Heteropogon</i>-grassveld in poor condition include <i>Cymbopogon plurinodis</i>, <i>Bothriochloa insculpta</i>, <i>Eragrostis rigidior</i>, <i>Aristida</i> spp and various annuals.</p>
<i>Sodic Grassveld</i>
<p>Much of the area observed was in poor condition with capped soils on which there was little grass growing, especially under the areas whether there were sodic soils. Species usually associated with these areas include <i>Sporobolus ioclados</i>, especially in areas in better condition and the typical increaser species including <i>Chloris virgata</i>, <i>Dactyloctenium aegyptium</i> and other annuals in areas of poorer condition.</p> <p>The potential grazing capacity of this very sensitive grassveld type is probably of the order of 1 LU:14-20 ha, except that the mopane leaves when they fall offer valuable feed for livestock to eat and which will reduce this figure slightly.</p>

**Table 3 Estimated Livestock Population and Holding Size in the Pilot Project Area 1/, 2/**

Items	Jeffrey, Mateuro, Gunde,										Pilot Project Area
	Hlamba	Magonyo	Murandu	Sekema	Makarichi	Muchina	Marumbe & Mahvondo	Komboni & Mujubeki	Mabarani	Mabarani	
No. of Household	32	71	75	55	179	232	215	184			1,043
<b>Average Holdings per Household</b>											
- Cattle	9.3	3.4	3.5	3	3	7	5	4			4.6
- Goat	6.1	0.9	0.6	7	7	3	4	3			3.8
- Pig	1.1										-
- Donkey		0.1									-
<b>Total Holdings per Household</b>	16.5	4.4	4.1								8.4
LU's per Household	2.4	1.7	1.7	2.1	2.1	3.7	2.8	2.2			2.6
<b>Total Holdings in Village</b>											
- Cattle	140	227	247	165	537	1,624	1,075	736			4,751
- Goat	92	59	42	385	1,253	696	860	552			3,939
- Pig	17										
- Donkey		5									
<b>Total Holdings in Village</b>	249	291	289	550	1,790	2,320	1,935	1,288			8,712
LU's in Village	77.4	119.7	127.4	115.5	375.9	858.4	602.0	404.8			2,681

1/: Data on Hlamba, Magonyo & Murandu villages based on the livestock inventory survey by the JICA Study Team

2/: Data on other villages approximated by: No. of households x average holding size of livestock per household = total holding size in village

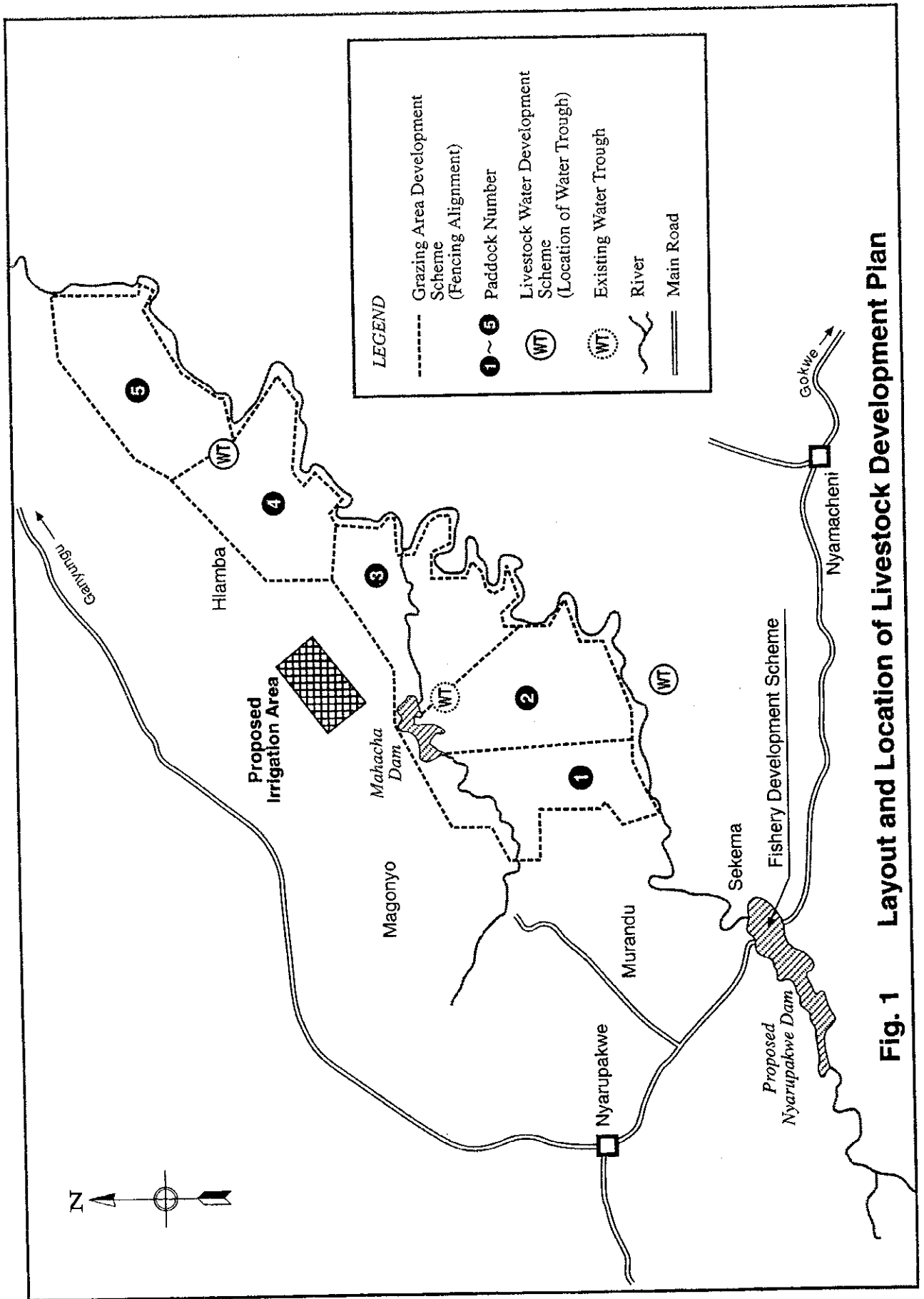
Source: the livestock inventory survey & the socio-economic environment survey by the JICA Study Team

**Table 4 Villagers' Perceived Livestock Development Needs**

Priority	Development Option	Villagers' Comments
High	Water Development	Water development is important for primary and secondary use in this semi-arid area.
	Grazing Area Development	Grazing schemes should be fenced in communal grazing area; important for improving grazing, crop protection, releasing labour for field work (relief from herding duties), providing animals for fattening schemes; important to find out more about veld rehabilitation and improvement; need a dam and means to reticulate water.
	Beef Fattening	For beef fattening, it is important to use home grown feed (grains and stovers) as there is an advantage in terms of cost compared to bought feed; should be done as a group so as to qualify for "free" transport to market (i.e. sell/transport more than 15 head each time as a group); probably fatten off veld rather than in pens, but both systems possible; would need credit for concentrate feed to mix with locally produced feed.
	Goat Fattening	Goat fattening is important as goats are relatively easy and cheap to keep, and would fatten especially male kids; fattening flock should be properly herded and housed or penned on a joint group basis; marketing needs to be developed; need male Boer goat to produce larger kids for fattening.
	Poultry Development (Broiler)	Mainly hybrid broilers; important to consider needs of women and youths; useful in providing food during harvest periods (in suitable quantities for feeding hired help) and in post-harvest periods (when people have a little money in their pockets); would need runs, feeding & watering trays, water and initial credit to buy stock (chicks) and concentrate to mix with home grown feed.
	Draft Power Improvement	Draft animal feeding is important and should be based on use of improved paddocking in grazing areas and crop residues and feeds; possible to develop fodder crops below Mahacha Dam, but would need information; would need fencing for grazing scheme.
Medium	Dairy Development	Dairy development is important as there is a general shortage of nutritious fresh milk in the area; could be done by first contributing to Gokwe Dairy Center, and, when electricity becomes available (scheduled for August 2000, but more likely to be in a few years time), then set up a local collection and processing point; would need credit to buy livestock and concentrate feed to mix with locally produced feed.
	Poultry Development (Layer)	Eggs should be produced mainly from hybrid layers; important to consider needs of women and youths.
	Pigs Development	Pigs are important as there is an unsatiated demand in the area; has the advantage of using cheaper home grown feeds (grains) and adding value; would need sties and credit to obtain stock and buy feed; consider both local and town markets.
	Fodder Development	Fodder development is unknown, but it is important to find out more as knowledge is limited; important to keep animals better; may be a high priority development if enough information is available.

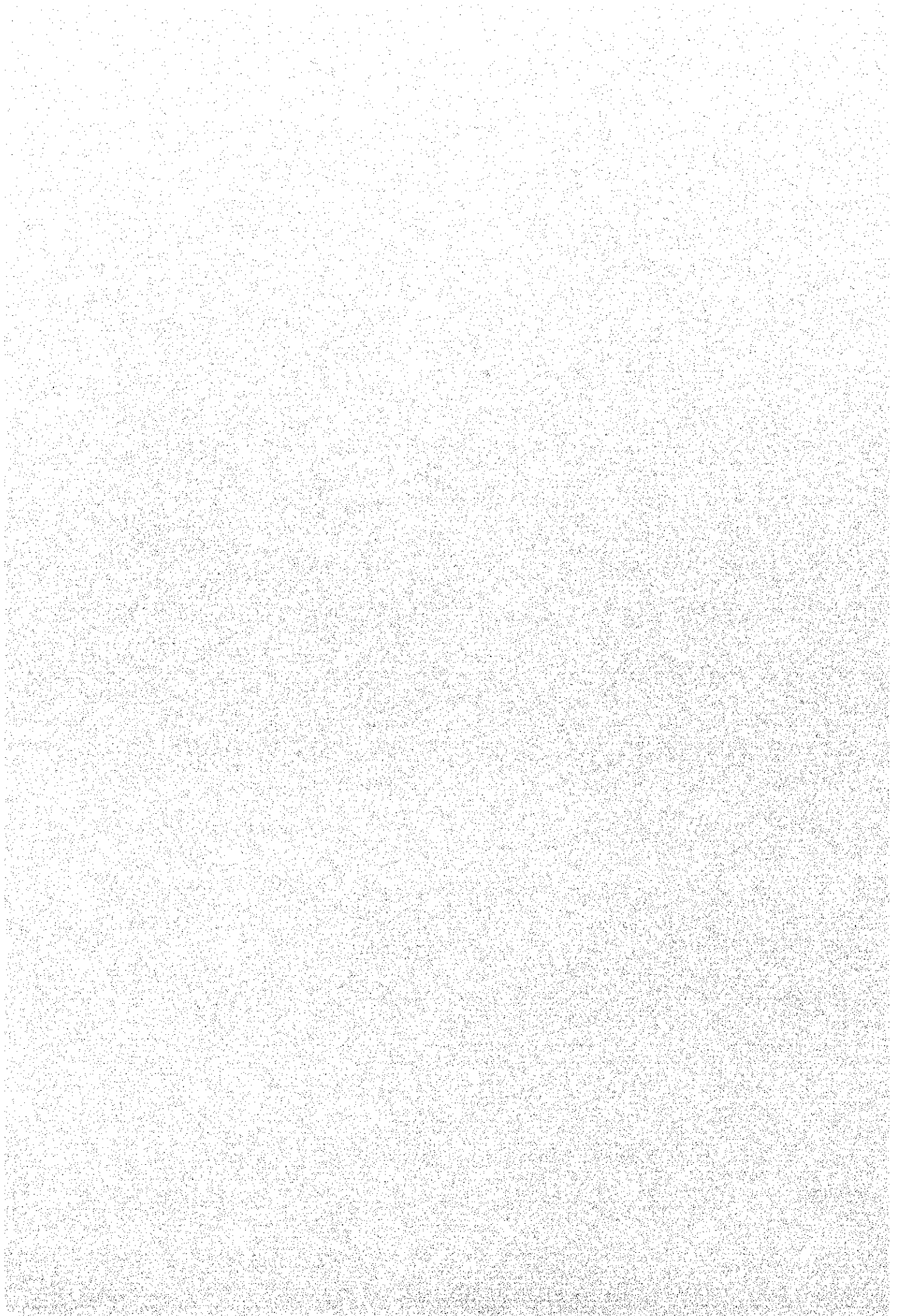
## ***FIGURES***





**Fig. 1** Layout and Location of Livestock Development Plan

**APPENDIX – V**  
**AGRO-ECONOMY AND MARKETING**



## APPENDIX – V

### AGRO-ECONOMY AND MARKETING

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## 1. Economy of the Project Area

The project area is located north-west of the town of Kadoma and consists of four districts, namely Kadoma in Mashonaland West province, Gokwe South, Gokwe North and Kwekwe districts in Midlands province. There are 12 wards under these four districts, six in Kadoma district and two each in the other three districts. Eleven wards are in communal areas and one in resettlement area.

Kadoma is the major urban center. Gokwe, Sanyati and Nembudziya are also important as they are surrounded by agricultural hinterlands. In addition to agricultural activity for input supply, output purchases and processing, the project area also has industry and manufacturing activity based on agriculture. A cotton ginnery producing lint, a spinning factory producing yarn and a textile factory for weaving, bleaching and dyeing of textiles operate in the area. An additional spinning and weaving mill is nearing completion. A flourmill has also started operations with a capacity of 2,700 tons a month. Several small hammer mills for maize grinding are scattered throughout the project area and cater to the needs of the subsistence farmers. The project area also has a brewery and a dairy products factory, mainly producing cheese and yogurt.

To support and service these economic activities, the project area is well served with a network of roads providing Kadoma with a link with the surrounding areas and with the rest of the country. Kadoma is also the converging point for link roads from Sanyati and Chakari. The main railway from Harare to Bulawayo also passes through Kadoma and more than 30 industrial units have direct access to railway service from Kadoma. Service activities include financial institutions such as banks, building societies and moneylenders. There are also cotton and grain collection points, grain bag depots and cattle sales points. The town of Kadoma also houses a District Hospital and nine primary schools and four secondary schools. As cotton is the most important crop in the area, cotton manufacturing is the largest employment sector accounting for about a third of the formal workforce of the town of Kadoma.

## 2. The Marketing System for Agricultural Products

### 2.1 General

Until recently, Zimbabwe operated a highly controlled marketing system with pricing, external trade and agro-processing activities regulated and monopolized by government through four marketing boards. These operations covered maize, wheat, small grains, groundnuts soybeans, edible beans, rice and coffee by the Grain Marketing Board (GMB), cotton by the Cotton Marketing Board (CMB), milk by the Dairy Marketing Board (DMB) and cattle and meat by the Cold Storage Commission (CSC). The expansion of this system in the 1980's to the smallholder sector led to an increase in the marketed output of cotton and maize. But such expansion also

contributed to financial losses of the boards and inhibited the development of a private sector market for field crops and livestock products.

These boards purchase produce from farmers at government determined producer prices. Produce was then stored, processed, transported and distributed to consumers in urban areas and were also responsible for export and import of major crops. This system was gradually dismantled in the early 1990's.

## 2.2 Recent Developments

Until 1991, the agricultural marketing system for agricultural and livestock products was under an extensive degree of government controls. These controls covered pricing, external trade and agro-processing activities. Many of the regulatory mechanisms were put in place during the pre-Independence era in order to protect the interest of large-scale commercial farmers. The goal of the system was also to achieve self-sufficiency in foodstuffs and raw materials; and to provide food at reasonable prices to the consumer. After Independence, the major policy goal was to extend marketing services to the small holder through construction of depots and collection points within communal areas. The existing array of regulations and controls was taken further with floor prices for most crops, compulsory delivery of specified crops to marketing boards, controlled consumer prices for staples and restrictions on imports and exports. Only for tobacco, horticultural crops and some minor agricultural products were producers, traders, processors and consumers free of government price setting and trade controls.

Beginning 1991, the government introduced a series of far reaching reforms that were to drastically change the structure of marketing as well as the policy environment under which agricultural marketing would be carried out. The major changes were as follows:

- Conversion from a system of controlled producer and consumer prices to market-determined prices for all formerly controlled products;
- Deregulation of statutory marketing controls and competition between marketing boards and private traders;
- Opening of export and import trade to private traders. However, trade in maize and wheat is being monitored by the Ministry of Lands and Agriculture for food security reasons; and
- Restructuring of marketing boards with a view to commercialization with the Cotton Marketing Board, the Dairy Marketing Board and the Cold Storage Commission now being registered companies and the Grain Marketing Board commercializing its activities.

### 2.3 The Evolving Market

Agricultural marketing has, and is continuing to undergo rapid changes since market liberalization. In the market now are private traders, millers, agricultural processors such as dairy food makers, millers, brewers, stock feed manufacturers, traders and middlemen and the Zimbabwe Commodity Exchange (ZIMACE). The Grain Marketing Board (GMB) is still a major operator in the market and so are the commercialized companies such as the Cotton Company (COTCO), Dairiboard and CSC. For most commodities, prices are market determined, free of regulation and control. In addition, a few cooperatives and some non-governmental organizations also engage in limited marketing activities, the latter through involvement in micro development projects in localized areas. Of greater significance is the increasing importance of contract farming, especially for specialized high value crops destined largely for the export market and for agro-processors.

### 2.4 Marketing of Field Crops

The GMB is a major actor in the market and buys maize, wheat, sunflower, groundnuts, soybeans and small grains from the farmer. The GMB has a 50,000-ton capacity silo at Chegutu that is about 40 kms from the project area and also has bag depots in Kadoma, Sanyati, Gokwe and Nembudziya. The GMB had a policy of setting up a depot every 30 kms. However, with commercialization, this policy is not likely to be pursued. Further, because of its commercial orientation and excess stock capacity, the GMB has been actively pursuing as part of its core business, the provision of storage rental services to the private sector.

Maize imports and exports continue to be the monopoly of the GMB to assist it in maintaining and managing the strategic food stocks on behalf of the government. In view of this role, it also imports maize and wheat when required and is authorized to issue permits to any other interested importer or exporter. Wheat is a major winter cereal and like other grains, wheat, bread and flour prices have been de-controlled and consumer subsidies and the allocation system removed. The market for wheat and small grains is now deregulated and prices received by producers are now market determined. However, recent end-season localized and intermittent shortages of maize meal have made government to intervene in setting prices.

Cotton marketing was decontrolled in 1994 and the private company, COTCO now competes in the market with processors and traders and this has had a positive impact on cotton producers. COTCO now operates collection centers in all cotton producing areas and has depots in the project area in Kadoma, Sanyati and Gokwe. COTCO has collection points in Veri, Bubugwani, Namacheni and Ganyungu. Cargill also buys direct from buyers and operates from the Sanyati Growth Point. A significant development is that COTCO is now operating a credit scheme for registered cotton growers and the scheme is widespread with over one half of smallholder cotton growers benefiting from this credit facility.



## 2.5 Agricultural Trade

Zimbabwe is a major exporter of agricultural products. The main items of export are tobacco, cotton lint, and sugar. In addition, there is a large range of less important agricultural products that are regularly exported such as meat products, maize, coffee, tea, hides, barley and more recently horticultural products which include cut flowers, fruits and vegetables. With the exception of maize and some cotton, most of the exported commodities are produced on the large-scale commercial farms. In the case of cotton and tobacco in the light of the small population, almost the entire production is exported. In recent years, agricultural exports have accounted for between 40 to 50 % of total merchandise exports. In

1997, tobacco exports alone accounted for 25% of total merchandise exports. Maize exports are regarded as a residual and exports takes place only if it is surplus to domestic requirements. Meat exports to the EC are still the monopoly of the CSC, while private exporters undertake exports to non-EC countries.

Zimbabwe is basically self sufficient in food, except when the rains fail as it happened in 1992 when over 2 million tones of maize was imported. Some wheat is imported and is likely to increase in view of the rapid increase in domestic consumption for wheat based products. Some rice is also imported, but the quantity is still small.

## 2.6 Storage

Until now, GMB has been the primary storage agency for grains, as the pricing and procurement system did not provide any financial incentives for millers, processors or traders to hold stocks. GMB maintains a network of depots (12 with silo storage and over 75 bag depots and several collection centers throughout the country) and is the main agency for the country's grain storage system. A few cooperatives and the ZFU have limited storage capacity, but these were mainly input warehouses. At the farm level, there are the traditional 'duras' but because there are no financial incentives to hold stocks on farm, these duras are used only for subsistence needs. In addition, most duras are poorly constructed and lack adequate ventilation.

## 2.7 Grading

The classification and grading system for agricultural produce is well established in Zimbabwe and is frequently reviewed and updated. The grading system was established mainly to cater to the needs of the exporters and the export market. For grains, the grading system is in place for maize, sorghum, soybeans, and wheat as well as for groundnuts. For maize, the grading system applies to both white and yellow maize. The characteristics included in the grading are moisture content, test density, extraneous matter, chipped and defective grain and the grades are divided into four classes. The same holds for sorghum, soybeans and wheat. The beef grading system has been revised in 1998 and the carcass grades are Super, Choice,

Commercial, Economy and Manufacturing. Beef grading is based on age of animal; fat content; carcass conformation and the producer can appeal against grading by the grader, if he considers that the grading is not appropriate.

## 2.8 Livestock Marketing

Livestock marketing is through a network of cattle and sales pens that are located in all cattle producing areas. Dates are announced for sale days and sellers and buyers meet and transact business. Major cattle traders, particularly the CSC and other meat traders and butchers attend these sales. In rural areas, the cattle sales are located near dip tanks.

Domestic beef marketing has been decontrolled and private butchers without restriction market beef, provided the slaughter conforms to stipulated hygiene standards and regulations. However, for trade, exports to the EU are solely by the CSC although private traders are permitted to export to other countries provided they conform to export health regulations. Milk trading was decontrolled and regulations now permit traders and processors to export dairy products. Milk processors now purchase milk directly from producers and marketing is primarily by processors in both domestic and export markets.

## 2.9 Marketing through Contract Farming

A significant development in agricultural marketing over the past decade is the dramatic increase in contract farming, especially in high value crops such as horticultural products destined for export. Exporters and processors enter into contracts with farmers (mainly on irrigated land) where contracts specify the crop to be grown, price and the quantity to be delivered. For horticulture, companies such as Hy-veld, Selbys, Cairns, Hortico, Canpac, and Olivine (to name a few) cover a range of high value commodities. These include paprika, baby corn, passion fruit, sugar snap peas, tomatoes and other fruits and vegetables. In addition, processors such as Natbrew, Chibuku Breweries, TA holdings, Trinidad and Agricultural Services (to name a few) cover some field crops. There are many advantages of contract farming for the project area and project farmers as follows: (a) farmer incomes could be maximised through increased cropping intensity and cultivation of high value crops; (b) the farmer's production and market risks could be minimised; (c) it is in the national economic interest to farm high value crops on irrigated lands; ensuring a return to the country on the investment; (d) in view of the proximity of the proposed project to major air and road transport facilities to link export markets, the project location is ideally suited for promoting the cultivation of high value crops for export destinations; and (e) contract farming offers credit facilities as well as technical advice to the farmers and assured collection of produce which obviates the need for public sector services in this regard.

### 3. Marketing of Farm Inputs

#### 3.1 General

The private sector's involvement in input supply and distribution has been more widespread than in output marketing. This is largely because of the existence of a sophisticated input supply industry whose major market was and currently is the large scale commercial farming sector. There is a wide range of operators in the market for the supply and distribution of agricultural inputs. These include the fertilizer, seed and agro-chemical companies, marketing and stock feed processing companies, cooperatives, private traders, shopkeepers and NGOs and Government.

#### 3.2 Fertilizers

There are a number of fertilizer manufacturing and importing companies in Zimbabwe, of which the two largest are Zimbabwe Fertilizer Corporation and Windmill. Controls and regulations on price, foreign exchange and investment in the fertilizer and agro-chemicals industry have been lifted or relaxed since 1992. The Fertilizer industry produces a range of 13 compounds (NPK) and single nutrient fertilizers. The ratios of the compounds are based on the recommendation of the Fertilizer Advisory Committee. All compounds are formulated using locally produced ammonium nitrate as the principal source of nitrogen and locally produced single and triple super phosphates as the source of phosphate. Imported muriate and sulphate of potash supply the potash. The fertilizer industry is relatively small and present plants are in need of refurbishing in order to increase production, cut unit costs and be competitive with imports. The industry is engaged in low analysis products that result in increasing handling and transportation costs.

The fertilizer manufacturing and importing companies have a network of distributors and agents and also have sales depots. Traders act as distributors and agents and make fertilizers available to farmers. A feature of the fertilizer supply situation in recent years is the very sharp increase in fertilizer prices across all compounds and main types of fertilizer which has impacted adversely on farmers production costs. Fertilizer prices for the period 1996-1999 are given below:

**Fertilizer Prices 1996-1999 (Per Tonne, Ex-Harare. Z\$/tonne)**

Compound	1996	1997	January 1998	June 1998	January 1999
Ammon. Nitrate	1970	2490	2490	3495	4710
Compound D (8:14:7)	1604	2125	2310	3240	4380
Compound .C (6:7:15)	2315	3075	3325	4690	6630
Compound .K(7:13:2)	1820	2290	3015	4190	6120
Compound.L (5:8:10)	1990	2480	2690	3800	5165
Compound.M(12:12:12)	2220	2170	2785	3870	5900
Single SP	1200	1510	1725	2490	3910
Triple SP	-	-	4090	5970	7850
Gypsum	360	540	585	820	1150

Source: Commercial Farmers Union

### 3.3 Seeds

The seed industry, led by Seed Co-op has changed considerably in the last decade and private research and breeding has expanded considerably. There are now seven Seed Companies, which undertake seed production and marketing. The area planted with improved seed has increased over the years. Maize is the only crop, where almost the entire area is planted with improved seeds. On the other hand, the area planted with improved seed for groundnuts, sunflower and sorghum is very low. The area planted with improved seed by crop is given in the following table.

**Improved Seed Use by Commodity (%)**

Crop	Improved Seed	Traditional Seed
Maize	99	1
Groundnuts	3	97
Soybean	51	49
Sorghum	26	74
Sunflower	14	86
Mhunga	5	95

Seed prices, like fertilizer, have shown some sharp price increases in recent years as is seen in the following table.

**Seed Prices**

		(Z\$per kilogram)						
Crop	Variety	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Wheat	All	1.32	2.12	3.01	3.58	5.81	-	-
	Long	5.81	5.81	6.31	8.41		12.41	18.12
Maize	Short	2.53	3.21	3.81	4.96	6.31	8.01	11.21
Cotton	All	2.31	3.41	3.51	7.11	8.85	9.01	11.88
Ground Nut	Certified	5.51	8.01	7.01	8.01	13.02	13.21	20.01
Soybean	All	2.22	3.12	4.11	4.61	5.81	-	11.34
Sunflower	Hybrid	6.01	8.01	8.01	15.01	22.88	31.21	44.24
Sorghum	DC75	2.11	4.32	5.52	6.01	7.81	9.81	14.01
Sorghum	Sv2	1.55	2.61	3.12	3.21	4.41	5.61	7.41

Source: CCZ, Seed Co-op

### 3.4 Agro-chemicals

The agro-chemical companies include Bayer, Zimbabwe Fertilizer Co., Windmill, Coopers and Sprayequip. These firms cater to the needs of the farming community in the provision of crop chemicals and animal health products. The crop chemicals include pesticides, insecticides, herbicides, fungicides, bactericides, nematocides and plant growth regulators. Those in the livestock sector include drugs, anthelmintics and acaricides. By far the largest user of pesticides is tobacco and cotton, which together consume 58% of the total pesticides, followed by maize. The marketing channels for distribution of improved seed and agro-chemicals are the same as that for fertilizers.

**Utilization of Crop Chemicals**

Crop	Percentage (%)
Tobacco	29
Maize	14
Cotton	29
Wheat & Barley	3
Oilseeds	6
Sugar Cane	1
Coffee	9
Other including Horticulture	9
<b>Total</b>	<b>100</b>

**3.5 Input Distribution**

There are three major distribution agencies to supply seeds, fertilizer and crop chemicals to farmers namely : (a) Private traders who number around 100 who obtain fertilizer and seeds from the wholesaler or manufacturer and sell in the rural market. Private traders account for about 35 % of sales in the rural areas. There are about 10 large firms within this group who operate at the wholesale level and have about 150-200 retail dealers. (b) Direct sale by manufacturers of fertilizers, seeds and agro-chemicals are by far the most important mode of marketing and account for over one half of all sales. All the requirements of the large scale-farming sector are met by this system. Many of these have established depots or stock points at the major towns and delivery is made from these stock points. (c) cooperatives, which were big in the past but these now play a less important role and their numbers have dwindled and there are only six operating currently, primarily in urban markets. They currently account for only about 1% of the market share for input sales.

**Fertilizer Distribution Agencies and Market Share (%)**

Agency	1985	1990	1993	1995
Manufacturers	15	43	52	50
Traders	12	29	30	35
Cooperatives	52	15	04	01
AFC Small Lending	21	13	08	09
AFC Large Lending	-	-	06	05

In addition to the above, there are several marketing companies such as the Cotton Company of Zimbabwe (COTCO), Grain Marketing Board (GMB), COTPRO, CSC and Trinidad Industries, which supply farmers with inputs under various credit schemes.

In the project area inputs are mainly obtained from dealers and traders. Sanyati Growth Point is an important centre for purchase of inputs and major suppliers such as Harry's, COTCO, Telstone Trading, Red Star Wholesalers, Farm and City Centre operate from this point. . In addition, farmers who are organised into groups can also buy direct from the companies and sales representatives of Cargill, Windmill, Cotpro, Pannar and Seedco who operate in the project area.

A rapidly growing source of input supplies to farmers, especially farmers on irrigated

lands are through companies taking advantage of contract farming through out grower schemes. Companies such as Hortico, Selbys, Zimfreeze, Canpak, provide smallholder farmers with inputs under outgrower contract arrangements. In addition, several stockfeed companies such as Agrifoods and National Foods are also suppliers of inputs, mainly as poultry and cattle feeds. Finally, there are several non-government organizations involved in small development projects where inputs are provided as part of the development effort. Often such micro projects are also engaged in imparting technical skills, extension and training in agricultural pursuits.

As a general rule the distribution network for inputs is established and works efficiently for the majority of large farmers. However, there are a few problems most of which have a more than proportionate adverse impact on the small or communal farmer. Safeguards to ensure quality control is not always adequate so that there is a likelihood of sub-standard material, especially, poor quality seeds getting to farmers. In addition, due to distance to remote areas, costs are excessive especially for communal farmers. Another problem is that there is often a lack of timeliness in delivery and this could have detrimental effects on crop productivity and returns. It has also been observed that there are limited delivery points in communal areas and lack of credit facilities to obtain inputs.

#### 4. Agro-Processing

Agro-processing activities in the project area are entirely a private sector activity. Being a predominantly agricultural area economic activity is agro-based; and forward linkages with cotton processing are by far the most important. There is a textile factory that does weaving, bleaching and dyeing, a spinning factory producing yarn and a cotton ginnery producing yarn. There are also plans to set up another large textile operation in the Kwekwe area. Next in importance is the large number of hammer and small scale milling operations that are scattered throughout the study area. These are located in every remote village and cater to the farmer household for maize milling for a small fee.

Other agro-processing activities in the study area are about ten seed cake processors, oil expellers for crushing sunflower seed and stockfeed processors, mainly for poultry feed. Among the larger but isolated single operations are a milk processing factory, mainly for cheese production which is owned by the Dairibord and a brewery. Cotton based activity is by far the most important in the project area and accounts for 35% of formal employment of the population of the municipality of Kadoma. There is a tomato processing factory about 40 kms. from the project area and is dependant on outgrower supplies of tomatoes from contract growers for its operations.. This factory has underutilized capacity and offers the potential for expansion of its outgrower activities to the project area on project completion.

5. Agricultural Credit

Financial institutions in Zimbabwe have provided credit to the agricultural sector for over 30 years, although informal credit is also widely prevalent, especially in the communal areas. The informal sector includes private moneylenders, traders, shopkeepers, relatives and friends. The formal sector includes the Agribank (formerly Agricultural Finance Corporation), five commercial banks with branches throughout the country, the Cotton Company of Zimbabwe (COTCO), the largest provider of formal credit to farmers in the project area, the Cold Storage Commission (CSC), a few Cooperatives whose role in credit has diminished over the past decade, a few NGO's and companies engaged in contract farming. These latter companies are becoming increasingly important in recent years.

All financial institutions concentrate on the more profitable large-scale commercial agricultural sector. Small farmers as a rule have met their agricultural financing needs from their own resources. In fact, a survey of the project area carried out in December 1998 revealed that 65% of farmers did not or could not obtain credit in the 1997/98 cropping season. This is consistent with the pattern in communal areas throughout the country where only some 5% received any loan credit from the formal sector. Most of these farmers are ineligible because of a lack of collateral; could not provide a guarantor or due to recent past default on a loan. Agribank's lending is somewhat restricted in the project area as a result of internal reforms and its concentration on a greatly reduced clientele due to an emphasis on quality lending. Agribank had low recovery rates in the early to mid nineties, partly because of the droughts in 1992 and 1995, but also due to poor loan appraisal and loan administration. Small holders receiving loans from Agribank has declined from 100,000 in 1985 to 30,000 in 1998. Source of loans in the project area based on the survey is as follows:

Source of Loans

Source	Average Loan Size (\$)	% of Recipients
Agribank	3300	26.1
COTCO	5553	60.9
Cargill Co.	1935	4.3
Friends/Relatives	250	4.3
Cooperatives	5000	4.3

In the project area, Agribank lending in the last two years is rather limited. Information available for two branches namely, Sanyati and Muzvezve I indicate a total of 225 short term loans in 1997/98 with the average size of loan of Z\$ 8,800 and 184 short term loans in 1998/99 with average size of loan of Z\$ 10,360. Medium term loans are also very limited details of which appear below: Interest rates on the short term loans are high at 34% per annum in 1997/98 and 36.5% in 1998/99.

**Agribank Loan Distribution in Sanyati and Muzvezvei---1997-99**

Year	Loan Type	No of Beneficiaries	Total Loans (Z\$)
SANYATI 1997/98	Short term	30	242,962.00
	Medium term	11	330,000.00
1998/99	Short term	49	453,856.00
	Medium term	Nil	Nil
MUZVEZVE I 1997/98	Short term	195	1,734,588.00
	Medium Term	6	87,000.00
1998/99	Short term	135	1,452,534.00
	Medium term	2	97,432.00
Interest Rates 1997/98	Short/Medium	34.0%	
1998/99	Short/medium	36.5%	

Agribank also offers credit to small holders through various schemes such as the Small Farm Credit Scheme, Resettlement Credit Scheme and the Group Lending Credit Scheme. The group lending scheme has been promoted as a means of reducing credit delivery costs through consolidation of multiple loan applications from small scale farmers and improving repayment performance through incorporation of peer pressure as group loans are subject to joint and several liability. Agribank provides training to groups in credit administration before a group is eligible to apply for loans and groups have to set up a savings account with a bank or building society as a condition of a loan. Group lending by Agribank has increased markedly since 1993 and now accounts for around half of the value of all loans to small holders.

The five commercial banks operating in Zimbabwe concentrate on the corporate business sector. In the rural areas, the commercial banks provide short term financing mainly to large-scale commercial farmers through overdraft facilities and to small businesses and enterprises. Lending to small farmers especially in communal areas is very restricted as farmers do not have title to property and therefore cannot meet the banks collateral requirements.

COTCO provides loans through the Input Credit Scheme to registered cotton growers in the large-scale commercial and smallholder sectors. For small holders, loans are provided to groups of registered cotton growers to enable purchase of seed, fertilizer, agricultural chemicals and spraying equipment. The scheme provides credit to about 30,000 farmers countrywide on an annual basis and is currently the most important source of credit to farmers in the project area. The interest rate is below the market rate and the initial capital was provided through a World Bank credit facility. The recovery rate is high as the loan is repaid as a deduction from the sale of the crop on delivery to COTCO. In competition with COTCO, COTPRO also operates a credit facility for cotton producers in the project area. Although not as widespread as the COTCO facility, many producers in the project area show a preference for COTPRO as a lender, mainly due to the frequent contacts and



technical advice provided.

The CSC operates a credit facility for both large and smallholder farmers for cattle production. The scheme is however, very limited in coverage and the bulk of the credit is for commercial farmers. Some savings and credit cooperatives also offer credit to its members, but reach only a limited number of farmers. The NGOs, which are currently engaged in localized development projects, often funded by overseas donor agencies, also provide production loans to farmers. But such facilities are more of a pilot nature and are very limited in coverage.

A recent and increasingly important source of credit for small farmers, especially in irrigated lands is the contract companies for out grower farmers. These companies also operate in the project area and provide farmers with contracts for delivery at pre-announced prices and the companies provide seeds, fertilizers and agricultural chemicals as part of the contract for delivery of produce to the company.

Major problems in the provision of agricultural credit is that the small farmer is largely excluded because lending policies are based on viability, proven past performance and the provision of collateral. There is also a lack of training and expertise in financial institution staff on financial management and a lack of a credit culture. The current credit structure in Zimbabwe is inappropriate to small farmer needs. Group lending has overcome some of these problems but has not yet become widespread.

In an overall sense, it is clear that credit available to farmers in the project area is inadequate. More farmers receiving credit for working capital could ensure higher yields and farm productivity. Farm survey data indicates that only 35 % of the farmers surveyed obtained cultivation loans. A credit facility from a non-budgetary source similar to the COTCO Input Credit Scheme (but applicable to all crops and livestock) could provide the necessary start up for such a credit facility. However, such a scheme needs to also tie up compulsory delivery of produce to a marketing agency as the provider of the loan. In addition, precise and clear guidelines are necessary for appraisal of loan applications.

## 6. Transport

Zimbabwe has a well-developed system of primary and secondary roads, which are also well maintained and serve the farming and agribusiness community. In addition, the railways are also heavily used to transport agricultural produce not only within Zimbabwe but also to export destinations. The road freighters charge for transport of grain from Harare to Durban of SA Rand 6800 per truckload (20 tonnes). However, the rail is also heavily used and is cheaper than road transport.

While the primary and secondary roads are well maintained, the tertiary road system is in a state of disrepair. Furthermore, these roads are often impassable during the rainy season. Most of the tertiary roads are in the smallholder sector and it is in this

sector that input agencies have less market outlets and collection points. This can act as a disincentive for farmers to improve farm productivity. There are also instances when processors show less interest in contracting with farmers in remote areas due to lack of a good transportation system that could enable easy and timely availability of inputs and timely purchase of produce. The project area is poorly served with a tertiary road network and a survey carried out in December 1998 revealed that a farmer has to transport his produce an average of 25 kilometers for delivery or sale and in the case of some farmers the distance is as much as 65 kilometers.

Some efforts have been made in recent years to develop the road network through the District Development Fund. Although the scheme has assisted in opening up remote areas, more needs to be done. Research undertaken in several similar countries has demonstrated a positive economic and financial return on investment in roads. This is mainly because of a positive supply response which results from increased use of inputs, and technical know how through input companies and extension staff and through a better market for produce. Research has also shown a positive economic return because of the improvement in social and economic indicators such as increased access to schools and health facilities and other social amenities. It has been demonstrated in rural India and Bangladesh that the primary and secondary impact (longer term) of investment in roads is greater than 2.0. In other words, a \$1.00 investment in roads is expected to result in value added of over \$2.00 in the longer term. Road transport charges for crops and inputs as well as cattle are in Table below:

#### Road Transportation Charges

Distance (Km)	(Z\$/tonne)*					
	1992	1993	1995	1996	1997	1998
25	30.82	35.38	46.81	46.81	63.73	70.10
50	40.04	54.78	72.48	72.48	98.68	108.55
60	44.54	60.82	80.46	80.46	109.54	120.50
70	48.23	68.29	90.34	90.34	122.99	135.29
80	52.48	73.19	97.76	97.76	133.10	146.41
90	55.75	81.14	107.34	107.34	146.14	160.75
100	58.62	86.08	113.88	113.88	155.04	170.55

\*For grains, cotton, tobacco and fertilizer (bagged)

Source: Leycotte Hauliers

#### Road Transportation Charges

No. of Head	(Z\$/km)					
	1992	1993	1995	1996	1997	1998
1-15	6.95	7.80	7.80	7.80	11.23	17.75
16-25	7.65	8.60	8.60	8.60	12.38	17.75

Source: Leycotte Haulie

## 7. Marketing Channels in the Project Area

Almost every small farmer engages in some form of marketing of food grains, cash crops and livestock. This marketing takes a variety of forms depending on the type of farmer, the distance to markets and the type of commodities grown. The main buyers for cash crops are COTCO, GMB, Dairibord, CSC and traders and local processors (e.g. oilseed processors, product millers.). Grain is sold if in surplus. These are sold to GMB or to the local processors. The farmer most often gets a discount on the announced price due to quality considerations. The farmer also gets a lower market price if he sells locally. However, the advantage of selling locally, despite a lower price, is that payment is immediate, transport costs are avoided and difficulties possibly encountered in dealing with involved procedures of marketing agencies are by-passed.

Most sorghum and millet sales take place between households in small quantities and in such transactions; the prices received are substantially higher than the GMB prices. Sunflower, if grown in limited quantities are sold to the local oilseed processor. Fresh produce such as vegetables and green mealies (green corn) are sold in local markets that comprise other households in close proximity, nearby growth points, business centers and townships, and various transit points along major bus routes. Vegetables and mealies also find their way to major urban centers. The main constraints to marketing of fresh produce are variability in output prices and high transportation costs.

Cattle are normally marketed through local markets and also through the CSC. CSC organizes cattle auctions at regular intervals at established sale pens. Cattle are sold to private buyers and the CSC who acts as a residual buyer. Cattle sales have declined since the droughts of the 1990's. Goats and donkeys are marketed informally between farmers and through private traders. As the majority of households rear goats, demand is generally limited, except during festive days. Marketing of donkeys is more prevalent than goats. Poultry are primarily consumed in the farm household, but small quantities of birds and eggs are sold in the local market. Demand is limited and confined to shops, growth points and business centers.

The most common supply channels for inputs and implements comprise urban shops, rural traders, local stores and outlets managed by various cooperatives. Farmers in the study area prefer to purchase inputs such as fertilizers in urban centers and arrange for transportation themselves rather than pay substantially higher prices charged by local traders. This also gives them greater control over its availability since fertilizer companies and their agents will usually delay deliveries to an area until the consignment is of economic size. The marketing channels for seeds are similar to those of fertilizer. Farmers may market seed by direct purchase at the seed company's authorized distributor retail outlets, other urban retail outlets or through rural retailers who purchase seed from town and transport it to rural shops for resale.

Purchases from these outlets may be made directly by individual farmer, his relative, local farmer cooperative, or informal groups of farmers who pool money and send a representative to town to purchase seed. Almost all farmers buy hybrid maize seed annually. These are obtained from local store and traders, urban stores and farmer cooperatives. In the case of small grains, groundnuts, sunflower seed the main sources of seed supply are home retentions from the previous season's crop and other local farmers.

## 8. Domestic Consumption Trends

In the domestic market, the demand in the coming years for food and agricultural raw materials will be closely guided by the rate of population growth and the changing distribution of incomes of the population, changes in consumer tastes and the international competitiveness of local industries depending on agricultural raw materials.

Zimbabwe's rate of growth of population is expected to slow down to about 2.1% over the next 10 years. Urban population growth would however be considerably higher, closer to the current rate of about 4.5 %. This continued population shift will change consumption patterns with greater emphasis on convenience foods. Rising and higher incomes in the urban sector and a higher income elasticity of demand for meats, dairy, oilseeds and horticultural products and wheat are expected to lead to faster growth demand for these products.

While the demand for maize as a preferred staple food is expected to continue, the aggregate demand for maize is expected to lag behind the rate of population growth of 2.1 %. The current per capita consumption of 138/kg is expected to decline. This is expected because of the low-income elasticity of demand for maize and maize based products. More importantly, more and more smaller mills are now carrying out hammer and small scale milling operations and obtain very high efficiency through extraction rates of around 98% as against the 75% extraction rates in the large-scale industrial mills. This efficiency gain is likely to lead to an overall slow growth or stagnant growth in consumption of maize-based products in the next 10 years. At the same time, with rising incomes, the demand for small grains such as mhunga and rapoko are also expected to decline and there is expected to be a shift to wheat from maize and small gains.

The demand for wheat grew rapidly in the period 1985 to 1992. However, the removal of subsidies on wheat and bread in that year led to a slowing down in demand although the growth in demand has resumed once again. Current per capita consumption of wheat is 38 kg and given the bread making properties of wheat and convenience, wheat consumption is expected to rise steadily as has been seen in all the neighboring countries. Total sales of wheat in recent years averaged about 340,000 tonne and rising rapidly. Demand for red sorghum and barley are also expected to rise because of the steady rate of growth in intake of these two crops by

breweries. Domestic consumption/utilization of all oilseeds – groundnuts, sunflower and soybean can be expected to increase. Vegetable oil consumption is expected to increase with rising incomes due to the high-income elasticity of demand. The demand for meat and meat products should also lead to a derived demand for oilseed meal based products.

Domestic sugar production, which is among the highest in Africa, has been growing at around 5% a year in recent years. The trend of increase in the rate of consumption of sugar is expected to continue into the future.

Demand for cotton lint by the textile industry has continued to increase and textile firms have made significant new investments in recent years. The shift to export parity prices for lint supplies in 1994 has not dampened the steady increase in demand for cotton lint. The new investments have also witnessed a much higher intake of lint in recent years and the textile industry turnover is also forecast to continue its upward trend.

#### 9. The Proposed Cropping Pattern

The cropping pattern proposed for the areas irrigated by the Kudu Dam takes account of domestic market trends and export market prospects. The proposed crops for the irrigated areas in the Kudu Dam Project at full development (Year 2011) and expected production is as follows:

**Expected Production of the Proposed Crops**

Commodity	Acreage (ha)	Expected Production (tons)
Maize	4,500	27,000
Cotton	17,500	43,750
Ground nuts	1,250	3,125
Wheat	15,750	66,150
Tomatoes	1,750	131,250

Maize production on average is grown on about 1.3 to 1.5 million ha. each season and production, though highly variable, averaged between 1.5 to 2.5 million tons. Per capita consumption has been estimated at about 138 kg per capita and the quantity consumed per person is static. This is to be expected as with rising incomes, the consumption of starchy cereals reaches near saturation point and then declines. The expected increased production from the Kudu Dam project is 27,000 tons a year, that is approximately 1.3 % of present annual production. At present, even at the current per capita consumption rate, an additional 36,000 tons of maize would be required each year to feed the increase in population. By the year 2010, in view of estimated population increase of 2.1% per annum over the next decade, an additional 47,000 tons would be required each year. In addition, to domestic requirements, maize has been exported, if production has been in excess of domestic requirements. On average, exports over the four years ending 1997-98 has been 308,000 tons. The additional production from the Kudu Dam from year 2111 onwards of 27,000

tons could therefore meet the increasing domestic requirements and possibly exports.

Cotton production has been averaging around 280,000 tons a year but production has been highly variable. Most of the increase in the past decade has been from the communal sector. The planned production increase from the Kudu Dam irrigated area from year 2010 onwards would account for an increase on current levels of 16%. This is a big expansion. However, domestic demand for cotton lint by the textile industry has increased sharply in recent years. Domestic lint utilization by the textile industry increased from an average of 36,000 tons lint to an average of 177,000 tons lint in the three years ending 1997. Lint utilization is estimated to increase sharply in future years as textile firms have made significant new investments in recent years. The textile industry turnover is also forecast to continue in its upward trend. On the export market, cotton exports are expected to continue to increase. Export of lint in recent years have accounted for about 75 % of total production and has registered dramatic increases. Exports of lint rose from an average of 24,000 tons in the three years ending 1994 to an average of 438,000 tons in the three years ending 1997. Export market prospects continue to be good due to world demand for natural fibres. Prices are expected to remain firm on overseas markets. World production from several Asian countries such as China, India and Pakistan are likely to increase. However, Zimbabwe's low production costs and reputation for high quality could ensure a competitive edge on export markets. The additional output from Kudu Dam from 2111 onwards of 43,750 tons annually should assist in meeting the domestic and export market requirements.

Groundnuts annual production is around 100,000 tons from about 200,000 ha. Most of groundnuts are grown in the communal sector where yields are much lower and groundnut is retained by farmers for household consumption. There are no imports but groundnuts were consistently exported until the 1993-94 season after which due to increase in domestic requirements and decrease in production exports ceased. Per capita consumption is about 8 kg. and is rising with the rise in incomes. Additional annual requirements of groundnuts due to population increase and increase in per capita consumption is estimated at 3,000 tons a year from year 2111 onwards. It is estimated that production from the Kudu Dam in year 2111 onwards would be 3,250 tons. In addition to domestic consumption, due to increasing demand for oil, there would be increased demand for groundnut from the oil expeller industry. The increased production from Kudu Dam could cater to this increased domestic demand, demand from oil expellers and provide for exports.

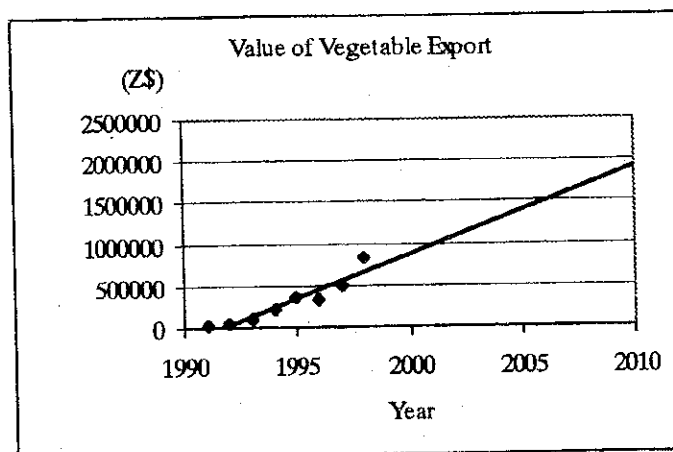
The cropping pattern also indicates an emphasis on wheat cultivation. Wheat is grown on large commercial farms under irrigation. About 50,000 ha. is under wheat and yields average around 5.5 tons/ha. Production of wheat, on average is about 225 - 250, 000 tons a year and imports average about 325, 000 tons a year. Per capita consumption of wheat is estimated at about 38 kg. The domestic demand for wheat has grown rapidly since 1985 except for a brief three years when subsidies

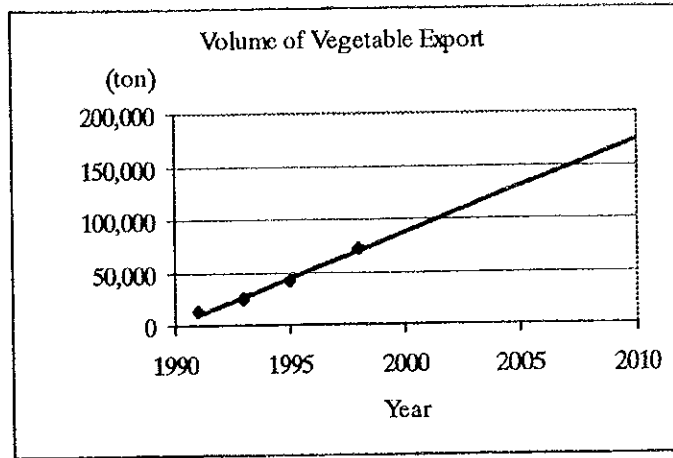
were withdrawn. At present imports account for about one half of domestic requirements. Domestic demand is expected to rise sharply in the next decade and per capita consumption could also rise steadily. It is proposed to cultivate wheat on 15,750 ha under the Kudu Dam starting year 2111. This is projected to provide about 66,000 tons of wheat annually. This is only a small proportion of projected domestic requirements. It is estimated that by year 2111, domestic requirements could be around 740,000 tons assuming population growth of 2.1% and per capita consumption of 45kg. There is scope for import substitution if domestic production is competitive with imports. Furthermore, the prospects for export to the neighboring countries is also good as the South African region is a deficit area and consumes about 850,000 tons a year.

Fresh vegetable export volume has seen very rapid growth in recent years. Volume and value of exports from 1991 to 1998 is as follows:

**Fresh Vegetable Export 1991-1998**

Year	Tons	\$1'000
1991	12,533	31,945
1992		55,023
1993	24,128	98,626
1994		202,979
1995	41,854	356,115
1996		340,694
1997		505,541
1998	72,265	826,551





A linear trend of the exports of fresh vegetables from 1991 to 1998 projected to the year 2010, the first year of production of the Kudu Dam Project, gives an export volume of 175,000 tons and export value is projected at Z\$ 2,000 million. The cropping system proposed for the Kudu Dam estimates that vegetable production from 3,500 ha. About one half of this would be for tomatoes for canning to feed the tomato processing plant at Chegutu and other processors who can tomatoes as juice and paste for export. These processors depend on out grower contracts for tomatoes. It is proposed to grow 1,750 ha of tomatoes estimated to produce 131,250 tons. Production of vegetables from the 1,750 ha. is estimated to be 87,500 tons. After accounting for culling and wastage, the quantity available for export would be 78,850 tons. This compares with the estimated 175,000 tons of exports in year 2010.

The Zimbabwe Horticultural Council has indicated that following the devaluation of the dollar, Zimbabwe has a advantage over its competitors from Africa in European destinations. Though final data is not available, exports have risen sharply in 1999 and so far in 2000. Exports of 175,000 tons in 2010 appears feasible. Zimbabwe has made heavy investments in infrastructure such as packaging and transport to support this export activity. It is also well equipped with air freight facility to European destinations and a further expansion is planned.

#### 10. Market Information

Until 1992, with administratively determined pricing for commodities and guaranteed delivery to a marketing board at these pre-announced prices, there was little interest by the farmer in market and price information. However, since that time with open market prices and many buyers in the marketplace, there is an increased interest in market information. In many cases, because of credit arrangements as in the case of cotton farmers delivering to COTCO, the delivery prices are announced in advance and farmers are obliged to deliver due to credit arrangements. However, for a wide range of crops and for cattle and other livestock, price information is becoming



increasingly important. Major farmer organizations do provide a good service to farmers by providing up to date and timely information on output and input prices and farmers are now beginning to increasingly rely on this information in making marketing and purchasing decisions and in entering into contracts.

### 10.1 Producer Prices

Producer prices by GMB, CSC and COTCO as well as prices paid by private processors and traders are given below. In many cases, the prices received by producers are a discounted price, as the produce delivered does not reach the standard grades set in terms of inert matter and moisture levels.

**Producer Prices 1995-1998**

Crops	Grade	1995	1995	1996	1996	1997	1998	1999
		Parastatal	Private	Parastatal	Private	Private	Private	Private
Beef	C/kg	1558.00	1578.00	1750.00	1750.00	2250.00	3000.00	3900.00
Cotton	B c/kg	500.00	600.00	550.00	650.00	650.00		
Ground-Nuts	A1 (\$/t)	2925.00	3400.00	-	7500.00	8000.00		
Maize White	A (\$/t)	1050.00	1380.00	1200.00	1300.00	1500.00	3000.00	
Maize Yellow	A (\$/t)	1050.00	1380.00	1200.00	1300.00	1500.00		
Milk	C/lit	179.34	185.12	-	220.00	295.00	555.00	700.00
Sorghum Red	A (\$/t)	650.00	1050.00	915.00	1400.00	1450.00		
Sorghum White	A (\$/t)	650.00	-	-	-	-	600.00	
Soybean	B (\$/t)	1600.00	2350.00	1600.00	2750.00	3500.00	6000.00	
Sunflower	A (\$/t)	1500.00	1900.00	1750.00	1950.00	1950.00	1900.00	
Wheat	A (\$/t)	2100.00	2750.00	2550.00	2650.00	2500.00	4900.00	5000.00

Source: CCZ, GMB, CSC, DBZ