NAMIBIA
Northern Livestock Improvement Project
Socio Economic and Production systems diagnostic study

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CHART
Organigramme of Ministry of Agriculture, Water and Rural Development
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SUMMARY AND CONCLUSIONS

(i) This report presents the findings of a socio-economic and production systems study (SEPSS) conducted in the northern communal areas (NCAs) of Namibia to support the preparation of a possible IFAD livestock improvement project. The purpose of the diagnostic study was to develop an understanding of the ecological, social and economic determinants of production systems in the project area; to identify the constraints and options for addressing them and in particular to understand the role of livestock and; to clarify the social economic and technical implications of translocating the veterinary cordon fence.

(ii) Both secondary source information and village household interviews were used to develop a broad database on socio-economic and technical matters concerning the project area. Total time for field work amounted to three weeks divided equally between Ovambo and Kavango. Prior to sampling, these regions were stratified according to agro-ecological zones and human population densities. A total of 29 village interviews and 56 household interviews were conducted. Mission findings were also interpreted to take account of conditions in Kaokoland and Caprivi.

(iii) The entire area suitable for rainfed agriculture in Namibia is within the central and eastern NCAs, which also contain much of the highest potential grazing lands. Each region is populated by a number of tribal groups but the cultural practices and traditions within each region are remarkably similar. In Kaokoland there are two main tribal groups, Ovambo, seven; Kavango, five; and in Caprivi there are two groups. The traditional tribal areas are more or less delineated by district boundaries within each region and most settlement is within home tribe areas but there is increasing inter-district mobility.

(iv) In both Ovambo and Kavango, cropland is assigned to individual households by the village headman or foreman. Grazing land, however, is communally owned and accessible to all. An important factor limiting the size of cultivated areas is a shortage of household labour, particularly for land clearing and weeding. Although off-farm employment is often quoted as the principal cause of lack of male labour in Ovambo, the diagnostic study does not support this conclusion. As a result of a general regional and to a lesser extent, national economic downturn, off-farm employment seems to have decreased.

(v) Throughout the four northern regions all the people place great importance on livestock ownership, but cropping is the core of the subsistence of almost all households. Crops grown in the NCAs mainly comprise millet, sorghum, beans, pumpkins, groundnuts and water melons, with maize being also important in Kavango and the main crop in Caprivi. A range of "bush foods", play a very important part in the diet of poorer families particularly in times of crop shortage. Most ploughing is with a single pair of draught oxen. Poorer households without access to draught animals have to cultivate by hand.
(vi) Livestock represent the main, and preferred, capital resource. Capital out
production is minimal, in accordance with a production system that is directed
entirely to subsistence, with virtually no sales of crops and only very limited sales of liv
or livestock products, and then only as a means to generate cash needed for fullfill
urgent need. Although a large number of households do not own livestock, over 5
some areas, the majority of cattle are held in herd sizes less than 40 head. Nea
households keep chickens and some keep a few pigs.

(vii) The principal livestock production constraints are water, disease and nu
For range grazing livestock (cattle and goats) the factors of water and nutrition are t
inter-related because the accessibility of grazing is determined by water availability. Ti
also a constraint of labour for herding during the wet season to prevent crop damage,
resulting from school attendance of children.

(viii) The main diseases in cattle are lung sickness (CBPP), botulism
blackquarter. Internal parasites are also a significant constraint, but there is little pn
with external parasites or tick borne diseases. The overriding health problem of goats
sheep) is internal parasites, but pasteurella and enzootic abortion also occur. The
production constraint of pigs is nutrition. With chickens, the main constraint is d
namely Marex, Newcastle’s and coccidiosis.

(ix) The informal sector of livestock marketing appears to satisfy the majority of
owners’ requirements. There is little evidence that the owners of fenced “comm
ranches in the NCAs are any more commercial in their outlook to livestock ownership
the subsistence farmers. The “red line” or veterinary cordon fence is commonly st
reduce market opportunities for the NCAs but in fact the government is already cmm
uniform pricing throughout the country, and this is being implemented by Meatco
mission findings do not support the need for the removal of the cordon fence in or
benefit the NCAs by providing access to the higher priced meat markets of South Afri
the EEC. Not only is there no evidence of stock owners being disadvantaged by the p
position of the cordon fence, there is ample evidence that the majority of the popula	he NCAs would be seriously disadvantaged by the new fences that would have b
constructed.

(x) The study established an essential linkage between crop and live
production. While crops provide the daily sustenance, livestock not only provide a c
reserve for food purchase in times of poor harvest but are both contributors to produ
and dependent upon it. Traditionally the ploughing of fields is performed by draught p
and it is only the decline in cattle ownership due to poor seasonal conditions that has f
more households to cultivate by hand. The ownership of livestock provided a buffer to
shortfalls in crop production. While there are undoubted needs for development of the c
sector, the proposed livestock project should also pay particular attention to small s
which are more widely owned and more affordable.
(xi) A livestock improvement project would be severely constrained in meeting the primary objectives as formulated at the time of general identification unless it could be sufficiently broadened to address certain constraints placed on crop production. This would need to include components that increase opportunities for animal traction, namely the supply of oxen, yokes and tillage equipment; improved use of crop residues; adaptive research and extension in addition to stepped-up training for not only government field staff but also a programme of exposure to new technology for farmers. The project would need to aim at engendering more initiative and the need for greater co-responsibility of communities in local development.

(xii) The study further suggests that greater availability of animal traction would be a principal means of increasing crop production and thus providing greater food security and should be included as a possible component of a livestock project. No tangible significant benefits could be expected in the NCAs in the short to medium term through relocation of the cordon fence. This applies particularly to small-scale livestock producers who represent the bulk of livestock owners. Whilst the relocation of the cordon fence may be considered a national objective, it presently represents little interest to northern livestock producers.

(xiii) In respect to the need for improvement of animal health services, the study confirmed that a number of crush pens had, in fact, been destroyed or were unserviceable and would require replacement. In Ovambo there is also irregular stock inspection which could be a result of an inadequate staffing and further in-service training to all AAHIs would be important sub-component. It is unlikely that the construction of dips would be required, except possibly in Caprivi. There only appears to be a limited requirement for establishment of animal health clinics. Greater attention to the future treatment of internal parasites, particularly for small animals, would require an increased supply of veterinary drugs. Considerable improvement to reproduction rates and livestock management is possible but there appeared little evidence of herd degradation resulting from inbreeding and hence there would be only limited gains to be achieved through improved genetic introduction.

(xiv) Development of water resources, particularly to allow greater access to under-utilized range resources offers further settlement and cropping opportunities and could be expected to interest a large number of households. This would particularly benefit existing medium to large cattle owners unless parallel development of access roads, clinics, schools and other facilities also occur and encourage households to move and resettle in the new areas. Opportunities would appear to exist to introduce improved pasture legumes to upgrade feed availability for feeding of selected animals for work or milk.

(xv) In respect to project risks and likely benefits, the take up of opportunities provided by the project would be slow, where beneficiaries are expected to contribute towards the cost of interventions and would constitute a risk to project effectiveness. Previous administrations, unfortunately, have not encouraged initiative and community-styled self-help
mechanisms to address constraints and overcome obstacles to development and pro...

(xvi) Associated with the opportunity to provide oxen and small livestock pack the problem of credit delivery and recovery. A possible project would need to proposals being presently considered by Government to facilitate credit to communal. This should not include a credit line simply to increase livestock ownership but support rural financial intermediaries and local savings groups. The main output of the pro an increase in animal numbers, rather than increased offtake and this has implications credit recovery.

(xvii) The Government is also faced with a number of difficult decisions in resubsidies on services such as tractor ploughing, fertilizer and the more recently introduced marketing of cattle. If subsidies were to be removed it is likely to result in a contraction existing production and a lag phase in development until adjustment is achieved.

(xviii) The continuation of the construction of the veterinary cordon fence across northern borders and requirement for a 50 km buffer zone along the northern river result in severe disruption to both human and animal movements without any assurance counter balancing benefits. If the GON continues with the erection of the fence, it is likely to benefit large scale livestock owners who would be prepared to re-settle southern parts of the NCAs and be away from interference caused by the fence.
1. INTRODUCTION

Project Origins and Status

1.1 The Northern Livestock Improvement Project was identified as one of three possible projects by an IFAD general identification mission ¹ which visited Namibia in April/May 1991. The main components proposed at identification included construction/relocation of a veterinary cordon fence to enlarge marketing opportunities for livestock in the northern communal areas (NCAs), improvement of animal health, production, marketing, increasing access to grazing land, pasture improvement and assisting in group organization. Whilst a possible project has been approved in principle by IFAD’S Technical Review Committee (TRC) and Policy and Programme Review Committee (PPRC), IFAD held reservations in respect to a number of issues raised during general identification and fielded a mission ² in May 1992 to examine and review these policy issues and constraints relating to land rights and resource management.

1.2 The basic concept of the project is to combat poverty in the NCAs by creating similar market and animal health conditions for livestock owners living north of the cordon fence as exist in the commercial areas to the south. A possible livestock project was given priority relative to crop production as it was perceived, at the time of general identification, that livestock offered the main source of monetary income and opportunity to alleviate poverty in the NCAs. In order to meet these objectives, the project would need to not only benefit the vast majority of NCA farmers but particularly those that are most disadvantaged and poor.

System of Project Preparation

1.3 It was agreed with the Government of Namibia (GON) and IFAD that project preparation would be preceded by a socio-economic and production systems diagnostic study (SEPSDS). Accordingly, the mission ³ the mission worked in Namibia

¹ Namibia - Strategy-Cum-General Identification Mission IFAD Report February 1992. Other possible projects were a Northern Crop Development Project (programmed to be prepared in early 1993) and the Nama Livestock and Rural Development Project.
³ J. Twyford, mission leader, 28 July-6 August; J. Sweet, range management specialist (consultant), acting mission leader 11 July-28 July and team member 29 July-7 August; F. Doorman, rural sociologist (consultant), 8 July-7 August; T. le Noir de Carlon, agriculturalist (consultant), 1 July-7 August
from 1 July to 7 August visiting Ovambo and Kavango. Whilst the original proposal was for a future livestock project to be restricted to these two regions, at the request of the GON and with IFAD concurrence, it was initially extended to include Kaokoland and could also include Caprivi depending on IFAD discussions with GON prior to the project preparation. Due to time constraints the team concentrated its study on Ovambo, Kavango and undertook, during report writing, to include existing information on Kaokoland, as well as to utilize the working paper to be prepared for Caprivi by the World Bank as its contribution towards the SEPSDS.\(^4\)

**Purpose of Diagnostic Study**

1.4 The purpose of the diagnostic study was to develop an understanding of the interaction between ecological, social and economic determinants of production systems in the project areas as well as to identify the constraints and options for addressing them and in particular to understand the role of livestock and; to clarify the social economic and technical implications of translocating the veterinary cordon fence.

**Diagnostic Methodology**

1.5 Diagnostic methodology used in conducting the study is presented in Appendix 1. In summary, methodology focussed on village and household interviewing in the project areas as well as the study of secondary sources and formal informant interviewing. Actual fieldwork was preceded by the collection and analysis of secondary sources and discussions held in Windhoek and the elaboration of interview schedules to be used for the village and household level interviewing. Interviewing was done both in teams and individually, so as to attain as broad a database as possible in the limited time available. Total available time for fieldwork amounted to three weeks and was divided equally between Ovambo and Kavango.

1.6 After zoning the research areas, a number of villages were selected in a random manner in each zone. In Ovambo, three zones were established, based on geographical location (west, central, east), agroecological characteristics (respectively lightly forested with pans, largely deforested with oshanas, and more densely forested/brushland with occasional pans) and population density (respectively, low, de

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and to continue the diagnostic study in Caprivi until 2 September to complete requirements for World Bank for a proposed Rural Services Support Project.
and low). Reflecting the relative importance of the three areas, three village surveys were executed in the western zone, seven in the central zone, and four in the eastern zone. The total number of household interviews was 34; 5 in the western, 23 in the central and 6 in the eastern zone. In Kavango zoning was undertaken on the basis of proximity to the river as well as geographical location, from west to east along the river. Here, 14 village interviews and 22 household interviews were conducted, bringing the total for both regions to 29 village interviews and 56 household level interviews.
2. BACKGROUND

General

2.1 Namibia, which is situated in southern Africa, shares common borders with the Republic of South Africa (RSA) to the south, Angola in the north, Botswana to the East and also fronts the Atlantic Ocean. The Caprivi strip, which forms part of north eastern Namibia, extends east for about 400 km to border with Zimbabwe and Zambia. The country has a surface area of about 823,000 km² with a total population of about 1.4 million people or an average population density of less than two persons per km². Statistics on human population, annual growth rate and distribution are shown in Table JT1. Administrative boundaries, location of main centres and population density region are shown in Maps JT1 and JT2. In 1990, Namibia achieved independence from RSA and established its own constitution with a central government and regional of replacing the former second-tier authorities (STAs). The first local authority regional elections are to be held in November 1992.

The Project Area

2.2 The project area is located in the northern part of Namibia and known as northern communal areas (NCAs) which include the regions of Kaokoland, Ovoromak, Kavango and Caprivi. In total these regions occupy some 164,000 km² and approximately 60% of the 1.4 million human population of Namibia. The number of rural households is estimated at about 110,000. Ovambo is the most densely populated region with more than two-thirds of the total NCA population or almost of Namibia’s population.

Physical Resource Base

Climate

2.3 The climate in the north varies from arid in the west to sub-humid in the extreme east, with the major part being semi-arid. Annual rainfall in the extreme west is less than 50mm but increases rapidly eastwards across Kaokoland to 400mm at

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2/ Inclusion of Caprivi in the project area is subject to present discussions between GON and IF.
Ovambo border, then increases gradually eastwards to 700m at the eastern end of Caprivi (Map 4). The length of the rainfall season also increases eastwards from about 3 months (Jan to March) in Kaokoland to 6 months (November to April) in Caprivi. Potential evaporation is between 2.5 and 3 metres per annum. There is considerable spatial and seasonal variability in rainfall, and drought is a recurrent phenomenon. Owing to the higher rainfall in the north of the country, almost the entire area suitable for rainfed agriculture in Namibia lies within the NCAs, which also contain much of the highest potential grazing lands.

2.4 Throughout most of the north, except the western part, the rainy season commences in October/November and continues until April, but the main rains occur from January to March. Daytime summer temperatures average 30-35°C, with high humidity. Night temperatures remain above 20°C in summer but can fall below 0 °C in winter. Frosts are very rare except in the mountainous areas.

Soil types

2.5 Most of Kaokoland is mountainous with rock outcrops and shallow, stony soils of virtually no agricultural potential, and the westernmost part is Namib desert; however, along the Cunene and some seasonal rivers are alluvial deposits, and in the east is a sandy plain stretching into Ovambo. The dominant feature of Ovambo is the Cuvelai basin with its network of shallow waterways which bring flood water from Angola. The soils are loose sands with clay overlying sandstone, and of low inherent fertility enhanced by alluvial deposits. Floods confine crop production to the higher ground. The Cuvelai area is very densely populated, owing mainly to water availability. The availability of land suitable for crop production in Ovambo is limited by large areas of saline soils in the south towards the Etosha pan. Eastern Ovambo, Kavango and Caprivi are predominantly Kalahari sands but there are pockets of good alluvial soils along the Okavango river.

2.6 The alluvial plains are the most favoured areas for settlement and for arable development, hence they are densely populated and almost fully utilised. The sandier plains are less favoured for settlement and provide the main grazing areas for livestock, but also hold opportunity for arable expansion.

2.7 The distribution of the major soil types is illustrated in Map 5, and their characteristics are summarised in the table below. Further details on land regions and land use suitability are given in Section 4.3.
### Soil types of northern Namibia

<table>
<thead>
<tr>
<th>SOIL TYPE</th>
<th>AREA %</th>
<th>AGRICULTURAL UTILITY</th>
<th>CHARACTERISTICS AND LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fersialtic</td>
<td>3</td>
<td>High</td>
<td>Well weathered tropical soils with low water retention capacity; potential for irrigation</td>
</tr>
<tr>
<td>Solonetzic &amp; pianosolic sand</td>
<td>5</td>
<td>Moderate to low</td>
<td>Shallow sands on clay; highly alkaline; periodic flooding hazard</td>
</tr>
<tr>
<td>Halomorphic</td>
<td>5</td>
<td>Low</td>
<td>Danger of salination; wetness; flooding hazard</td>
</tr>
<tr>
<td>Arenosols littoral sands</td>
<td>8</td>
<td>Low</td>
<td>Low water retaining capacity; prone to wind erosion</td>
</tr>
<tr>
<td>Arenosols interior sands</td>
<td>46</td>
<td>High</td>
<td>Low water retaining capacity; erodible; potential irrigation</td>
</tr>
<tr>
<td>Alluvium</td>
<td>6</td>
<td>High</td>
<td>Danger of salination; flooding hazard; potential irrigation</td>
</tr>
<tr>
<td>Calcareous soils</td>
<td>7</td>
<td>Low</td>
<td>Shallow; stony; steep</td>
</tr>
<tr>
<td>Lithosols</td>
<td>20</td>
<td>None</td>
<td>Rocky; steep hills and mountains</td>
</tr>
</tbody>
</table>

### Range vegetation and carrying capacity

2.8 A simplified vegetation map of northern Namibia is shown in Fig. 1. The coastal area of Kaokoland is bare Namib desert. This gives way to Mopane grassland, strongly dominated by *Colophospermum mopane* in variable tree and shrub vegetation, extending east to central Ovambo. The grass cover is highly variable, depending on type and intensity of use. The rest of the northern region is Northern Kalahari Savanna. In the more open savanna a good cover of useful grasses such as *Schmidtea pappophoroides*, *Antephoras pubescens* and *Brachiaria nigroper* is found; in the more densely wooded areas the grasses tend to be poorer and include *Aristida* spp and *Eragrostis pallens*.

2.9 A more detailed vegetation map for Ovambo is shown in Fig. 2. It distinguishes the open palm savanna and seasonally waterlogged grasslands of complex within the broad mopane vegetation type, as well as separating wooded bushland in the tree and bush savanna.

2.10 Carrying capacity has been broadly estimated to be between 20 and 30 hectares per large stock unit for Ovambo, Kavango and Caprivi, decreasing to 12 to 24 ha/LSU for most of Kaokoland (Map 8). There are no detailed or up to date carrying capacity data available.
Native Forests

2.11 The northeast Kalahari Sandveld woodland, contains two principal commercial species: Pterocarpus angolensis (Kiaat) and Baikea plurijuga (Rhodesian teak). Tree density is low and the tree regeneration cycles are around 40 years and 80 years respectively. Ovambo is reported to have a potential annual extraction rate of 6,000 cu m of Pterocarpus, and concessions have been granted for extraction of about 1,000 cu m per year. Mopane (Colophospermum mopane) wood is widely used for building kraals and houses, for fencing and for firewood, and in the densely populated Cuvelai area has been seriously depleted.

2.12 In Kavango, where there is a sawmill and a small local woodcarving industry, sustained annual yields have been estimated\(^1\) at 3,600 cu m and 4,100 cu m for Pterocarpus and Baikea respectively, and 900 cu m for a third species Guibourtia coleosperma (False mopane). In 1988-89 the actual extraction was only 1,700 cu m for Kiaat and nothing for the other species.

2.13 East Caprivi has a 1,600 sq km forest reserve in which the relative frequency of timber species is reported to be Baikea 40%, Pterocarpus 15%, and other species (including Guibourtia) 45%. The current annual extraction is 400 cu m of Kiaat, which goes to South Africa. There are plans to establish forest reserve areas totalling 36,000 sq km in Ovambo, Kavango, West Caprivi and East Caprivi (Table JS1).

Wildlife

2.14 The principal wildlife resources of the northern areas lie in Kaokoland, eastern Kavango and West Caprivi. Kaokoland already has tourism based on the local people and the wildlife, which includes gemsbok, springbok, giraffe, small game and the famed desert elephants. Ovambo has virtually no wildlife resources left, although the southern area has some potential. The saline grassy plains bordering onto the Etosha Game Reserve are more suitable for wildlife than for domestic stock but the attitude of the local people was found to be totally negative towards wildlife, and the area has little scenic attraction for tourism compared to Kaokoland.

2.15 In Kavango some problems with hunting dogs and jackals killing stock, and monkeys stealing crops, were reported by farmers. There are also some elephant movements across the Angola border, just west of the Okavango River, towards Mangetti and back, and these cause occasional damage to water points. Again, the attitude of the local people was that wildlife should be kept far away behind a fence, and that they wanted nothing to do with it. In eastern Kavango, bordering onto Botswana and Bushmanland, the situation is different. The area is unwatered and almost devoid of domestic stock, and is the only part of the region with good potential for wildlife.

\(^1\) Strategy-cum-general identification mission to Namibia. IFAD, 1992
conservation or utilisation with minimal conflict with crop or livestock farming. An
already exists a substantial game reserve, Kaudom, of approximately 3,700 sq km. It
is also a fenced area of about 375 sq km immediately east of the Mangetti block, in
the Mangetti Game Area. In the eastern edge of the region, bordering West Ca
there are two very small wildlife tourism developments, the Mahango Game Park
sq km) and the Popa Falls Rest Camp (about 25 hectares).

2.16 Western Caprivi between the Okavango and Kwando rivers is, apart fr
very narrow northern strip, already a proclaimed Game reserve of 6,000 sq km.
Ministry of Wildlife Conservation and Tourism is currently developing a nat
programme of community based natural resource management, and has started wo
with San communities in West Caprivi and eastern Bushmanland to develop
projects based on the principle of "people's participation". In West Caprivi there has
agreement on zoning the game reserve into core conservation areas along the rivers
a multiple use area in between. The Ministry, together with the local community,
a the process of establishing a joint management committee which will decide how
wildlife in West Caprivi should be used.

2.17 East Caprivi reportedly has two small wildlife conservation areas,
Mundumu Game Park (1,000 sq km) and the Mamili National Park (300 sq km).
region is in a generally rich wildlife habitat and consequently 6 out of 10 East Ca
farmers ranked damage by wild animals as their greatest crop production proble

Water

2.18 There are only two perennial rivers, the Cunene and the Okavango (cal
called the Kavango). Apart from a strip of waterless Namib desert in the 
Kaokoland is reasonably endowed with water as a result of the Cunene river in
north, natural springs in the highlands, and boresholes in the east. Ovambo ha
perennial rivers and few functional boresholes, and in the dry season faces the g:
water constraints of the four regions; in the wet season the ephemeral pans
oshanas (flat grassy drainage lines) provide adequate water. Kavango and Caprivi l
the Okavango river as their northern border, and there has been considerable bore:
development in Kavango. Nonetheless there are large tracts of grazing land in the NC
particularly Ovambo and Kavango, that are under-utilised due to lack of water.

\footnote{NEPRU Briefing Paper. National conference on land reform, 1991}
Specific Regional Characteristics

2.19 Kaokoland has a land area of 49,500 sq km occupying the northwestern corner of Namibia. It is separated from Angola by the Cunene River in the north, and is bordered by the Atlantic Ocean in the west, Damaraland in the south, and Ovamboland in the east. Most of Kaokoland is mountainous and inhospitable. The westernmost part is a strip of Namib desert, the eastern part is a sandy, gently undulating plain that stretches into Ovamboland.

2.20 The only constantly flowing river is the Cunene, which forms the northern boundary, however the highland areas are fairly well supplied with natural springs and wells. The sandveld plains to the east have few natural permanent water sources but there are pans which hold water in the wet season. In 1990 there were 153 boreholes in Kaokoland, mainly in the east, but two thirds of these were out of action; and there was considerable range degradation around areas of permanent settlement, notably Opuwo and the functional boreholes\footnote{Paskin R.D. (1990) A review of agriculture in Kaokoland with special reference to animal husbandry and veterinary extension.}.

2.21 There are no tarred roads in Kaokoland and the majority of roads are dirt tracks requiring four-wheel drive transport. There is a part-time telephone service to Opuwo.

2.22 The Ovamboland region covers some 52,000 sq km. It lies between Kaokoland and Kavango, and is bordered directly by Angola in the north, and by the Etosha Game Reserve and the commercial farming districts of Outjo and Tsumeb in the south. The area is extremely flat, with altitudes between 1090m and 1150m above sea level.

2.23 The dominant feature of Ovamboland is the floodplain of the Cuvelai basin with its network of shallow, grassy waterways (oshanas) which carry floodwaters from Angola during the wet season. These seasonal flows provide water for stock and human consumption as well as bringing fish and recharging the ground water. The high water table in the basin enables wells to be dug and is the primary reason for the concentration of human settlement in the Cuvelai area. The Cuvelai network connects to the Etosha pan and to a number of smaller pans. The area west of the Cuvelai is dotted with large numbers of small pans, and to the east the oshanas drain into several small pans as far as the latitude 18° south, below which the area is characterised by permanent dunes. South of the Cuvelai towards Etosha the soils are saline.
2.24 The principal form of land use is grazing for livestock and some 43,000 km² have been identified as suitable for this purpose, but about 8,500 km² of this are unutilized due to lack of water. In order to overcome grazing shortages in their home areas, many cattle owning households in the oshana area move the majority of their animals in the dry season to distant pastures, mainly to borehole developments in the east of the region.

2.25 A number of fenced, and supposedly commercial, ranches exist in the southeast. In the 1970s the FNDC established 97 farms of 1,200 ha each in the Mangetti area and leased them to private farmers. There has reportedly been recent development of private fencing by wealthy stock owners in the same vicinity, but the present mission did not find that respondents considered this a serious issue.

2.26 There are no perennial rivers in the region. Areas to the west and east of the oshanas rely on pans for temporary water, and boreholes for permanent water, but the development of boreholes is limited by salinity in the west and by extreme depth throughout. Many of the boreholes are reported to be non-operational, and there is no map of the location of boreholes or dams. A number of small dams have been built in the central region. There is a canal and pipeline network designed to carry Cunene river water from Ruacana in the northwest to supply the growing towns of Oshakati and Ondangwa, together with the military camps and hospitals. A pipeline carries treated water from Ogongo to Oshakati, and various taps and stock watering points have been established along its length. Other pipelines have been laid and more are planned (Map 10). Despite this network the majority of people in the central area rely on hand dug wells. The limited water availability in the outlying parts of Ovamboland severely restrict effective livestock distribution and results in the central area being highly degraded by overgrazing while much of the region remains under-utilized.

2.27 The main road from Grootfontein to Oshakati is tarred. The northern part of the region is reasonably served by roads and there is considerable road development underway, but the southeast and southwest remain relatively inaccessible (Map 8). Electricity is supplied from the Ruacana hydro scheme to Oshakati and Ondangwa at some points on route to Kavango.

2.28 The Kavango region covers 46,000 sq km in the northeast of the country adjoining Ovamboland in the east, Caprivi in the west, Grootfontein and Bushmanland in the south, and Angola in the north. The perennial Okavango River forms almost the entire border with Angola, and separates Kavango from West Caprivi.

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1/ NISER Discussion Paper No.4, May 1990. This estimate is lower than the NEPRU estimate of 21.0 km² underutilized due to lack of water.

2.29 More than 89% of the population, and hence the majority of land use activity, is concentrated in a narrow 5-10 km band along the Okavango river and, to a lesser extent, along the seasonal Omatako river.

2.30 The major form of land use is grazing for livestock. Compared with Ovambo, the water resources are more plentiful and livestock are more widely dispersed. Seasonal livestock movements are less pronounced and tend to be practised in the wet season to take advantage of ephemeral water sources. There is a significant number of fenced ranches, and more are being developed. The FNDC Mangetti block in the south west, adjoining the Mangetti block of Ovambo, occupies approximately 2,600 sq km but technically lies south of the cordon fence and therefore markets stock in the south. A further 44 ranches of about 5,000 ha each (the Mangetti Farms Project) have been demarcated and allocated (but not yet developed) along the northern edge of the Mangetti block, and there are already in existence about 30 other private fenced ranching units of 5,000 ha or less in the region.

2.31 The southeastern part of the region, bordering onto Bushmanland and Botswana, is waterless and therefore not used by domestic stock but supports the only significant wildlife populations remaining in the NCAs. Part of this is a designated wildlife reserve.

2.32 In comparison with Ovambo, the water resources of Kavango are relatively plentiful. In addition to shallow groundwater along the river and tributary valleys, there is potentially exploitable groundwater throughout most of the region except for zones in the east and the west (Map 16). The area of highest groundwater potential is in the location of the Mangetti Block and the Mangetti Farms Project in the southwest. About 225 boreholes have already been drilled throughout the region and the total is expected to reach 260 by the end of 1992. Drilling requests are processed by the chiefs together with the Land and Farming Committees; each of the tribal districts has a budget for 4 boreholes per year. As a drought relief measure to open up new grazing, a grid of 20 boreholes with a 9 km spacing is about to be implemented east of the Grootfontein - Rundu road; new villages are expected to develop around them. A further 26 boreholes are to be scattered through the north and west for the same purpose. Livestock are able to disperse more widely than in Ovambo but, nonetheless, there is a heavily grazed band along the river and there are large areas of underutilised grazing away from it.

2.33 The main road from Grootfontein to Rundu is tarred, as is the first 60 km of the road from Rundu to Katima Mulilo. There is good dirt road all along the river and part of the way to Ovambo, but generally away from the river zone there are few roads (Map 14), the sand is very heavy and the tracks require four wheel drive negotiation. Electricity also comes from the Ruacana hydro scheme on the Angolan border in northwestern Ovambo.
2.34 The Caprivi is a 425 km long strip of land extending east from Kavango like a pan handle and is bordered by Angola and Zambia in the north, and Botswana in the south. It is divided into two parts separated by the Kwando River. West Caprivi is a fairly flat area of 5,877 sq km with rolling sand dunes. East Caprivi occupies 11,877 sq km and is entirely bordered by perennial rivers, apart from its short northwestern border with Angola. The southern border with Botswana comprises the Kwando-Linyanti-Chobe River system, while the Zambezi River forms the northeastern border with Zambia.

2.35 Settlement in Caprivi is constrained by annual floods (particularly in the east and, to a smaller extent, in the south), water availability away from the rivers, and soil suitability for cultivation. Approximately 15,000 ha have been classified as having high potential for dryland cultivation; 65% of this area is considered to have medium potential for irrigation but none of the Caprivi soils have high potential for irrigation. In the north there is a large forestry reserve along the Zambian border. East Caprivi has a rich and highly diverse ecology, and two national parks of 32,000 ha and 101,000 ha in wetland and woodland sites were proclaimed immediately before independence. Most wildlife resources are concentrated in and around the two parks.

2.36 According to an unreferenced survey in 1980, 23% of the population drew water for domestic and livestock use directly from the rivers, 35% were dependent upon wells, 14% upon boreholes, 11% on springs, dams or malapos (shallow depressions), and the remaining 18% were dependent upon the bulk water scheme at Katima Mulilo.

2.37 The Caprivi is geographically isolated from the rest of the country and has a distinct cultural identity. There is a tarred road from Kongola to Katima Mulilo and, although the road system is still inadequate, the region is reasonably well served in relation to the other northern regions.

Population Distribution and Demographic Trends

2.38 In 1991 the population of Ovambo was approximately 615,000, giving a mean population density for the entire region of 11 people per km2. However, population distribution is extremely skewed, with large areas in the south, west and east being very sparsely inhabited. In the densely populated Cuvelai basin in the centre and north density is much higher, with up to 100 people per km2 in the peri-urban Ondangwa-Oshakati area \(^1\).

\(^1\) SIDA, 1992.
2.39 In Kavango the situation of uneven population distribution is similar, with 80% of the some 120,000 inhabitants living in a narrow strip along the Okavango river on the northern border. To the south of the strip large areas are underutilized or not utilized at all.

2.40 With an annual population growth of 3 to 4% the population of both regions is expected to double within 20 years. In Ovambo it is doubtful that the natural environment can sustain such large numbers of people. SIDA indicates that unless a progressive and successful family programme is implemented in Ovambo in the near future, all efforts to raise living standards are likely to fail as economic gains are absorbed by the increasing numbers of people. The same is valid for Kavango, even though in this region the relationship between available land and population is more favourable then in Ovambo.

2.41 Population pressure in the Cuvelai basin in Central and Northern Ovambo and along the Okavango river in Kavango has already led to the overutilization of areas of grazing and crop and wood land. One might expect that pressure on the land would force people, particularly young households without their own crop land, to migrate to the presently underpopulated and underutilized parts of the region. Up till now, however, migration within the regions has been limited due to insufficient water in the dry season, as pans dry up rapidly and ground water supplies are too deep to be reached by means of hand dug wells. Also, in some areas in Ovambo ground water is saline. Another impediment for moving into underutilized areas is the lack of economic and social infrastructure, particularly schools, clinics and shops.

2.42 A more even spreading of the population of Ovambo and Kavango over the two regions will require establishing permanent water supplies (mostly through boreholes) as well as access roads, schools and clinics. When a reasonably sized population is established, shops are sure to follow. There is however another element that keeps people from migrating from the densely populated areas. Migration implies the severance or at least weakening of family ties that, particularly for young families, are crucial for access to ploughing oxen and implements, labour and food. As population pressure in the densely populated areas increases people will be forced to migrate, as natural resources, particularly crop land, become limiting.
Livestock Numbers and Trends

2.43 The livestock populations of the northern communal areas (Table JS2) include approximately 620,000 cattle, 540,000 goats, 50,000 sheep, 125,000 donkeys, 5,000 horses, 100,000 chickens, 2000 pigs, and 2,000 ducks. Ovambo has by far the greatest numbers of cattle, goats and donkeys and the greatest overall stock density. The density of cattle is highest in East Caprivi whilst ducks appear to occur only in Caprivi.

2.44 Almost all livestock in the NCAs are of local breeds, which are hardy and well adapted to their environment. Occasional traces of Africander and Brahman are to be found among the cattle, and of Boer goat among the goats. The local cattle are Sanga type, which are smaller framed than the large European breeds, but of good fertility and high potential for selection. The Kaokoland goats are distinctly larger than those from the rest of the northern regions. The sheep are a fat-tailed hair type.

2.45 Historically, livestock populations were limited by disease and availability of water. Disease pandemics have been eradicated and, while water is still a constraint, the introduction of high yielding boreholes has enabled the development of local populations that are too large in relation to the accessible grazing resources. Consequently, drought is now the major limiting factor controlling livestock populations; a pattern has developed in which populations build up during good rainfall years then crash in severe drought.

2.46 In Kaokoland the cattle population dropped from 110,000 head in 1980 to 60,000 in 1981 and possibly as low as 15,000 in 1982, due to drought, but is now up to 80,000\(^{1}\). The increase was not entirely due to natural recovery, however, as many cattle were brought in from Hereroland after the drought. In Ovambo cattle numbers rose from 380,000 in 1962 to 567,000 in 1970 but have since dropped to 350,000. In Kavango, where there is a steady programme of borehole development and drought is less common, cattle numbers have risen rapidly from 74,000 in 1987 to 93,000 in 1992. In Caprivi cattle numbers have increased from 40,000 in 1984 to 98,000 in 1992, making this region the most densely stocked with cattle. Small stock trends tend to follow those of cattle but goats are less prone to drought mortality, and their populations make more rapid post-drought recovery.

\(^{1}\) Paskin (1990)
Veterinary Cordon Fence

2.47 The northern border with Angola is not closed to stock movement and, as there is no effectively fenced internal subdivision within the NCAs to contain disease outbreaks, the whole of the north is separated from the rest of the country by a veterinary "red line" cordon fence. The purpose is to block southerly movement of livestock in order to prevent the introduction of the two diseases Contagious Bovine Pleuropneumonia (CBPP or lungsickness) and Foot and Mouth Disease (FMD) into the commercial areas, which export meat to the South African market and the EC. The valuable export market is dependent upon the animals being guaranteed free of FMD.

2.48 No live animals, nor untreated animal products, are allowed to pass from north of the fence to the south, hence the livestock populations in the NCAs are excluded from the export markets. All meat processed by the northern abattoirs is currently canned. Until recently the prices paid by the northern abattoirs were lower than those obtainable south of the fence, but since February 1992 a standard pricing system has been applied.

2.49 The cordon fence is a double fence 10 m apart, game proof on the northern side and stock proof on the southern side. It runs from Palgrave Point on the west coast below Kaokoland, along the southern and eastern edge of the Etosha Game Reserve to the Ovambo border, along the southwestern border of Kavango (but deviating up around the Mangetti block), then down and around Bushmanland to the Botswana border (Map 3).

2.50 In some quarters the cordon fence is believed to have been constructed more for political expediency than for disease control, and since independence there have been calls for its removal. Complete removal would lose Namibia its valuable meat export trade, and the international disease control regulations demand maintenance of at least a 50 km wide buffer zone between Namibia and Angola. Fencing of the Ovambo/Angola border, between the Cunene and Kavango rivers, commenced in mid 1992 but the details of relocating the cordon fence have not yet been decided.

Administration and Institutional Framework

2.51 The structure of agricultural institutions in Namibia has exerted a major influence on the dualistic nature of the rural sector. Virtually all the essential institutions and consequently services necessary for sound development of large-scale commercial areas are in place but are generally weak in the communal areas. The commercial farming system is supported by a financial infrastructure which is competitive and
sophisticated. Marketing boards\(^1\) are directly responsible for trading the controlled commodities. Prior to independence, the Boards received financial support from the Second Tier Administration for Whites (AFW) as well as from South Africa. South Africa guarantees a substantial market for Namibian beef ensuring integration with the RSA market.

2.52 In pre-colonial times the powers of chiefs were absolute and their influence extended to virtually all spheres of social and economic life. Despite the efforts of the South African Government in maintaining the system of chiefs as part of a strategy of ethnic fragmentation, the influence of the chiefs waned considerably during the war years. Many chiefs collaborated with the colonial government (participating in the Second Tier ethnic government) and thereby alienated the support of their subjects. Formal allegiance to chiefs and headmen varies from area to area with some communities or sections of communities openly calling for the evolution of the institution. There is clearly a need for greater understanding of traditional leadership structures and how they can be used to maximum effect in community development.

2.53 The three year period before independence was marked by efforts to introduce reforms to level the inequalities between communal and commercial farmers. These reforms\(^2\) were poorly designed and inadequately financed however and proved ineffective to extend from the commercial sector to subsistence farmers in the communal areas.

2.54 Communal area farmers have benefitted little, if at all, from present Government institutions. There are only weak marketing channels for cereals produced by communal farmers. The first attempt to establish a formal marketing channel was only recently undertaken by the Agronomic Board in 1990/91. Markets for northern livestock are restricted to local sales or canned meat for export due to the need to comply with the veterinary restrictions imposed by the positioning of the cordon fence. AGRAGA cooperatives do not have retail outlets in the communal areas and, as a result, communal farmers have no ready access to inputs. Agronomic research into farming systems in communal areas is extremely weak and much remains to be done. Extension services are under-resourced and lack effectiveness. In addition, there are virtually no formal credit markets in communal areas.

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\(^1\) There are three statutory marketing boards: the Agronomic Board, the Karakul Board and the Meat Board. External trade is regulated by them.

\(^2\) For example, the Farmer Support Programme (FSP) initiated by the FNDC aimed at providing institutional support in communal areas. Unfortunately, FSP was never implemented.
Project-Related Institutions

2.55 The Namibian central government comprises 18 ministries including the Ministry of Agriculture, Water and Rural Development (MAWRD) which was restructured following independence and is composed of seven directorates namely: Agriculture; Planning, Marketing, Pricing and Cooperatives; Rural Development; Veterinary Services; Forestry; Agricultural Training; and General Services. An organogram of the various directorates within MAWRD is shown in Chart 1. The Directorate of Agriculture has three divisions and is responsible for research, extension and agricultural engineering, namely in relation to mechanization and water development. The Directorate of Planning provides advice on agricultural planning, policy analysis, collection and collation of statistics, support to the marketing authorities and the evaluation and monitoring of projects. The Directorate of Rural Development is a relatively directorate and is mainly involved in the promotion of rural industries and off-farm employment opportunities. In this capacity it has an extension role to improve social services in the communal areas. The Directorate of Veterinary Services serves to maintain optimal animal health and production and to ensure proper marketing status for animals and animal products.

2.56 The DVS has a field services division, a laboratory services/research division, a meat hygiene division and an epidemiological monitoring/extension division. For functional reasons the field services are divided into two: one section operating in the mainly cattle husbandry areas in the north of the country, and the other in the sheep areas of the south. The main emphasis of DVS activities is on scheduled disease control coupled with improvement of herd health. The veterinary cordon fence is a first line measure for control of scheduled diseases transmittable by livestock movement; Foot and Mouth Disease and Lungsickness are the two most important of these.

2.57 The area north of the cordon fence is a high surveillance zone in which all stock are supposed to be inspected fortnightly, and prophylactic vaccinations carried out. All herd owners are supposed to keep stock cards which are updated at the stock inspection visits. In Kavango the regional veterinary services are impressively well organised; the region is divided into 19 stock inspection zones each with ten crushes covered by one Assistant Animal Health Inspector (Ass.AHI). All herd owners met by the mission had up to date stock cards, and the regional office maintains comprehensive records. There were, however, criticisms from respondents that prompt animal treatment is difficult to obtain and that some inspection staff do nothing more than count the animals. There is considerable potential for developing the present structure into a really effective animal health delivery and extension system through appropriate training and back up.
2.58 In Ovambo the long period of hostilities severely disrupted animal health services including the vaccination campaigns. Not one respondent was found to have a stock card and a number said their cattle had not been vaccinated this year. The staff establishment allows for 8 Animal Health Inspectors (formerly known as Stock Inspectors) and 65 Ass.AHI, of which about 50 are currently in post. This region requires organisational and logistical support to re-establish the operational capacity of the field services, in addition to the training envisaged for all field staff.

2.59 Among the parastatal institutions, which were established before Independence, the most relevant for a possible future agricultural development project are the First National Development Corporation (FNDC), the Development Fund of Namibia (DFN) and two statutory marketing boards: the Agronomic Board and the Meat Board. Unlike other African countries, where the marketing boards are solely state-run, the Namibian boards are mixed entities reflecting the close alliance that, until recently, existed between the Government and commercial farmers.

Capital and Credit

2.60 Since independence, the supply of credit to communal farmers has remained scarce. Formal sector financial intermediaries have not been willing to lend to communal farmers on the grounds that they lack secure title to their land. Informal credit channels exist but little is known of how they operate. The efforts of voluntary agencies in developing rural financial intermediation have been focused on mini-loan schemes and on saving groups. Whilst these serve a useful purpose, it is doubtful whether mini-loan schemes and saving groups have the potential to develop into a major source of finance of agricultural seasonal inputs or medium term assets.

2.61 Whilst a commercial banking system operates in the main centres of the NCAs, lending policy has largely excluded small farmers from access to credit. At the same time, it is not clear what is the potential demand for formal credit\(^1\) in these areas. Demand is obviously highly price elastic based on location and prospective return from the enterprise being considered. In Ovamboland, where the population is greatest, there may be substantial need amongst small farmers for credit for productive purposes, to include fencing of cultivated areas, but it is a higher risk credit area compared to the more favoured dryland eastern areas of Kavango and Caprivi. There is also clearly much more capital being repatriated into Ovamboland through migrant workers, civil servants and pensioners but this is being largely invested in trade and commerce in the two main centres, Oshikati and Ondangwa.

3. SOCIO-ECONOMIC CONTEXT OF THE PROJECT AREA

Historical Origins of Existing Agrarian Systems

3.1 Small groups of hunters and gatherers may have occupied Ovambo and Kavango as far back as 100,000 years ago. Research in Zambia and Angola suggests that agriculturalists may have started to occupy northern Namibia at least some 2,000 years ago. Ovambo speaking agro-pastoralists probably were present in northern Namibia and southern Angola by the early seventeenth century. These people lived on small farms centred within "kingdoms" separated by woodlands. By 1921, the population of Ovambo was estimated to be 90,000\(^1/4\), approximately 1.6 persons per square kilometer.

3.2 The present inhabitants of Kavango are assumed to have settled in the region along the Kavango river only between 1750 and 1800; before that, the region was very sparsely inhabited by hunters and gatherers like Bushmen and the VaTshaube people.

3.3 Eighteenth and nineteenth century agricultural systems are likely to have been fairly similar to today's, with millet as the main crop and sorghum, maize (mostly in Kavango), cowpeas, bambara nuts, groundnuts, pumpkins and melons as crops of secondary importance. When the Kavango settled in the region only a small number of people owned cattle; since then, however, the number of cattle has increased considerably. Until well into the second half of this century cattle ownership is likely to have played an even greater role than currently. The diagnostic study interviews indicate that a considerable number of households have lost their cattle due to drought, disease outbreaks and the upheaval of the independence war.

3.4 Traditionally land was prepared by hand. However, under the influence of the Mission and the South African administration hoe cultivation has to a large extent been replaced by ox ploughing. Donkeys were brought to Ovambo from the south by migrant labourers, and are now fairly widely used for both ploughing and transport. Pigs were introduced in the beginning of the century by missionaries and have caught on well. However, the numbers of pigs per household seldom exceeds two or three adult animals since there is not enough food (crop surplusses or other) available to support larger numbers.

\(^v\) SIDA 1992: p.19
Demographic Context and Settlement Patterns

3.5 In Ovambo some 20% of the population has settled in the towns of Oshakati and Ondangwa, the remaining 80% lives in dispersed rural settlements. Household compounds (or "kraals") are separated by cropland, grazing land, woodland in the less densely populated areas, and, in central Ovambo, the *oshanas*: a seasonal flood water system consisting of water courses that are inundated in the rainy season.

3.6 Cropland is located around or adjacent to compounds and is usually fenced in with thorn bushes. However, in some of the most densely populated parts bushes have become scarce and fencing has become difficult, particularly for the poorest households. Traditional compounds are fenced in with wooden poles and count a large number of internal fences, which have a function similar to that of the inside walls of a modern dwelling. However, because of the lack of wood in the densely populated areas newer compounds have less fencing - particularly within the compound - than older ones.

3.7 In Kavango the compounds are more concentrated in actual villages, while cropland is situated further away from the compound. In the interior - away from the river - where people depend on boreholes for their water, adequate crop land may be up to an hour's walk away from the settlement. Alongside the river adequate crop land has become scarce and new land is cleared further inland, at distances of up to half an hour's walk from the compounds.

Social and Political Organization

3.8 In Ovambo the supreme traditional authority is the King (or paramount chief), who is choosen by and from among the members of the royal family. Although there are seven tribes in Ovambo - the Kwanyama, Ndonga, Kwambi, Ngandjera, Kwaludhi, Mblantu and Nkolonkadhi, the first four accounting for 85% of the total population - only three have kings. For various reasons the other four tribes have chosen not to designate a new king, due to problems related to the war of independence or internal frictions.

3.9 The five Kavango tribes - Kwangari, Mbuza, Shambyu, Gciriku and Mbukushu - are headed by chiefs. Traditionally the position of chief is hereditary and matrilineal, but nowadays chiefs are elected from amongst the favoured family in a tribal meeting organized by second level officials, the headmen. One of the current Kavango chiefs is female. Both kings and chiefs represent their people towards the formal authorities. Vice versa, government action towards the tribes is canalized through the chief. In cooperation with the governmental authorities kings and chiefs also deal with grave offenses such as murder.

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3.10 After the king or chief the next ranking official is, in Ovambo, the senior headman and in Kavango, the headman. Senior headmen preside over several wards or villages which in turn are administered by headmen in Ovambo and foremen in Kavango. In Ovambo, senior headmen are chosen by assemblies of headmen and approved by the king. In Kavango they are chosen by assemblies of the villagers of the wards involved. Kings and chiefs as well as lower ranking traditional leaders are frequently counseled by elders. There do not appear to exist any "institutionalized" councils with formal authority over community or tribal issues.

3.11 At village or ward level, the ranking official is the headman in Ovambo, and his equivalent, the foreman, in Kavango. In large villages or wards (over 50 households) there may be assistant headmen or foremen who preside over 10 to 20 households. Duties consist mainly in resolving minor conflicts between villagers and the allocation of crop land. Headmen and senior headmen also have to give permission for sale of cattle outside the village, as a means to control sales of stolen cattle. Headmen and foremen also serve as the village or ward representative to higher administrative levels.

3.12 In Kavango, foremen obtain their position through popular election at village level and retain their position for as long as the people see fit. In Ovambo, however, it is accepted practice that a headmen purchases his position, for a price of up to 10 oxen or a few thousand Rand's in cash. The negotiability of the position of headman is accepted by the Ovambo people, and it is considered reasonable that the person who has invested in obtaining the position recuperates his investment through the fees charged for allocating cropland.

3.13 It stands to reason that a person who purchased his position has less authority, prestige and status than a person who obtained his position through a popular election. Indeed, the foremen of Kavango seem to have somewhat more prestige than Ovambo headman. Nevertheless, social differentiation between headmen and villagers is limited, and in many cases the headman is little more than a first among equals. That is among others observable in group interviews, in which villagers do not hesitate to answer questions put to the headman if they consider their knowledge and opinions more relevant.

3.14 Operating parallel to the traditional administrative and political institutions are those of the modern nation state, described in Chapter 2.3. Although in the major towns of the regions - Oshakati, Ondangwa and Rundu - these institutions have replaced traditional structures, at village level their political and administrative impact is quite limited. The presence of the state is more notable in the area of services: education, health care, infrastructure and pensions.

3.15 Traditionally, social organization of both the Ovambo and Kavango has been based on the matrilineal system of relationship. This system determined family law,
marriage, the law of inheritance and succession as well as religious and political systems. However, under the influence of particularly the Christian mission social organization has changed considerably, with the traditional matrilinear extended family unit being replaced by the nuclear family as the central household unit.

3.16 Mostly, the ties between households that make up a rural community (village or ward) are weak. Each household has a large measure of autonomy in decision making as long as general values and norms that prevent people from harming each other’s interests (from the prevention of having cattle eat other people’s crops to murder) are respected. Strong social ties are mostly found between households of closely related relatives, e.g. brothers and sisters, parents and (married) children. Young couples frequently remain tied to the households of their parents even if they set up their own compound and obtain their own cropland. Continuing social ties are then used to obtain draught power (oxen) and ploughing implements and for the exchange of labour.

3.17 In spite of a relatively weak social structure, various forms of mutual assistance can be found in both Ovambo and Kavango society. As a means of old age security, elderly people are sometimes “allotted” grandchildren, to be brought up by their grandparents. In turn it is expected that these children will take care of their grandparents once these will have become too old to fend for themselves.

3.18 Another form of mutual assistance is group work on each other’s land. The organizing household cooks food and brews the local beer (from sorghum and millet) and invites people from three or four neighbouring households to work on their cropland, usually for weeding but also for land clearing, planting, harvesting or threshing. In turn, members of the organizing household are supposed to participate in similar group work organized by the other participating households. Only elderly people are exempt from that obligation. For poorer households, however, it has become increasingly difficult to spare the food and drink needed to organize a day of group work. Particularly in Kavango, this has already led to a change in character of much group work. Where that has happened the horizontal relationship involved in labour exchange has been replaced by a vertical relationship of employer-employee, exemplified in what amounts to payment in kind (food and drink) of people too poor to organize their own group work. The fact that on some occasions groups may involve up to 30 persons and that a head of cattle is slaughtered to feed them seems to indicate that organizing large scale group work may also involve a status element.

3.19 Another form of mutual aid is the lending of cattle to cattelless households. The borrower receives manure - to be used as fertilizer on crop land - and milk, in exchange for herding his cattle. For larger cattleowners distributing his herd over various households provides the additional benefit of the spreading of risk. Smaller cattle owners also exchange part of each other’s herds so as to limit the risk of an entire herd being affected by a contagious disease.
3.20 Two other forms of mutual assistance are the collective digging of wells (in the dry season) and cooperative herding, particularly at cattleposts. Members of different households will take turns in looking after their combined herds, thus liberating labour needed for crop cultivation and other activities.

Land Tenure and Control of Common Property Resources

3.21 In both Ovambo and Kavango cropland is assigned to individual households by the village headman or foreman. In Ovambo, headmen charge amounts of up to five hundred Rand or a head of cattle for the allocation of cropland, which gives the person the right of usufruct for the rest of his or her life. This right is not transferable, which means that upon the death of the beneficiary payment has to be renewed. This implies a particularly heavy burden on widows, a burden that is further increased by the fact that in many cases, the family of the deceased husband claims all the cattle the household owned. In Kavango, no payment is involved in the allocation of cropland, and widows and children retain the right of usufruct originally awarded to their husbands. In principle, grazing land - or in fact all land that is not used as crop land - is communal property and accessible to all. Water is also communal and freely accessible. The only exception to this rule may be hand dug wells, the use of which is sometimes restricted to those who have helped in the digging.

3.22 In addition in spite of the principle of collective land ownership considerable areas of previously unutilized land in Southeast Ovambo and Southwest Kavango have been divided up in parcels of around 5000 ha and allocated to individuals. In Kavango, this is actively supported by the regional agricultural services in an apparent effort to stimulate commercial farming. Individual farmers are also known to have fenced in rangeland without official permission. In the medium and long term this privatization of communal land, if allowed to continue, will greatly reduce the possibilities of outward migration from the densely populated areas in Kavango and particularly Ovambo.

3.23 In the narrow strip bordering the Okavango river in Kavango and especially in the central Cuvelai basin in Ovambo, crop land is becoming scarce. In some instances it is no longer possible to extend existing fields and no new cropland is available to (newly formed) households. As a result, young couples have two options: stay with the household of one of the parents or move to areas where land is still available. For the time being the former option seems to be preferred. However, as population pressure grows it will become increasingly difficult to sustain ever larger families with existing croplands. As a result the second alternative, migration, is likely to increase importance in the future.
Social Stratification

3.24 Within most villages there is only a limited measure of social stratification. Traditionally, factors such as the size of cropland, the amount of stored millet and cattle ownership are important denominators for social status. Now, wealth is also reflected in housing, ownership of pick-up trucks, tractors or large modern coca shops. People that possess the latter resources form a small minority in the larger, more accessible villages.

3.25 In most of the smaller villages, differences between households are difficult to observe. Relatively better off households may have larger compounds with a larger number of huts and more elaborate fencing - both internal and external. Particularly the homesteads of female headed households that have been deprived of adult male labour for a long period of time may show signs of decay. Fence and hut construction are typically male tasks and the households in question usually do not have the resources to pay men from other households to perform the necessary maintenance or expansion.

3.26 Cattle ownership is, as a rule, not reflected in living conditions. One might expect that the ownership of a large herd of cattle would allow regular offtake of a considerable number of animals, providing income which could be reinvested in agriculture, off farm activity such as trade or transport, housing or possession of consumer goods. In practice, however, the possession of a large herd of cattle is considered as a goal in itself. In economic terms cattle is considered as a savings account, to be drawn upon in times of need, and as a source of manure and milk. It is not considered a source of (regular) income. This implies cattle is only converted into cash to satisfy immediate and urgent needs, not to purchase items that can essentially be considered as luxuries. As a consequence, differences in cattle ownership are not reflected in differences in material wealth such as modern housing, the possession of durable consumer goods or clothes.

3.27 Still, cattle ownership is still an important determinant of social stratification. Access to draught power in the form of oxen has contributed to increased differentiation between households. Over the last decade a significant proportion of households has lost their cattle as a result of drought, disease and war. Frequently loss of cattle has meant loss of access to draught power, and consequently, the inability to cultivate areas large enough to meet subsistence needs. Especially in Kavango, work on the crop lands of less poor households has become one of the few available alternatives. Thus, socio-economic differentiation occurs as a result of the creation of the already mentioned vertical employer-employee relationships, which replace the traditional horizontal relationship of labour exchange through group work. As stockless households without access to draught are increasingly forced to sell their labour, a gap is created between this group and those who employ them. In between there is a group without cattle but with access to draught power, through family relations and/or some source of off-farm income.
3.28 Although the increased status tied to cattle ownership is often mentioned the two are not synonymous. This can be observed among others in the fact that foremanship or headmanship, the principal way of obtaining formal social status, does not appear to be necessarily tied to cattle ownership. In Ovambo, it will usually be cattleowners who have the resources to buy a headman position. However, as indicated above, acquiring this position is not so much tied to status and prestige as to the ability to generate the required price. In Kavango, several cases were encountered of foremen with only small numbers of cattle: a majority of villagers apparently had preferred these individuals over other community members with much larger herds.

3.29 Although social differentiation at village level is relatively limited, there is a huge gap between, on the one hand, the large mass of the rural population (as well as most of the urban population) and on the other, a small regional elite consisting of businessmen and government officials. A small group of businessmen controls most of the economic activity in Oshakati, Ondangwa and Rundu. It is mostly these same persons who are involved in the above described privatization of communal land for - supposedly - commercial farming. Together with top government officials this group makes up the regional upper class. Then there is a small middle class consisting of, in the urban areas, intermediate level government officials and professional personnel employed in the private sector. At regional level, the people based in the rural areas that own larger stores, means of transportation and/or tractors could be considered as part of this upper middle class. At village level, however, the gap between these few households and the rest of the villagers is such that the former can rightly be described as the rural upper class.

**Household Structure**

3.30 Traditionally both the Ovambo and Kavango are polygamous. However, under the influence of Christian churches, the central household unit now is the nuclear family (man, wife and offspring). Often, this central unit is extended with divorced or unmarried daughters with children, and in some cases, with single or widowed brothers or sisters of the head of household. Frequently one also encounters grandchildren, nieces or nephews in the household. One reason given was that the parents of these children were, for one reason or another, not able to adequately take care of these children. Also, these younger children are ceded to elderly couples so they could help out their stepparents once these would be too old to work. Under this arrangement the children benefit from the more ample resources of the household to which they have been assigned the stepparents secure the support of old age providers.

3.31 In Kavango also the traditional kinship and marriage system of matrilinearity and polygamy has largely been replaced by the nuclear family as the predominant family
unit. However, polygamy still occurs and seems to be more frequent than in Ovambo. Wealthy polygamous men may have their wives living in different homesteads.

3.32 An important difference between Ovambo and Kavango is that while in Ovambo a household will occupy one homestead and work one field (situated adjacent to or even encircling the homestead) in Kavango a homestead or compound may contain several households - each with its own crop land. Mostly it concerns a man and wife with offspring, joined by the households of married daughters with husbands and offspring. For one enumerated village a total of 77 enumerated homesteads 22 (28%) were indicated as having more than one household. Actual decision making on the measure of integration seems to be more a matter of choice of the people involved and the situation at hand than one of strict social rules. The variation encountered makes the definition of what exactly constitutes a household - and in diagnostic research, what is the sampling unit - quite complicated. For practical reasons, the team decided to define a household as a family unit cultivating its own crop land.

Gender Relations

3.33 Where a (married) couple is the central unit of a household, the man is invariably indicated as the head of household. That said, men and women seem to stand on a fairly equal footing in the management of household affairs, particularly in Kavango. Although each gender has its own tasks, the relative influence of husband and wife in decision making at household level appeared to be more a matter of personality than of traditional roles. In Kavango women were said to manage cash income for the household, while in Ovambo men appear to do most of the decision making in this respect. Cattle management is a typical male affair, as is the ploughing of crop land. Men as well as women ascertain that apart from planting, a typical female activity, other agricultural activities - weeding, harvesting, threshing - are a shared responsibility of men and women. In practice, however, it seems that women perform most of these tasks while the men are more occupied with herding.

3.34 The position of women in inheritance matters stands in sharp contrast to the apparently considerable degree of equality between men and women in daily life. Upon the death of the husband, the man's family decides on what to do with the household's property, particularly cattle. Especially in Ovambo it is common that all cattle are taken away by the deceased's family, i.e., his brothers, parents or cousins. As simultaneously payment for cropland must be renewed the widow and children of the deceased are severely disadvantaged. In Kavango, the decision as to what happens with the deceased's cattle is also made by the man's family. However, the family is more likely to leave at least some cattle to the widow and children, who also retain the right to their cropland without any need for payment.
3.35 In the literature, particularly that concerning Ovambo, mention is made of a large number of de facto female headed households as a result of the large number of men that have migrated to urban areas in search of work. In the household interviews, however, less cases of migrant labour were found then expected: only 4 heads of households in Ovambo (12%, n=34) and none in Kavango. Moreover in Ovambo men working outside of the region were still considered the de facto head of household, and with some justification. Even though the man would be away for most of the year he would still make a number of key household decisions on cash expenditure, cattle offtake and area to be ploughed. Three out of the four cases involved work in the fishing industry in Walvisbaai for a period of only seven months a year, which means that the other five months the man would be at home. Thus the man retains at least the “title” of head of household, as well as the de facto decision making powers with regard to a number of crucial aspects of household management.

3.36 Even when households where migrant labour takes men away most of the year are still indicated as male headed, in Ovambo the number of female headed households is high. Village enumeration shows a percentage of 33 (n=447), as compared to 17 (n=125) in Kavango (figures for the household interviews were 21%, n=34 for Ovambo and 24%, n=21 for Kavango). Since as a rule village enumerators considered households where the man was involved in migratory labour as male headed, female headed households must have involved only cases of divorce and widowhood.

3.37 The reasons for the difference between Ovambo and Kavango was not investigated, but several hypothesis can be presented. First, the higher occurrence of migrant labour in Ovambo may have caused a higher number of divorces, as men working in urban areas set up new households there and severed ties with the original household in the Communal Area. Secondly, Ovambo society bore the brunt of the independence war, which may have resulted in both higher casualties among men and larger numbers of men being separated from their families - again a factor increasing the chances of divorce. Finally, as in Kavango it is common to have more households living in one compound, divorced or widowed women may have had more of an opportunity than in Ovambo to return to the compound of relatives. Thus female headed households would have been absorbed into larger households.

Farmer’s and Women’s Groups

3.38 Apart from occasional church groups dedicated solely to religious activities, no permanent formal or informal organizations or groups were identified in the 29 studied villages. The closest that people come to organization is through different forms of inter-household cooperation, i.e. the exchange of labour through group work on each other’s land, collective herding and the collective digging of wells in the dry season. It
seems that particularly with regard to the latter more cooperation and coordination would be feasible.

3.39 Village assemblies are a form of communal organization but do not have the characteristics of a formal organization. Meetings are called *ad-hoc* by the headman or foreman to address specific issues. Meetings are not, however, held on a regular basis and the assembly has no specific objectives other than the very general one of dealing with community issues.

3.40 Formal organizations, in which groups of people cooperate on an equal footing to achieve specific goals, are extremely rare. The main reasons for this are a lack of tradition and experience in formal organization, and a lack of purpose. Traditionally, individual or small groups of households fend for themselves and are to a large extent self-sufficient. In fact, this situation continues today, as households are still primarily directed at self-sufficiency, while the limited needs for cash are satisfied through individual small-scale trade at village level. Generally speaking there thus seems to be little need for organization. For example, there is no need to propose action against or circumvent middlemen who take in most of the benefits of the sale of agricultural or other produce. Neither does there appear to be a need to address a problem of shop owners who charge exorbitant prices. Most basic needs are satisfied by the already mentioned network of tiny locally owned stores (cuca shops). Thus there do not seem to be major institutional obstacles to satisfying the goals of the overwhelming majority of the rural population: food security, a small cash income to pay for a few basic necessities, and ownership of a reserve fund, in the form of cattle or cash. The major limiting factor in satisfying one’s objectives is perceived to be drought: a consequence of the erratic climate and something only God can resolve, but certainly not any kind of organization. Although there is fairly widespread perception that the government should do more to help - particularly in a drought situation - organization is not yet considered as a means to pressure the authorities more effectively. Rather, concerns with regard to government support are considered as something to be transferred through traditional leaders.

3.41 When specifically asked, many people affirmed the importance of organization. Yet, people were limited in conceiving specific goals or purposes. However, on a few occasions, people were found to have cooperated at village level to attain a common goal. In one case this involved digging a trench for a water pipeline promised by the government - an activity for which a village "Water Committee" had been formed. This example appears to indicate that where people perceive a clear benefit from cooperation they are willing to do so.

3.42 Although no formal organizations appeared to be functioning at village level, a regional farmer cooperative operates in Kavango. NAKACO (Namibia Katembo Cooperative), formed in 1990 to market millet, now has 200 members who pay a R10 monthly fee. This seems high and probably an insurmountable obstacle to most
communal area farmers. In 1991 some 400x50 kg bags of millet were marketed from approximately 10 farmers. The cooperative has received support from several NGO's who have financed the purchase of a dehuller, a hammer mill, a cold room for vegetable storage and a truck. Because of the crop failure no millet was purchased in 1992. However, the cooperative's manager succeeded in obtaining a contract with the Rundu municipality for garbage collection and disposal. Net profit of this operation was estimated to be R5000 a month. These proceeds were being used for short term credit to members, with a maximum of R2000 per beneficiary. The coop aims at helping the Kavango vegetable production projects with the marketing of their surplus produce. To that purpose it obtained NGO funding for a cold room, installed in February 1992 but hitherto unused. The cooperative has plans to embark on and is looking for grants for fish farming, chicken farming and millet production on a 40 ha plot.

3.43 For the time being there appears to be a big gap between NAKACO and the average Kavango farm household. In the absence of regular crop or livestock sales and with minimal input use in production, there is no basis for a marketing or input supply cooperative for communal farmers. So far NAKACO appears to have formulated two responses to this predicament. One is the orientation towards larger farmers, as is indicated by the relatively high membership fees and the aim of marketing surplus millet. The second response involves developing the coop into what amounts to a productive enterprise, aimed not only at processing the produce of farmers but also at the actual production of millet, chickens and fish.

Access to Supporting Services

3.44 The people of Kavango and particularly Ovambo have had very little access to or benefit from services supporting agricultural development. NGO's - particularly the Mission - have had some impact earlier in the century, particularly through the introduction of ox ploughing. However their influence has diminished considerably as a consequence of the insecurity and political problems that accompanied the war of independence.

3.45 Communal farmers have benefitted to a certain extent from government providing water development and veterinary services. Particularly in Kavango a fairly ample network of boreholes has been established and maintained, while the veterinary service is active in the vaccination and monitoring of cattle, particularly against lung disease (CBPP) and food and mouth disease (FMD). In Ovambo a considerable number of boreholes as well as small dams were established in the years before the war. However, many were damaged or not maintained during the war. Although a vaccination programme is in place, the disruption caused by the war has not yet permitted the veterinary program to attain the same level of service as that in Kavango. The only other recent development efforts appear to have been some small scale projects for irrigated
vegetable cultivation near permanent water supplies - in Ovambo, along the Ruacana-Ondongo canal.
4. PRODUCTION SYSTEMS IN THE PROJECT AREA

4.1 The vast majority of rural people in the NCAs are subsistence farmers who feed themselves from their crops, and keep livestock as an adjunct to their arable activities. Throughout the four northern regions all the people place great importance on livestock ownership, but arable cropping is the essential core of their subsistence. Only in Kaokoland are there possibly any true pastoralists who rely primarily on livestock, rather than crops, for their subsistence but even there cultivation is widely practised.

4.2 The production systems include both crops and livestock, and can be further classified as subsistence or commercial. There is an insignificant number of commercial producers in the NCAs although in Caprivi the Department of Agriculture classifies farmers with holdings greater than 10 ha as commercial. There is considerable interdependence between crop and livestock production at subsistence level. The major livestock species are cattle, goats, sheep and chickens, although pigs are kept in small numbers in Ovambo, Kavango and Caprivi, and ducks are quite common in Caprivi. Horses and donkeys are not considered to be in a livestock production system per se; horses are used only for human transportation, donkeys are used mainly for ploughing and for pulling carts, but neither are actively managed.

4.3 The areas of different agro-ecological zones, and their suitability for crop or livestock production, are summarised in the Table JS8. Areas suitable for cropping are also suitable for livestock, i.e. suitable for grazing livestock. There are no accurate data available for the areas under different forms of land use or production system in the NCAs.

4.4 Within both crop and livestock production there is some gradation from pure subsistence to commercial production, however there are extremely few strictly commercial units in the NCAs. The difference between subsistence and commercial production is primarily dependent upon the scale of operation; only those operators who are able to exceed their household requirements for food security can envisage sale as an objective of production. Only a small minority of farmers, in Caprivi, fit in this category.

4.5 In respect to land use for crop production, the choice of crops grown in each region is dependent upon regional (ethnic) food preferences, soil type and rainfall. In livestock production the most favoured species throughout the NCAs is cattle, followed by goats, although goats greatly outnumber cattle in Kaokoland. Goats are generally preferred to sheep. Throughout the major part of the NCAs there appears to be little deliberate selection of a particular livestock species in relation to a vegetation type; as far as possible all grazing livestock are run together, and the regional differences in species distribution appear to be mainly due to tribal preferences. However there is some
consideration of the greater suitability of goats than sheep to wooded areas, and of smallstock than cattle to very dry areas. The occurrence of ducks only in Caprivi reflects the greater abundance of water and the tendency to flooding. Chickens are found wherever there is settlement, irrespective of land type, while pigs are linked to areas of arable production.

Crop Production

4.6 Whilst each of the northern regions is populated by a number of different tribal groups, the range of crops grown and the crop production practices are remarkably similar, with the possible exception of Kaokoland. Prior to independence there was essentially no development of the crop or livestock sectors in the communal areas, hence the majority of the population, and the vast majority of the rural people, are subsistence farmers who strive to feed themselves from their crops. Great value is placed upon livestock ownership, and there are important inter-dependencies between crops and livestock, but arable cropping is the essential core of their existence.

4.7 In addition to traditional subsistence farming, in which surpluses achieved in good years may be sold but production is not planned for marketing and cash income from farming is low to non-existent, a more commercially oriented group of farmers is emerging in East Caprivi. These people plan production with a view to selling on the informal or formal market and regard agricultural production as their primary economic activity, but most are still partially dependent upon wage employment in Katima Mulilo to finance their agricultural enterprise\(^1\). Maize is the staple food and the most easily marketable product in Caprivi.

4.8 As Eastern Caprivi is regarded as having the highest agricultural potential in Namibia, there is likely to be an increase in commercial production activities. The Lonrho Group, for example, has announced plans to develop a 6,000 ha sugar cane plantation in the region. Livestock are widely owned in East Caprivi, and in recent years there has been a rapid expansion of cattle numbers.

4.9 A summary of estimated cropped areas, yields and consumption for the three regions Ovamboland, Kavango and East Caprivi is presented in Table JS3, and a generalised crop and seasonal calendar in Table JS6.

\(^1\) NISER (1990) The land issue in Namibia: an inquiry
Range of Crops

4.10 The range of crops commonly grown from Ovambo to Caprivi includes pearl (bullrush) millet, sorghum, maize, beans (mainly cowpeas), pumpkins, water melons and groundnuts. In Kaokoland the main crop is an extremely hardy local variety of maize\textsuperscript{1}, however in Ovambo very little maize is grown and the yields are usually poor. In Ovambo and Kavango, millet (mahangu) is the main crop and staple food, but the planting of maize increases through Kavango to Caprivi where maize is the staple food and sorghum the second most important crop.

4.11 In Ovambo and Kavango a local variety of millet is normally grown but an improved variety, bred at ICRISAT in India but tested and released under the local name of Oshakana-1 by the Rossing Foundation in Ovambo, is now available. Farmers who have tested it report that it greatly outyields the local variety in a short or poor growing season, but has no definite advantage in a good year. Being a short season variety, Oshakana-1 matures during the rains if planted too early, and farmers find the shorter stems less suitable for building material, but the processing and food quality characteristics are considered to be as good, or better than, the local variety. In Caprivi, hybrid types of maize were introduced but have largely been replaced with more convenient open pollinated varieties.

4.12 In Ovambo and Kavango a number of local forbs, e.g. \textit{Amaranthus spp.}, and \textit{Hibiscus vitifolius} (mutete) are collected, and even cultivated, for use as vegetables. In Kavango the fruits and nuts of various local trees, e.g. \textit{Strychnos} spp. (uguni, utu), \textit{Guibourdia coleosperma} (nsivi) and \textit{Ricinodendron rautanenii} (mangetti) are widely harvested for consumption and for sale. These bush foods play an important part in the diet and economy of poor households in times of crop shortage.

Site selection, size and number of fields

4.13 Site selection and field size are inter-related and depend upon many factors including soil type, natural vegetation cover, land availability, distance from household, size of household, labour resources, and access to draught or tractor power. Particularly in Kavango, access to ox ploughing services has a significant bearing on the area cultivated. The best available soil is selected within the constraints of the other factors, for example choosing between a small field close by or a larger one further away.

\textsuperscript{1} Paskin, R.D. (1990)
4.14 Sites of suitable soils for cultivation and with reasonable access to permanent water are few and consequently there are pockets of high concentration of settlement and cropping, e.g. along the riverine alluvial soils and in the Cuvelai basin. Population pressures in these areas are forcing farmers to move further away, to cultivate more marginal land and/or to cultivate fields further from where they live. In Ovambo the croplands are almost always adjacent to the homestead but in Kavango they are often up to an hour's walk away. The reason for the separation is not always clear but in some instances it is due to the development of a village around a borehole, and the people having to scout around for good soil to cultivate.

4.15 Households aim to cultivate as much land as is necessary to meet their subsistence needs, and as the size of the household increases so does the household try to cultivate more land, but this is not always possible. There is a direct correlation between field size and household wealth in each region. Kaokoland farmers cultivate fields from 0.5 ha to 2-3 ha in size, mainly in the floodplains around Opuwo and along the banks of the Okawesha and some of the seasonal rivers. In the Cuvelai area of Ovambo there is intense land pressure, hence field sizes are smaller (2-3 ha) than those outside (4-10 ha). The majority of Cuvelai farmers say they would like more land to cultivate, whereas many of those further out say they have as much as they need or are able to cope with.

4.16 There is less land pressure in Kavango and fields tend to be larger than in the Cuvelai but smaller than those outside it. Average field sizes in Kavango are reported to be 4.4 ha. In Caprivi, where commercial production is becoming more common, some farmers hold rights to up to 200 ha of arable land and the average area held by farmers in Caprivi was 82 ha in 1990/91, about twenty times more than in any other communal area. However, the average area cropped was 5.6 ha compared to the communal area average of 3.5 ha.

4.17 The full range of crops is normally grown in the same field, either interplanted or in different parts of the field. There is no practice of rotating crops within a field. In Ovambo the normal practice is to continuously cultivate a single field, although some individuals do acquire more than one if they need to expand their cultivated area but cannot increase their field size. In Kavango there is generally less pressure on cultivated land and in former times it was common practice to use two fields alternately. The diagnostic study found that most respondents initially said that this is still practised, but on further questioning admitted that they are not actually doing so. It appears that generally one field is used for as long as it provides acceptable yields, but that it is still considered possible to find additional land for cultivation, albeit some distance from the homestead.

Land clearing and ploughing

4.18 New land is cleared of natural vegetation by hand, but the labour requirements to do this restrict the ability of households to expand their cultivation even if more land is available. Ploughing is done mainly by draught power and by hand (using hoes). In Kaokoland the Himba plough mainly by hand, whereas the Herero sometimes use draught power in the form of donkeys or oxen. In Ovambo a UNICEF survey¹/ found that 34% of the rural households ploughed by hand, 24% with their own oxen, 37% with their own donkeys, 6% with tractors, and 12% with hired draught. The diagnostic survey found that farmers commonly use more than one method of ploughing their land. Draught teams usually comprise two oxen or two donkeys.

4.19 There are very few donkeys in Kavango, and the diagnostic study recorded no usage of donkeys for ploughing. The study did not detect any tractor usage either, as this tends to be limited to the less common larger land holdings. From the village interviews and household enumeration lists, it is concluded that access to draught power is more of a constraint in Kavango than in Ovambo.

4.20 In Kavango the government currently operates 10 tractors, which plough about 800 ha per year at a charge of R24 per hectare, but these services are normally limited to field sizes of ten or more hectares, so excluding the most needy. Similarly, in Caprivi, the "commercial" farmers with holdings of more than 10 ha are eligible for subsidised mechanised land preparation and planting, in order to remove labour constraints to expansion. In Kavango, and possibly in other regions, the government ploughing was initially available on a credit basis but there were so many non-repayments that prior payment is now demanded, although farmers complain that it is too difficult for them to pay in advance.

4.21 The government also subsidises contract ploughing by private tractor owners; costs per hectare are estimated to be R60, of which the farmer pays R24 and the government pays R36. In Ovambo 46 private tractor owners performed contract ploughing services through the subsidy scheme in 1992, ploughing a total area of about 1,800 ha. In Kavango there are only 4 private tractors doing contract ploughing. Tractor owners are understandably reluctant to send their tractors far to plough small areas, so again only the larger land owners benefit. The ploughing subsidies are expected to be phased out over the next 5-10 years but concern was expressed by Department of Agriculture officials in Kavango that the tractor ploughing programme could be counterproductive by causing farmers to sell their draught animals and become dependent upon an unsustainable subsidy.

¹/ UNICEF (1990) Household health and nutrition in Namibia
Planting and weeding

4.22 In the subsistence sector all planting is by hand. The cereals are planted immediately after the ploughing or hoeing, normally by women who walk in lines at right angles to the direction of ploughing (to prevent the seed being buried too deep) and drop a few seeds at one pace intervals then tread it in as they walk on. The result is a plant spacing of approximately 0.75m x 0.75m. The vegetable crops are interplanted 3 or 4 days later.

4.23 Ploughing and planting normally run from December into January. Farmers who are dependent upon hiring or borrowing draught animals may be forced to plant later than they would like but, in general, late planting is not considered to be a problem. Some farmers with light soils choose to plough and plant while the soil is dry before the rains, to derive maximum benefit from the wet season. However, the majority prefer to plough after weed emergence in order to secure better weed control for their crop.

4.24 Weeding is also performed by hand, and is the major wet season occupation. Depending on field size, soil type, rainfall and labour availability, some households only manage to weed the whole field only once. A second round is considered preferable.

Harvesting

4.25 There is a concentrated harvest period in May/June, in which the fields are cleared of all remaining crops, however much of the maize and vegetable crop is extracted intermittently for consumption before this. In Ovambo the maize is eaten as a green vegetable. Hence, end of season harvest yields can considerably underestimate total production.

4.26 In Ovambo, where the fields are near the houses, the millet and sorghum are brought to the homestead for threshing but where the fields are further away, as in Kavango, threshing is performed in the fields and only the grain transported. At smallholder level, threshing is done almost always by hand; there is very limited access to mechanical threshers, except perhaps in Caprivi.

4.27 Grain is stored in purpose built stores or granary baskets. Post-harvest losses are variable but generally low, however in-field losses due to birds and other pests are reported to be high.

Labour availability

4.28 An important factor limiting the size of cultivated areas is shortage of household labour for land clearing and for weeding. The availability of male labour for
weeding is restricted by their occupation in herding cattle and, to a lesser extent, off farm employment. Female headed households often face more acute problems of labour shortage, however the downturn of off-farm employment is in some cases leading to the return of male labour. The broader issues of seasonal and gender related labour tasks are discussed later in this chapter.

4.29 Relatives tend to assist each other without repayment but many households pool labour for particular tasks on a flexible exchange basis. Traditionally participants in group labour tasks are supplied with food and drink, but poor households cannot afford even this provision, and in lean years many land owners may be unable to do so. However, in Kavango, cash payment for labour is more common. Households without oxen for ploughing can often borrow from a neighbour in return for labour.

**Crop inputs and yields**

4.30 In Ovambo, kraal manure is considered a very important animal product and is applied by the farmers to their croplands. In Kavango, manure is very rarely applied to the cropland; the fields tend to be further away from the kraals but it is not used even where the fields are close. This seems to be linked to the former practice of shifting cultivation which, although no longer common, still engenders a land use complacency. In Caprivi, also, shifting cultivation is less common than in former times but there is little use of manure.

4.31 Throughout the communal areas livestock are given access to the crop residues after harvest and there is some deposition of dung and urine on the cropland during this period.

4.32 Artificial fertilisers are not used at all in the subsistence sector, nor are any seeds normally purchased. Each farmer keeps a small quantity of his own harvested seed for replanting, and this is only consumed in dire necessity. A number of respondents gave difficulty of purchase or transport as reasons for not using fertiliser, while others said it is too expensive. There is little evidence to suggest that farmers would in fact use fertiliser if it were readily available, as in Caprivi fertiliser is rarely used despite a substantial subsidy.

4.33 Other crop production inputs are limited to labour and draught ploughing or tractor ploughing, all of which can be home owned, borrowed, exchanged for other services, or hired. There are no regular purchases of inputs. Periodic purchases include draught ploughs and harnesses and, possibly, draught animals.

4.34 Crop yields have not been recorded for smallholders in the NCAs. Based on various reports and discussions, millet yields appear to be in generally in the range 200-300 kg/ha in normal years, possibly reaching 500 kg/ha on good soils in good years, but
falling below 100 kg/ha (to nothing at all) in poor rainfall years. An FAO crop assessment study\(^1\) estimated 1990 millet yields to be 300 and 340 kg/ha for Ovambo and Kavango respectively, and sorghum yields for the same year to be 350 and 400 kg/ha. The report stated that due to good March rains these yields were 10 - 13% and 20% above normal for Ovambo and Kavango respectively. This has been confirmed by NEPRU\(^2\) who found that 75% of crop producing households in the Cuvelai area, and 68% of those outside, were obliged to purchase additional millet or maize for some months of the year. The region is a net importer of grain. The diagnostic study found that households start to mix maize with their millet at an early stage, rather than making a complete substitution.

4.35 Maize yields are difficult to determine in Ovambo, owing to the practice of harvesting the crop while green, and are highly variable in Caprivi. The FAO report estimated 1990 maize yields in Caprivi to be 150 kg/ha, only 15-20% of normal production (750-900 kg/ha).

4.36 In Kavango, where the average field sizes tend to be larger, the soils better and the rainfall higher than in Ovambo, more households are able to satisfy their own food requirements. Farmers with access to draught power are more likely to produce surplus to their household requirements and some are willing to sell this rather than store it. There is also a small number of commercial crop farming operations, mainly belonging to FNDC, and occupying a few thousand hectares in total.

4.37 Reports are contradictory on whether Kavango is normally a net importer of grains. Certainly Kavango does produce a surplus in some years and the Administration has occasionally bought millet from small producers in Kavango for relief operations in Ovambo; for example in 1987/88 about 80,000 bags were purchased at R70 per bag (R1.00 per kg), transported to Ovambo and sold to households there at R55 per bag. Equally certain, there is usually a net deficit of millet in Ovambo and Kavango combined. Even East Caprivi is a net importer of grain in most years.

4.38 Yields in a particular field tend to be regarded simply a function of rainfall and area planted, rather than dependent upon husbandry practices. Hence increasing the field area is seen as the only effective way of increasing production.

**Crop and by-product use**

4.39 All crops grown in the smallholder sector are primarily for home consumption. Millet and maize are used for making the porridge that is the staple diet.

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Millet is the preferred staple in Ovambo and Kavango but households commonly mix (purchased) maize with it to make it go further. Maize in Ovambo, and to a lesser extent in Kavango, is often harvested immature and used as a green vegetable rather than as porridge. In Kaokoland and Caprivi, porridge is made mainly from maize. Mechanical mills are rare, and pounding is normally accomplished by pestle and mortar. Some project farms have hammer mills which provide services to smallholders as well as processing their own production. There is one roller mill for maize in Katima Mulilo.

4.40 Millet is also used for preparing a drink (oshikundu), which may be slightly fermented, and is the standard breakfast for most rural households in Ovambo and Kavango. In Ovambo, sorghum is used primarily for brewing and for mixing with millet oshikundu to add flavour, rather than as porridge, but in Kavango sorghum porridge is also eaten. Brewing and, to a lesser extent distilling, is widely practised.

4.41 Beans and pumpkins are used as vegetables, as are various types of "bush cabbage" e.g mutete. The latter is not only eaten freshly cooked, but cooked and dried for dry season use. The seeds of some of the pumpkin family are used for extracting oil. Of the tree fruits, the bush orange (Strychnos spinosa) is eaten as fruit or brewed; nsivi (Guibourtia coleosperma) has a thin edible pericarp over a bean which is cooked and eaten; mangetti (Ricinodendron rautanenii) has under the hard shell an edible pithy mesocarp and inner kernel, and is also used for brewing as well as direct consumption. In Kavango, a mixture of mangetti and bush orange is commonly distilled into an alcoholic liquor which is used for both home consumption and sale.

4.42 The crop residues in the fields are grazed by livestock, especially cattle, but they are not reserved for any particular class of animal. In Ovambo, where the fields are closer to the homestead, many farmers collect some of the residues to feed in the late dry season, particularly to draught animals; in Kavango, where the fields are further away, this is rarely done. The millet and maize bran, separated during pounding, is fed to pigs and sometimes to poultry. Other household residues are also fed to pigs and poultry. Millet stalks are used in Kavango for constructing grain storage bins, and in some households as hut and homestead walls.

Marketing

4.43 Crop production surplus to immediate household requirements is normally saved for future use, rather than sold. Smallholders are subsistence farmers and hence only grow crops useful for home consumption. Almost all of the food produced in a village remains within that community; most is consumed within the household but some of it may be exchanged between households for other necessities. For example, millet is exchanged for meat. The subsistence economy is a largely cashless one, and exchange is more common than sale. Sale outside the villages is rare; householders interviewed in
Kavango said that in the past they had sold some of their millet harvest to FNDC but they regretted it and would not do so again.

4.44 Prior to independence, no formal channels existed in Namibia for marketing millet. However, the Namibian Agronomic Board is supporting two pilot purchasing schemes in the north with the aim of producing commercial millet flour products. There now exist, but more in name than in practice, several marketing cooperatives. One such is NAKACO (Nabibia Katemo Cooperative) which was founded in Kavango in 1990 with the objective of trading millet, and claims 200 members; business started last year with a revolving fund provided by Oxfam and 400 bags of millet were purchased from farmers at R55 per 70 kg bag, and sold to urban consumers at R65 per bag. Some of this came from Angola. They have new intentions to process millet into flour and to embark on fish farming, chicken production and millet production but no definite ideas how to go about it. The principal buyer of agricultural commodities offered for sale is the FNDC, also known by its Afrikaans initials ENOK. Cooperative marketing is possibly more common in Caprivi.

4.45 Maize production in Caprivi is being subsidised at three stages: at production (land preparation subsidies), at purchase (producer price subsidies) and during storage (by the Agronomic Board); hence even if Caprivi were to become maize-surplus it could never become competitive with other maize producing areas in Southern Africa.

Livestock Production

Role of livestock

4.46 With possible exception of the "commercial" fenced ranch developments, largely confined to the Mangeiti area of Ovambo and Kavango, the livestock sector is within the subsistence economy. In this context livestock have a far more diverse role than in commercial production. Cattle are the most important and valuable livestock species, as they satisfy the widest variety of needs. The main functions and products of livestock are as follows:

- capital - in the relatively cashless economy of the subsistence sector livestock are the major, and often the only, store of capital. Larger stores of capital mean wealth and, as such, livestock also provide status to the owner. As not only do livestock prices increase with time, but the animals multiply in number, livestock are the most attractive form of investment available to the majority of farmers.

- cash or barter - the store of capital can be used to generate cash when needed, e.g. for clothing and school fees. Meat of home
slaughtered animals is often exchanged with other members of the community for food commodities, e.g. millet.

food - the more pastoral Himba and Herero of Kaokoland rely most strongly on their flocks and herds for direct sustenance but, even in the more widespread farming households from Ovambo to Caprivi, food in the form of meat and milk is important. Cattle are never slaughtered simply for home consumption, but a large proportion of the meat is sold or exchanged for other commodities. Smallstock are slaughtered for home consumption but usually a portion is sold or exchanged. Slaughter of healthy animals is minimised by making full use of animals which die or are injured. Goat milk is consumed to some extent in Ovambo but rarely in Kavango or Caprivi. Goat skins are sometimes eaten. Poultry eggs are left to hatch.

draught - draught power is the preferred form of ploughing for all farmers except the few larger ones with access to tractors. Oxen are most widely used but donkeys are also used for ploughing in Ovambo and in Kaokoland. Oxen are used for pulling sledges on the sandy soils, and donkeys are used with wheeled carts. Donkeys and horses are also ridden.

manure - Ovambo farmers state the production of manure for application to cropland to be one of the most important reasons for livestock ownership, and the major benefit of caring for livestock belonging to others. In Kavango and Caprivi there is remarkably little use of manure but it might increase with land pressure. In Kaokoland cattle dung is mixed with clay for building houses.

traditional purposes - traditions demand the slaughter of livestock for various occasions including weddings and funerals. A chicken is normally slaughtered in honour of a household guest. Certain payments, for example the bride price (lobola) and fines imposed by the tribal authorities, are customarily payable with livestock. The actual ownership of livestock is also traditionally important, and being without any "is like being without clothes".

hides and skins - these are often discarded and represent an underutilised resource. However they are used for a variety of purposes including human consumption, feeding to dogs, making drums and chairs and making ropes (riems), e.g. for harnesses.
4.47 In the smallholder farming economy the crop-livestock linkage is very strong, and the people do not regard crops and livestock as alternative forms of production to be chosen between. The two are seen as complementary. Cattle (and donkeys) provide the most important means of land preparation, as well as providing manure for the cropland (although this is not always used), and in turn derive benefit from use of the crop residues in the dry season. Pig production is dependent, for at least part of the year, upon agricultural production surplus to human requirements. All types of livestock form a capital reserve with which to obtain additional food in times of inadequate crop yields.

Ownership, distribution and herd composition

4.48 There are no reliable data for herd sizes and ownership distribution in Kaokoland but it has been estimated by the DVS that the average cattle herd size is 30-50 head, while small stock flock sizes vary from less than 100 to over 1,000 per owner.

4.49 In Ovambo the DVS estimated in 1990 the average cattle herd size per owner to be between 12 and 15 head, and concluded that following the succession of droughts in the 1970s and 1980s many households had lost their entire herds. A UNICEF survey1/ of rural areas in northern Ovambo found that 52% of households said they had no cattle at all. The DVS suggests that there is an increasing disparity in ownership, with wealthier individuals maintaining or increasing their herd sizes while an increasing number of households are owning none at all.

4.50 The diagnostic survey data for herd size distribution in Ovambo and Kavango are summarised in the table below and detailed in a series of tables in the Annex. The data indicate that 51% of households in Ovambo, and 66% in Kavango, have no cattle. A contributory factor to the high proportion of stockless households in Ovambo is the influx of many returnees since the end of hostilities in the region. In the densely populated central Ovambo the herd sizes tend to be smaller than away from the Cuvelai. In eastern Ovambo there are fewer households without cattle, and more large herds. Assuming a minimum herd size of 20 cattle for regular offtake to be possible, and DVS staff suggest the figure is nearer 30, less than 20% of herds are large enough. In central Ovambo and Kavango, where the majority of the people live, the figure is less than 10%.

4.51 The lending and borrowing of cattle and goats appears to be common in Ovambo. The diagnostic study found 17 out of 32 households to be caring for cattle belonging to another household, but 13 of these owned some cattle themselves. The borrower benefits from the manure and milk in exchange for caretaking and watering the animals in the dry season. In Kavango the practice of caring for another household’s

livestock is less common and is only done to help out relatives who are unable to care for the animals themselves. The diagnostic study found only 4 out of 20 households caring for another household’s animals in Kavango.

Summary of herd size distribution for cattle and goats in Ovambo and Kavango (% of households).

<table>
<thead>
<tr>
<th>No. of Head</th>
<th>CATTLE</th>
<th></th>
<th></th>
<th>GOATS</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ovambo</td>
<td>Kavango</td>
<td>Total</td>
<td>Ovambo</td>
<td>Kavango</td>
<td>Total</td>
</tr>
<tr>
<td>None</td>
<td>50.7</td>
<td>66.0</td>
<td>57.6</td>
<td>43.3</td>
<td>77.8</td>
<td>61.3</td>
</tr>
<tr>
<td>1-10</td>
<td>15.9</td>
<td>15.1</td>
<td>15.5</td>
<td>19.1</td>
<td>11.4</td>
<td>15.1</td>
</tr>
<tr>
<td>11-20</td>
<td>9.1</td>
<td>8.9</td>
<td>9.1</td>
<td>11.5</td>
<td>5.7</td>
<td>8.5</td>
</tr>
<tr>
<td>21-30</td>
<td>9.3</td>
<td>3.8</td>
<td>6.8</td>
<td>14.2</td>
<td>2.4</td>
<td>8.0</td>
</tr>
<tr>
<td>31-40</td>
<td>10.8</td>
<td>4.1</td>
<td>7.8</td>
<td>7.9</td>
<td>2.1</td>
<td>4.9</td>
</tr>
<tr>
<td>41-50</td>
<td>4.2</td>
<td>2.1</td>
<td>3.2</td>
<td>4.0</td>
<td>0.6</td>
<td>2.2</td>
</tr>
<tr>
<td>50+</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>(n = 408)</td>
<td>(n = 338)</td>
<td>(n = 746)</td>
<td>(n = 303)</td>
<td>(n = 333)</td>
<td>(n = 636)</td>
</tr>
</tbody>
</table>

Note: 1. Only one household had more than 100 cattle
2. Only one household had more than 100 goats

4.52 In Ovambo 43% of surveyed households had no goats and in Kavango the figure was 79%. These numbers reflect the much higher goat population in Ovambo than in Kavango. Flock sizes rarely exceed about 40 animals even in wealthy households, and there appear to be constraints of herding and disease which limit flock size.

4.53 The most detailed information on stock numbers and herd sizes is available from Kavango, where comprehensive records for each livestock owner are kept by the DVS. The 1992 data for cattle are summarised in Table JS4. The data show that herds of less than 40 animals are held by 83% of owners, and constitute 58% of the total cattle population, and that the mean herd size is 26.60 head. Only 1.25% of owners hold more than 100 cattle, and these herds constitute 7.78% of the cattle population. The average herd size is larger than in Ovambo but is not as widely skewed as has been suggested in other reports.

4.54 Herd size data compiled by the DVS for East Caprivi are misleading because they pertain to homesteads, which comprise more than one household and more than one herd. The average cattle herd size per kraal was found to be 63 head but the average number of households per kraal is not stated.
4.55 The diagnostic survey was unable to obtain conclusive data on herd composition; other workers have also experienced difficulty in obtaining accurate information on herd numbers and composition from household interviews. Unfortunately the data available from other reports are not presented in a standard format, so making regional comparisons difficult. The available data (Table JS5) show a healthy proportion of cows and calves, with a higher proportion of the latter in Kaokoland, although that sample was only four herds. The relatively high proportion of mature oxen reflects the importance of draught animals, except in Kaokoland.

**Grazing and water management**

4.56 The principal livestock management activity is herding, which is practised during the wet season to protect crops. For the rest of the year the animals are allowed to range free during the daytime, as they return voluntarily to the water points. All stock are normally kraaled at night throughout the year but less rigidly during the dry season. Herding is traditionally the responsibility of the younger men and boys, but school attendance causes a scarcity of herding labour, and has led to changes in herding patterns. In areas where the croplands are of low density, or adequately fenced, many cattle are now left unherded. In some of the remoter areas, herd owners complain that their animals range too far from the homesteads and consequently become lost or stolen. In Ovambo most farmers herd all their livestock together but in Kavango, where the cattle are often herded away from the homestead, the goats are more often herded separately. Where no herding is practised the goats tend to remain closer by than the cattle.

4.57 With the exception of a limited area of fenced ranch developments, mostly in the Mangetti area of Ovambo and Kavango, all grazing land is communal and no individual, village or group grazing rights are recognised. There is no active grazing management, and the seasonal distribution of livestock is inextricably linked with water availability. In the wet season livestock find water widely in ephemeral catchments such as pans and oshanas, but in the dry season are reliant on permanent sources which include hand dug wells, boreholes and the two major rivers. Springs are limited to the Kaokho hills. Dams are few, and limited mainly to Ovambo as the soils are unsuitable in Kavango.

4.58 There are, however, seasonal movements related to water and grazing availability. In Kaokoland the Himba tend to live near temporary water points in the wet season, and move to permanent water (springs, the Cunene river) in the dry season, and thus practise a form of rotational grazing. The Herero are known to be more sedentary, and to move only when the local grazing is exhausted.
4.59 In Ovambo many cattle owners move their herds out to dry season grazing areas (cattle posts), due to lack of grazing and lack of water in the homestead area. The main movement is eastwards, even into Kavango, and there is also movement into Angola (Map 10) but there is little movement to the western part of the region, owing to lack of water. There are specific grazing areas surrounding the Oshana area that have been traditionally used on a regular basis, for example the Oshimpolo veld (in Angola), the Ombuza flats, the Andoni flats (now largely in the Etosha Game Reserve) and the Omasheke. The large movement eastwards suggests that there is already considerable water development, although water for dry season grazing is still cited by herd owners as a major constraint. Most of the water sources are reportedly hand dug wells, and hence of limited extraction capacity, but there has been some borehole development in eastern Ovambo and more in western Kavango.

4.60 Herd owners commonly group their animals together for the dry season grazing to reduce the herding requirements. The movement principally involves cattle but some farmers send all their livestock. The herds usually move out in about May, after grazing the crop residues, and return in time for ploughing at the start of the next wet season in October/November. The majority of herds return to the same areas year after year but some entire herds are kept permanently at the cattle posts, with only the milk and draught animals returning to the homesteads for the wet season.

4.61 In Kavango there is less pronounced seasonal movement, and what there is occurs in the wet season. Cattle from the densely cropped and settled river zone tend to be grazed inland during the rains to keep them away from the crop lands. During this period they make use of ephemeral water sources although these are scarce in the sandveld. In the dry season the animals return to the river and homestead area. Cattle from inland settlements are also in some instances herded away from the homesteads and croplands during the wet season but, generally, where there are boreholes the animals take water from them all year round. Small stock are seldom grazed far away from the homestead.

4.62 In Caprivi the grazing and watering patterns are thought to be similar to those in Kavango, but the study team has no reliable data.

4.63 At present the rivers, dams and, with the same fenced ranch exceptions mentioned earlier, boreholes are essentially all communally accessible. Hand dug wells are owned and maintained by the people who dig them, but access to other stock owners in times of need is rarely denied. All the communal grazing area dams and boreholes have been provided by government and their maintenance is accepted to be the government's responsibility. There is no community responsibility for meeting any operational or maintenance costs; each borehole with a diesel pump has a pump operator paid by the tribal authority, and the diesel is supplied free of charge by government; the only cost sometimes borne by the beneficiaries is that of transporting
the diesel. Boreholes with handpumps do not have operators but the repairs are effected by government. Many respondents complained about delays in repairing borehole pumps. Each borehole has a single outlet and there is no practice of reticulation to additional water points.

Animal husbandry

4.64 There are no planned breeding seasons but the majority of animals are born during the wet season, from December onwards. Calves and kids are allowed to run with their mothers until naturally weaned, at about one year for cattle and six months for goats and sheep. All surplus males are castrated, during the coolest months of May and June, usually between 12 and 18 months of age. Castration is most commonly by knife for all species but some farmers in Ovambo reported using a Burdizzo for calves and/or elastorator rings for goats. Dehorning is not practised at all. The males kept entire are selected mainly on their own conformation characteristics but some farmers also take into account the production record of the dam. A seasonal calendar showing the main livestock related activities is presented in Table JS7.

4.65 The criteria are less specific for culling of females. Some owners say they get rid of a cow if it has not produced a calf for 3 or 4 years, others say they cull when the teeth are too worn or the owner thinks it will not survive the dry season. In practice no animal is sold or slaughtered until there is a specific cash need. Where possible a farmer will exchange his cull animal with a younger one from a household that intends to slaughter.

4.66 Cattle, and sometimes other stock, are given access to crop residues in the fields after harvest. In Ovambo and sometimes in Kavango, if the fields are nearby, farmers harvest some of the crop residues and store them at the homestead. They are fed late in the dry season, primarily to the oxen to build up their condition for the next ploughing season.

4.67 Goats are normally expected to be entirely self sufficient on what they graze, browse and scavenge. Chickens are free range but receive household scraps and are sometimes supplemented with grain residues. Pigs in Ovambo are also free ranging but some in Kavango are kept in small enclosures. All pig owners agree that, unlike chickens, pigs must be supplemented for their survival. The number of pigs that can be kept by a household is a function of its crop production and food surplus, hence pigs are only found in small numbers and are sold off in times of food shortage. Housed pigs must be entirely fed, and the constraints are tighter.

4.68 Cattle and goats are normally kraaled separately. In Kavango, where the manure is not removed from the kraals, the kraal sites are moved periodically and some
stock owners alternate kraal sites during the wet season to let one dry out while the other is being used in order to reduce foot problems. No use is made of old kraal sites for planting of fodder or vegetables, although upon questioning some stock owners said they intended to do so.

4.69 There are few inputs into the livestock production systems; water and grazing are free, and herding is normally performed by a member of the household. The only cash inputs might be for additional labour for herding (although labour is also arranged by means of exchange, or paid in kind) and for animal health treatment. Other inputs include non-cash payments for herding labour, time for collecting and feeding crop residues, and any feed or feed residues fed to pigs and poultry. Returns are seldom realised directly in cash because so few animals are sold. Benefits include improved herd/flock health and productivity, and draught animal performance.

4.70 The diagnostic study was unable to obtain reliable animal (or bird) productivity data, and there do not appear to be any available. NISER has estimated that calving rates in Ovambo are as low as 30%, heifers come late into first calf, calving intervals are long, the cattle grow slowly and oxen mature at over 6 years with slaughter weights of 350 kg, while cows weigh 200-300 kg.

4.71 Most respondents in the diagnostic survey claimed that their cows produced calves nearly every year but the herd composition data in Table JS5 suggest calving rates of about 50% for Ovambo, Kavango and Caprivi, and about 70% for Kaokoland, although the last sample was only four herds and may be an over estimate.

4.72 Respondents also claimed that heifers calve at 3-4 years of age, and that oxen are mature for ploughing at the same age. From the NISER data, it is more likely that 4 is the minimum age for both. Mortalities are highly variable, with no losses in some years and very high losses in others.

4.73 All cattle owning respondents in Ovambo and Kavango said they milk their cattle. Milk is only available in the wet season and is drunk fresh or sour, or made into a type of butter. Goat milk is used sporadically in Ovambo and scarcely in Kavango. Cattle are milked by men while smallstock are more likely to be milked by women. In Kaokoland milk is an important part of the diet, particularly of the Himba people; cattle milk is preferred but smallstock milk is consumed in time of drought or in absence of cattle. There are no data for milk yields in the NCAs but they are known to be low.

4.74 The cattle and smallstock are let out of the kraals somewhere between 8am and 10am. The cattle are allowed to graze until about midday, then brought back in for milking. Thereafter they are let out again to graze until evening. Cows with older calves may be milked again in the evening.
Animal Health

4.75 Animal health is a major constraint to productivity, and for sheep, goats and poultry is of much greater significance than water or nutrition. Annual vaccination campaigns for cattle are conducted by the DVS against the major scheduled diseases Anthrax, Foot and Mouth Disease (FMD), Contagious Bovine Pleuropneumonia (CBPP or lungsickness) and Brucellosis (contagious abortion), according to the known areas of occurrence. Kaokoland is only vaccinated for CBPP, Ovambo for all except Brucellosis, Kavango for CBPP and FMD. East Caprivi is excluded from CBPP but Bovine Pasteurellosis vaccination is included due to large scale mortalities from this disease in the past. There are no routine vaccination programmes for other stock.

4.76 In Ovambo and Kavango the main cattle diseases are CBPP, botulism and blackquarter. Blackquarter causes rapid death but affects only young stock, whereas Botulism is prevalent among all animals in the dry season. Trypanosomiasis is enzootic in Caprivi at a low incidence in the vicinity of the Kwando River. FMD outbreaks are rare. Eradication of lung sickness has not been achieved in Ovambo due to a combination of factors including two-way movement of stock across the Angola border, a vaccination rate of less than 80%, and less than 100% efficacy of the CBPP vaccine. Furthermore, there is no effective treatment for the disease. Eradication of CBPP had been achieved in Kavango but it recurred in 1984 due to the war situation. Botulism could be avoided by calcium/phosphate supplementation but this entails supply logistics and a willingness to spend money on livestock. There is little problem with external parasites or tick borne diseases, although Anaplasmosis and Babesiosis occur in the higher rainfall areas. Dipping of cattle is not recommended by the DVS for any of the northern areas except Caprivi.

4.77 Internal parasites are a significant constraint for most stock, and the overriding health problem of goats (and sheep), but pasteurella and enzootic abortion also occur. Pigs seem to be fairly free of health problems but are liable to have measles owing to their scavenging habits.

4.78 Chickens are prone to a range of diseases with similar symptoms but samples are seldom obtained for laboratory diagnosis. Newcastle Disease can wipe out entire flocks; Coccidiosis and Mareks complex also occur. Vaccination and treatment of poultry is more difficult than with other livestock owing to the large total number of birds widely dispersed in small flocks.

4.79 In Ovambo the diagnostic survey found that anthrax, blackquater, lungsickness, gallsickness and lameness were stated to be problematic at almost every livestock owning village. In Kavango only lungsickness, lameness and FMD were commonly reported, reflecting the higher disease control status of this region. According
to the DVS, there has only been one outbreak of FMD in the NCAs in the last 24 years, but the local people often mistake lameness for FMD.

4.80 The diseases reported for goats and chickens were similar in both regions and included scab, diarrhoea, itch sickness, gallsickness and plant poisoning. According to the DVS, the diarrhoea is mostly attributable to internal parasites, and the itch sickness is probably caused by a Psoroptes mite. Scab is less common in goats than in sheep and the problem might be mange. The poisonous plant Dichapetalum cymosum is known to occur in the sandy soils of the northern areas. The most widely reported chicken disease was trembling sickness (thought by DVS to be Newcastle disease), followed by swollen eye problems (said by DVS to be symptomatic of several poultry diseases) and external parasites. Pigs were generally reported to be disease free.

Livestock Marketing

4.81 Offtakes of cattle and goats are low, particularly in Ovambo. Livestock are the principal capital assets and food security of rural households and, as such, they are only sold to meet particular cash needs. Small herd owners have little leeway to sell and still maintain a positive herd balance, and there is no clear herd size threshold beyond which an owner can be expected to sell regularly rather than on a need basis.

4.82 Contrary to expectations, the diagnostic study did not find among farmers a general preference to sell goats rather than cattle to meet their cash needs. In fact many respondents said they prefer to keep their goats for home consumption and would only sell any if specifically requested to. The principal cash requirements necessitating animal sales were stated to be school fees, clothes, food and medical bills.

4.83 Prior to independence the northern abattoirs were operated by FNDC, and a price differential existed between the north and south of the cordon fence, with lower prices pertaining in the north. In February 1992 Meatco took over from FNDC all meat marketing activities in the NCAs including the operation of the three abattoirs at Katima Mulilo in Caprivi, Rundu in Kavango and Oshakati in Ovambo. Prices paid in the north are now the national ones, aligned to the South African market and adjusted on a weekly basis. In addition, since April 1992, the government has been paying a bonus of R120 per head for mature cattle as an incentive to sell during the current drought. North of the cordon fence all cattle with at least 6 teeth (2 1/2 - 3 years old) qualify for the subsidy but in the southern communal areas it is understood to apply only to mature females.

4.84 All meat in the northern areas is currently canned at Oshakati, but Meatco is building a quarantine camp at Mangetti. When this is operational meat from animals that have been quarantined for 3 weeks immediately prior to slaughter, and which has been kept in cold storage for a further 3 weeks after slaughter, will be eligible for transportation south of the cordon fence.
4.85 The Oshakati abattoir has a slaughter capacity of 120 head per day but seldom slaughters more than 40, including those coming from outside Ovambo. From March to July 1992 Meatco slaughtered 1,106 cattle from Kaokoland and 2,079 from Ovambo and Caprivi, but a significant number of those purchased at Oshakati are believed to come from Angola. The Ovambo offtake, excluding local slaughter, is probably not much more than 2% per annum. The Meatco manager gave the following reasons for the extremely low Ovambo offtake:

- no decentralisation of buying points; apart from the Mangetti buying point, stock are purchased only at the abattoir (Meatco has plans to develop buying points).
- bush market prices are higher than Meatco prices
- farmers do not understand or trust the grading system and price fluctuations
- it is not in Ovambo tradition to sell livestock.

4.86 The Caprivi abattoir is currently closed for upgrading, and all slaughter stock are being trucked to Oshakati (because the Rundu abattoir is too small), a distance of approximately 1,000 km, which costs R5,000 per journey for 32 head of cattle.

4.87 In Kavango the offtake is a little higher than in Ovambo, probably in the region of 3% to 3.5%. Meatco slaughtered 1,107 head from March to July 1992; averaging 187 kg CDW they realised a mean net price of R3.91 per kg and R731.63 per head, but these figures include some pre-subsidy prices. The figures for July were 397 cattle slaughtered at an average carcass weight of 169 kg, realising an average price (with subsidy) of R4.05 per kg and R684 per head. The manager said that Meatco has about 12 buying points in the Kavango region, and buys 2-3 times a week from different points.

4.88 Despite the unprecedented high price there appears to be a poor sale response from the communal areas, particularly in Ovambo. The manager said he believes that the bush market price is still competitive with current Meatco prices including the subsidy, and that ten animals are sold in the bush market for every one that reaches a Meatco abattoir. The vast majority of those slaughtered since Meatco took over have been 8 tooth animals which graded C2 to C4, and would not have been acceptable to the prime beef export market. The average killing out percentage at the Rundu abattoir is only 43%, which is very low compared to the 50% plus averaged in the commercial areas. Slaughter data from earlier (FNDC) years were unavailable for comparison.
4.89 The subsistence farmers rarely sell a live animal except when they have a major cash need or there is insufficient local demand for meat to dispose of a slaughtered one. They prefer to slaughter within the village, sell what they need to meet their cash requirements, exchange some of the meat for millet or other commodities, and keep some for home consumption. In Ovambo the diagnostic study determined that returns of between R800 and R1,000 are realised for an animal of 350kg liveweight that would fetch only R600 at Meatco prices, and the same holds true for Kavango.

4.90 In addition to the bush markets there is an active urban and peri-urban market. For example, the diagnostic study found about 20 livestock traders at the Upindi market (Oshakati), where about 10 animals are slaughtered daily. The traders buy animals from market areas along the Angolan border at prices between R700 and R1,200, hire local people to walk them to Oshakati where they are slaughtered, then sell the meat to local retailers or butchers at a profit of about R120 per head. Interestingly, the diagnostic study determined that the price paid by these peri-urban meat retailers is also higher than that paid by Meatco, and so it would be to their advantage to buy carcasses from Meatco rather than from the traders. However, in the present system the retailers are given short term credit by the traders, and payment is made only after the retailers have sold to the butchers. Meatco does not provide credit.

4.91 The informal sector of livestock marketing appears to satisfy the majority of smallholder stock owners' requirements, and the diagnostic study found no indication of a more commercial attitude to livestock ownership among the larger fenced ranch operators in Kavango. For example, one farmer interviewed close to the Mangetti block, who had 160 cattle and 40 goats in addition to growing millet and cotton, said he normally expected to sell 2-3 head per year to meet cash needs, but had sold more in 1991/92 because of the drought; it transpired that he had sold 6 old cows, 10 2-3 year oxen and 2 bulls (all for slaughter) to meet drought needs and wages and the demands of an extended family totalling 26 people. However he had sold no animals at all in 1990/91, and had no intention of selling any more in 1992/93. Less than 8% of the total cattle population in Kavango is in herds larger than 100 head (Table JS4), and the figure is probably lower for Ovambo.

4.92 There is thus little evidence there would be a positive cattle sale response if the NCAs were opened to the South African or EEC markets. The drought situation is undoubtedly stimulating sales at present (to buy food) but there is likely to be a fall off when the rains come, irrespective of the planned removal of the subsidy.

4.93 Meatco abattoirs do not handle smallstock but there is a small factory for slaughtering sheep, goats and pigs in Oshakati. The throughput is about 200 -300 sheep and goats per year, many of these from Kaokoland. Goats, pigs and chickens are rarely sold outside the home village, although there is considerable peri-urban demand and people from the urban areas do sometimes go into the villages to purchase goats. In
Oshakati the local butchers are mainly supplied by Kaokoland goats, which are considerably larger and command a higher price (R170 - R190) than the Ovambo ones (about R120). The price of goat meat is higher than that of cattle. purposes.

Translocation of the Cordon Fence

4.94 The "red line" cordon fence has been widely cited as the principal cause of low cattle offtakes from the NCAs, by denying access to the high price markets of South Africa and the EEC. There have been a number of different proposals for its removal or relocation, including moving it in stages to the national border and restocking the NCAs with "clean" animals from the south. The idea of restocking has now been abandoned as impractical.

4.95 The current DVS proposals¹ include fencing the Angola border between the Cunene and Kavango rivers and establishing a buffer zone at least 50 km deep along the "high risk" borders of Ovambo and Kavango (Kaokoland is considered low risk for FMD). The present cordon fence line would remain in place, or be moved forward in stages, until the areas between the present line and the new buffer zone are certified free of FMD and CBPP. Animals from CBPP endemic areas would only be allowed to cross the cordon fence after a quarantine period, and only to approved abattoirs. Animals within the buffer zone would thus never be eligible for the export markets.

4.96 The line of the present cordon fence and the proposed buffer zone are shown in Map 3. Caprivi is within the buffer zone and therefore remains excluded from the export market. The DVS in Kavango estimates that only 10% of the Kavango cattle population would lie outside the buffer zone and be eligible for export. In Ovambo the proportion would not be more than 30%. As explained earlier, there is no longer a price differential between the north and the south of Namibia, and there does not appear to be a market constraint in the NCAs. The diagnostic survey found almost no antipathy among farmers to the present cordon fence, and there is no doubt at all that the alternative buffer fence would be far more disruptive to their lifestyles and to their livestock movements. It should be noted that any northward relocation of the present fence would divide the northern regions of Kaokoland, Ovambo and Kavango. Thus the results of the diagnostic survey do not support the proposal to relocate the cordon fence.

Other productive activities and off-farm income

4.97 During the flood period (January to March) of the Ovambo oshanas, fishing becomes a food contributory activity of those living in the Cuvelai area. The floods are

¹/ DVS memo V13/1/B of 12th February 1992
erratic and the fishing opportunistic, but fish can constitute the major source of dietary protein to non-stock owning households during this period. In the shallow waters of the oshanas the fishing is mainly by performed by young boys using spears.

4.98 Fishing is also a major source of dietary protein for those households living close to the rivers in Kavango and Caprivi. Various methods are used to catch fish, including lines, nets and traps. The nets seen by the survey mission were of such fine mesh that there must be a danger of depleting the fish stocks. Unlike Ovambo, where fish are caught at the height of the rains, fishing in Kavango does not take place when the river is high, and is thus more of a dry season activity. Both men and women are involved in fishing, although there seems to be variation from village to village in the preferred times of year, the methods used, and the household members involved. The variations are linked to the depth and turbulence of the river, and the proximity of the household to the river.

4.99 The gathering of wild fruits is of particular importance to poorer households when faced with a food deficit from their crop lands. Hunting and gathering plays a more important role in the subsistence of the Bushman population, particularly in Kavango and Caprivi.

4.100 Pensions are probably the single most important source of off-farm income, outweighing remittances from employment. Men and women become eligible at the age of 60 for state pensions of R120 per month (R1,440 per year), paid in alternate months. In Ovambo twelve of the interviewed households (35%) obtained income from at least one pension, and only four households enjoyed incomes of over R1200 from migrant labour. Nevertheless, real income from migrant labour may have been understated as remittances often consist of food, clothing and other commodities rather than cash.

4.101 In Kavango, 6 out of 20 inventoried households (30%) had at least one household member receiving a pension, a level similar to that in Ovambo. Among the households surveyed in Kavango, local off-farm employment in government service was found to be the principal source of income, but this finding was influenced by the fact that one of the villages where household interviews were conducted had a hospital and secondary school, both of which provided job opportunities that were exceptional in comparison with other villages.

4.102 Since the departure of the South African forces and, latterly, the United Nations forces there has been a marked drop in the potential for off-farm employment within the northern regions. However there is substantially more urban development in Ovambo than Kavango, and hence more potential for non-farming income earning activities. Secondary schools and hospitals provide work for some members of the population in the areas they are located. However, off-farm employment is generally difficult to find and the level of remittances determined by the diagnostic survey was less
than expected from other reports; only 4 out of 34 households interviewed in Ovambo had significant remittances.

4.103 The production of beer, other forms of alcohol, and household requirements such as granary baskets provides modest income for some households. In Kavango there is a small woodcarving industry but few, if any, rural households benefit from it. Within village communities, members of poor households find opportunities to assist less poor households with such tasks as herding, weeding, building huts and gathering wood in return for food or loan of draught power or, occasionally, cash.

4.104 A large number of small shops (cuca shops) developed, particularly in Ovambo, in response to the presence of the armed forces, and their business has suffered badly since the forces’ withdrawal.

Labour allocation

4.105 The labour priority is generally toward crop production activities, except for those who have off-farm employment. The majority of the manual labour tasks fall to women, however the diagnostic study observed that the women were also more involved than men in both the brewing and consumption of alcoholic beverages, particularly in Kavango.

4.106 Daily tasks of women and girls include fetching water and firewood (both of which can be time consuming), processing and pounding millet, child care, cooking and housekeeping. Seasonal tasks include planting, weeding, harvesting, threshing and cutting thatch grass. After the harvest there is time to relax, brew alcohol, and make baskets and clay pots.

4.107 In livestock owning households men and boys are primarily occupied by the livestock related activities of herding, watering and milking, and are responsible for ploughing, whether by hand or with draught animals. Otherwise they assist with weeding, harvesting and threshing. In the dry season the men and boys are traditionally at the cattlepost. Men’s dry season tasks also include digging and repairing wells, building/repairing houses and fences, and cutting the necessary wood for these jobs. The large grain storage baskets are normally made by men. Boys, and sometimes girls, make clay bricks during the dry season.

4.108 In small households there is less distinction between traditional male/female responsibilities, and most of the production activity tasks are shared. The children are normally assigned the task of collecting the fallen fruits and nuts of mangetti and nsivi, while the women collect the wild spinach and bush cabbage (mutete). As mentioned
earlier, the majority of children between the ages of 6 and 18-20 attend school, so depleting the traditional labour force.

4.109 The seasonal distribution of labour for typical household and production activities is shown in Tables JS5 and JS6.

**Crop models and farm budgets**

4.110 Indicative crop models and farm budgets for millet, sorghum and cowpea are included in Appendix 3 (tables 1.1 and 1.2). The models are based on the use of minimum inputs, namely seed and hiring of oxen, and on expected yields in an average season. No distinction is made between the greater reliability of yields in Kavango compared to Ovambo. A constant value is placed on crop residues which, although having value in intensively settled Ovambo, have generally less value in Kavango. Returns to labour for millet, sorghum and cowpea are shown as (R/day) 3.96, 3.38 and 4.18 respectively.

4.111 Farm models based on the farm typologies described in Chapter 5 are presented in Appendix 3 (tables 2.1 and 2.2). The area of crops and net value of crop production for each of the Models A, B, C and D are 1.5 ha (R436), 2.5 ha (R728), 3.0 ha (R866) and 5.0 ha (R1456) respectively. Total net values (of crops and livestock) are shown as R436, R826, R1066 and R3556 respectively.

**Constraints Analysis**

**Livestock related constraints and possibilities**

4.112 The principal livestock production constraints are water, nutrition and disease. For grazing livestock (cattle and goats) the factors of water and nutrition are usually inter-related, and there are large areas of good rangeland which are underutilised owing to water constraints; however there are other areas near to permanent water where the range has been degraded by overgrazing. There is also a constraint of labour for herding during the wet season to prevent crop damage.

4.113 The main diseases of cattle are lung sickness (CBPP), botulism and blackquarter. Cattle are routinely vaccinated against CBPP and FMD but not more than 80% of animals are covered (lower in Ovambo), the CBPP vaccine is not 100% effective, and there is no treatment for the disease. Botulism could be avoided by calcium/phosphate supplementation but this entails supply logistics and a willingness to spend money on livestock. Internal parasites are also a significant constraint but there is little problem with external parasites or tick borne diseases, except in Caprivi. The
overriding health problem of goats (and sheep) is internal parasites, but pasteurella and enzootic abortion also occur.

4.114 The main production constraint of pigs is nutrition. Free ranging pigs can forage much of their requirements but do need supplementation, and their scavenging leads to a high risk of measles. Housed pigs are free of measles but have to be fed throughout the year, and are in competition for human food resources.

4.115 With chickens the main constraint is disease. Vaccination and treatment is more difficult than with other livestock owing to the large total number in conjunction with wide dispersion in small flocks.

4.116 The informal sector of livestock marketing appears to satisfy the majority of stock owners’ requirements. The constraint in the formal sector is less one of inadequate infrastructure than one of supply, however a need for more buying points and better market information has been identified. There is little evidence that owners of fenced ranches in the NCAs manage their livestock more commercially than subsistence farmers. Since introduction of a uniform pricing policy throughout the country, the "red line" cordon fence can no longer be stated to reduce market opportunities for the NCAs.

4.117 The main livestock related constraints and possibilities are summarized in the table below.

<table>
<thead>
<tr>
<th>CONSTRAINTS</th>
<th>POSSIBILITIES</th>
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| Nutrition   | open up new grazing (water development)  
grazing management & improvement  
improve quality & utilisation of crop residues  
fodder banks, legume introduction  
increase crop production  
feed supplements, compound feeds |
| Water       | dams in pans and oshanas  
new wells and boreholes  
reticulation from existing boreholes |
| Health      | support to DVS  
build vaccination crushes  
training and extension  
improve availability of drugs  
calcium/phosphate supplementation (against botulism) |
| Herding     | live fencing - fencing croplands  
- drift fences |

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5. HOUSEHOLD TYPOLOGY, CONSTRAINTS AND OPPORTUNITIES

Socio-Economic Differentiation between Households

5.1 The main goal of Ovambo and Kavango rural households is food self-sufficiency. Self-sufficiency has to be obtained through crop production and depends primarily on the area of cultivated land, which in turn depends on capacity to perform land preparation, i.e., access to draught power. Thus, cultivated area, access to draught power and labour availability are criteria to be used for a household typology. The second priority for rural households is income generation for the purchase of bare necessities that cannot be home produced: foodstuffs such as salt and cooking oil, clothes and school uniforms for children. Cash is also essential for school fees, medical costs and transport. The third priority for rural households is building up reserves to be used in times of need, particularly years of crop failure. The ability to build up such a reserve, mostly in the form of cattle and sometimes in the form of cash or off-farm activity (mainly cucashops), is therefore another key element in typeifying households.

5.2 Other household characteristics, namely resource endowment, production systems, food self-sufficiency, savings and survival strategies are to a major extent determined by the above mentioned indicators. The choice of crops, cultivating practices and input use, access to crop land (the limiting factor is not the quantity of land available but the ability to work it), and farmer’s objectives and strategies (the objectives are similar, the differentiation is encountered in the ability to achieve them) are governed by these factors.

The following household typology for Ovambo and Kavango can be elaborated:

Model A: Poorest Households

- Estimated proportion of rural households: 25-30%
- Economic mainstay: crop production (millet) and gathering.
- Small cropland/cultivated area (1-1.5 ha), land preparation by hand, usually no or very limited access to oxen for land preparation.
- Livestock: no cattle, goats or pigs, a few chickens.
- Limited household labour does not permit cultivating larger areas.
- Includes a significant proportion of female headed households: divorcees or (young) widows.
Not enough food production to attain food self sufficiency for longer than six to eight months a year, even with a good harvest.

Income in Ovamboland almost exclusively from sale of (processed) gathered products; in Kavango also work on crop land of other (Model C and D) households. Cash income less than R 600 a year.

Diet: millet (in drink or in porridge), maize meal, gathered products, particularly "bush cabbage" (evama in Ovambo, mutete in Kavango), pumpkins, melons. Some beans, occasionally maize, consumed green. Meat less than once a month. On occasion may consume or sell a chicken and consume fish (in central Ovambo from the oshanas in the rainy season, in Kavango from the river). Protein deficiencies and in poor crop years carbohydrate deficiencies are likely.

Expenditure: on food (maize meal, salt, cooking oil), school fees, very little on clothing except for occasional school uniform.

Survival/production strategy: attempt to provide as much as possible in food needs, particularly millet, from own cropland. Deficit is alleviated through gathering and purchase of maize meal with proceeds from sale of processed gathered products. Particularly in Kavango, household members may work for somewhat better-off households (Models C and D) and be paid in cash or kind. Also participation in group work without labour exchange, i.e. only remuneration is food and drink given by organizing household. Some food aid from better-off relatives.

Causes of poverty: loss of livestock through drought, disease, war or, in case of divorced women or widows, claim by husband or family. No or weak relations with better-off households, therefore no access to draught power. Lack of access to draught power and in some cases labour limits possibilities for food production. Limited productive capacity results in incapacity to employ non-household labour: lack of food does not permit organizing group work as participants cannot be given the expected food and drink. No access to sources of significant off-farm income, no capacity for accumulation.

Perceived problems and priorities: lack of food security, lack of food and income to buy barest necessities. Gaining access to ploughing services, either by ownership of oxen or obtaining income to pay for services is perceived as a possible solution, particularly in Kavango.
Opportunities: Improved crop cultivation practices and possibly introduction of new crops could raise production and create surpluses to be used for sale and animal feed, particularly for chickens and pigs. Proximity to boreholes or dams might permit small scale irrigation for high value crops, particularly vegetable and adapted tree crops. Making oxen (or possibly donkeys) available would permit increase in cultivated area. Increased cropping areas may result in labour shortages for weeding, hence labour saving measures for weeding should be analyzed.
Model B: Poor Households

- Estimated proportion of rural households: 30-40%

- Economic mainstay: crop production (millet), gathering, additional income from pensions or small scale economic activity.

- Intermediate size cropland/cultivated area of between 1.5 and 3 ha; land preparation at least partly by oxen

- Livestock: no or a few heads (less than five) of cattle, may or may not have goats, up to ten chickens

- Labour: household labour somewhat more ample than Model A households, however, not sufficient for cultivating larger areas. Better able to organize groupwork, thus at least alleviating labour constraints in peak periods.

- Includes households with elderly person receiving state pension

- Only in very good year is self sufficiency in millet obtained, normally self sufficient for 8 to 10 months.

- Cash income from pensions, minor remittances from temporarily employed young household members, gifts from relatives. Also sale of (processed) gathered products and work on other farms for cash or kind (mainly in Kavango). Cash income between R 600 and R 2000 a year.

- Diet: millet (in drink or in porridge), maize meal, gathered products, particularly "bush cabbage". Some beans, green maize, ground nuts, bambara nuts, pumpkins, melons. Meat once or twice a month. On occasion consumption of a chicken and fish. Protein deficiency and in very poor crop years carbohydrate deficiencies are likely, depending on family size.

- Expenditure: on production: ploughing, group work. Consumptive: food (maize meal, salt, cooking oil, very occasionally meat), school fees, clothing, school uniforms, occasionally bottled drinks, tobacco.

- Survival strategy: cash income is essential to obtain ploughing services and food. In some instances, food is received from better-off
relatives. In some cases household may have small cash savings for emergencies.

Causes of relative poverty: loss of livestock through drought, disease, war, need to sell livestock to satisfy household needs after consecutive crop failures. Limited possibilities for obtaining off-farm income, little or no capacity for accumulation.

Perceived problems and priorities: lack of food security, lack of food and income, lack of reserve. Fixed employment is perceived as a possible solution.

Opportunities: Similar to those of Model A: Improved crop cultivation practices to raise production for sale and use as animal feed (chickens and pigs). Where possible, small scale irrigation for high value vegetable and tree crop production. Improving access to oxen or donkeys would permit expansion of cultivated land.

Model C: Less Poor Households

- Estimated proportion of rural population: 15-20%

- Economic mainstay: crop production (millet), livestock, in some cases additional income from pensions, wage earning and/or trade.

- Somewhat larger cropland/cultivated area of between 3 and 6 ha; land preparation with own oxen

- Livestock: herds of cattle between 5 and 20 head, including oxen. Frequently also goats and a few pigs, and between 10 and 20 chickens.

- Variable supply of household labour: sometimes large households with cattle, in other cases shortage of labour because of off-farm work of men. However, in latter case the household has the capacity to contract labourers (for cash, kind or in exchange for ploughing services) and/or organize group work. In both cases, access to labour permits cultivating larger areas than first two Models.

- Includes households with head having steady employment.

- Cash income mainly from occasional homeslaughter of cattle and local sale of meat, off farm work, pensions, cuca shops.
In normal years enough food production to attain sufficiency, although millet may be mixed with maize harvest is used for participants in group work and gifts, between R 2000 and R 5000 a year.

Diet: millet (porridge), maize meal, milk (in rainy seasons), products such as "bush cabbage", beans, green maize, bambara nuts, pumpkins, melons. Meat a few times, occasion chicken or pig meat, and fish (when and where available).

Expenditure: on production: paid labour on crops and livestock, expenses for group work and on occasion, transport, cattle; on food (maize meal, meat, fish), school fees and transport, clothing, transport, bottled drinks, canned food, tobacco.

Survival/production strategy: obtain food security, generate income, reduce production costs and purchase of consumer goods, emergency fund / savings account in the form of a capital and livestock Diversification into cuca shops. Accumulation through herd ownership, investment in cuca shops; in some cases bank accounts.

Reasons for lesser poverty: lesser or no livestock losses in severe droughts, regular income from present or past regular off-farm work.

Perceived problems and priorities: drought affects crops, thus self-sustainability, lack of grazing, lack of water, particularly for those who take cattle out to cattle post. Also problems with cattle and goats (in Ovamboland).

Opportunities: this group would also benefit from the development of crop production. Successful development for Model C farmers might limit access to paid labour, hence labour saving devices applied by Model C and D farmers would be accessible for the poor to obtain off-farm income (in cash or kind). Essential for the poor to reduce their dependency on such labour by aiming agricultural efforts specifically, at Model A and B households.
thus allow herd increase (however, successful development could reduce cfftake as needs can be met in other ways than selling cattle).

Model D. Households with Medium Sized Herds

- Estimated proportion of rural households: 10-20% (but large intra-regional variations: in central Ovambo and Kavango less than 10%, in western Ovambo up to 30% and in eastern Ovambo up to 70%).

- This group is practically identical to that represented by Model C: production systems, income, expenditure, survival and production strategies, and perceived problems and priorities are similar. The differentiating trait is herd size: Model D owns larger herds, from 20 to 50 and up to 100 head. This implies a much larger resource base than the first three models and consequently, increased food security, accumulation and investment capacity. This model household would, through the offtake of cattle, be able to generate resources for productive investments in, for example, agriculture. However, in practice this Model household views livestock in the same manner as Model C, i.e. as a savings account to be drawn upon only when cash is urgently needed.

- Perceived problems and priorities: similar to Model C, but with an even greater interest in cattle post development and greater benefits to be obtained from improved animal health care.

- Opportunities: similar to those of Model C. This model household is likely to benefit most from water development at cattle posts and improved veterinary care.

wealthy rural households

This group constitutes of no more than 1 to 2 percent of the total of rural households. These households have significant off-farm income and/or means of production such as tractors, pick up trucks, stores. Often, a combination of ways to generate income is encountered. Included are government professional personnel with salaries over R1000 a month, i.e. headmasters and possibly teachers of secondary schools, higher level health care personnel, etc. Households of traditional leaders (chiefs, kings) a also be assumed to fall into this category. Income anywhere from R5000 up to 100000 a year, though households with very high incomes are likely to settle in towns her than remain in the countryside. This group would fall outside the target group of development effort.
Landless households

5.4 There are as yet no significant numbers of openly landless households in the rural areas of either Ovambo or Kavango. Nevertheless, two quite different Models of landless households should be identified. The first consists of small groups of Bushmen households in Kavango and eastern Ovambo who gain some income - sometimes in cash, usually in kind - from work on cropland and herding. Their mainstay, however, is probably still hunting and gathering, particularly in the dry season. 1/

5.5 The second group of households without crop land is "hidden" within households with crop land. It concerns young couples in densely populated areas where no more cropland is available. Particularly in Ovambo, lack of land may force young people to postpone setting up their own household with their own cropland. In Ovambo, this may be compounded by the fact that the man and/or his family have to pay a dowry (lobola). Thus, instead of setting up their own household adult young men may have to opt for remaining at home and helping out their parents. In the past they could have tried to obtain jobs in the urban areas, but opportunity there has decreased.

5.6 In Kavango, where there is no dowry tradition, a young couple may get married and move in with the girl's household. It is then possible that they work their own field or alternatively, that the extra labour is used to expand the existing cropland. In the latter case two - or more - households not only live in the same compound but also work the same cropland.

5.7 Particularly in central Ovambo, the pressure on cropland may grow to such an extent that young people will be forced to move out. Adequate land and water from boreholes would be available in eastern Ovambo and inland Kavango. However, what keeps young couples from settling in these zones is the loss of security and family support, particularly with regard to essential inputs such as oxen, ploughing implements, labour (much labour is needed for clearing land while the presence of young children implies a high dependency ratio), cattle for manure and milk, and food reserves. In addition, the unsettled areas do not offer services such as schools and clinics. Nevertheless in the near future young couples may be forced to leave for these areas as the pressure on available resources, particularly the crop land of their parents, increases.

1/ As for the reasons why Bushmen do not grow crops or livestock, Ovambo and Kavango informants asserted that Bushmen lack the skills and interest to do so. In an interview with a small group of Bushmen this point of view was more or less confirmed, as two of the three interviewed Bushmen stated not to be interested in obtaining crop land because they did not know how to cultivate it. The third informant said he was considering asking the local headman for cropland, which he would like to plough with oxen. When asked if he was prepared to prepare the land by hand if he would not be able to obtain oxen he stated that that would be too much work.
5.8 The following table provides an overview of the characteristics of the four principal types of households.

<table>
<thead>
<tr>
<th>Model/Characteristics</th>
<th>Model A: Very poor</th>
<th>Model B: Poor</th>
<th>Model C: Less poor</th>
<th>Model D: Medium size cattle owning</th>
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<tbody>
<tr>
<td>Estimated proportion of population</td>
<td>25-30%</td>
<td>30-40%</td>
<td>15 - 20%</td>
<td>10 - 20% *</td>
</tr>
<tr>
<td>Economic mainstay</td>
<td>Crop production</td>
<td>Crop production</td>
<td>Crop production, livestock</td>
<td>Crop production, livestock</td>
</tr>
<tr>
<td>Cropland size</td>
<td>1 - 1.5 ha</td>
<td>1.5 - 3 ha</td>
<td>3 - 6 ha</td>
<td>3 - 6 ha</td>
</tr>
<tr>
<td>Cattle ownership</td>
<td>None</td>
<td>0 - 5</td>
<td>6 - 20</td>
<td>&gt; 20</td>
</tr>
<tr>
<td>Goat ownership</td>
<td>None</td>
<td>0 - 10</td>
<td>11 - 20</td>
<td>&gt; 20</td>
</tr>
<tr>
<td>Land preparation</td>
<td>Manual</td>
<td>Oxen (hired) and manual</td>
<td>Oxen, sometimes tractor</td>
<td>Oxen, sometimes tractor</td>
</tr>
<tr>
<td>Household composition</td>
<td>Often female headed</td>
<td>Headed by pensioners, young married men</td>
<td>Usually male headed, middle aged, with grown up sons or daughters living in</td>
<td>See Model C</td>
</tr>
<tr>
<td>Labour supply</td>
<td>Lack of adult male labour. No hired labour or group exchange</td>
<td>Limited, but more ample than Model A. Organizes group work.</td>
<td>Ample: if not from household hired or group work</td>
<td>See Model C</td>
</tr>
<tr>
<td>Main sources of cash income</td>
<td>Sale of gathered and processed products</td>
<td>Pensions, minor remittances, sale of gathered and processed products</td>
<td>Steady off-farm work of men, sale of cattle, cura shops, pensions</td>
<td>See Model C, but sale of cattle more important</td>
</tr>
<tr>
<td>Food self-sufficiency (average to good year)</td>
<td>Selfsufficient for 6 to 8 months</td>
<td>Selfsufficient for 8 to 12 months</td>
<td>Selfsufficient, small surplus</td>
<td>See Model C</td>
</tr>
<tr>
<td>Survival strategy (apart from crop cultivation)</td>
<td>Gathering, labour on cropland of others for cash or kind</td>
<td>Dependent on off-farm income such as pensions, gathering, working on other farms</td>
<td>Livestock is main security, also regular off-farm income and pensions</td>
<td>Livestock is main security</td>
</tr>
</tbody>
</table>

Central Ovambo, Kavango: less than 10%

Causes of Poverty and Socio-Economic Differentiation

9. The causes for poverty and socio-economic differentiation are lack of access to draught power and lack of reserves to be used in times of need, namely livestock ownership and/or sources of significant off-farm income from regular employment and/or pensions. Female headed households - widows and divorcees - are in the worst predicament, as a result of not having livestock and therefore draught power. Usually
these households also face a shortage of male labour. Hence they are unable to produce enough for subsistence, let alone establish reserves or produce surpluses for sale or small livestock feed.

5.10 With regard to poverty villages can be differentiated on the basis of the prevalence of livestock ownership and possibilities for off-farm employment. The reasons for significant differentiation between villages are likely to be the incidence of disease and the availability of adequate grazing. In densely populated areas losses of cattle to drought and disease attacks may have affected cattle populations more than in sparsely populated areas such as eastern Ovambo. It is not quite clear why Kavango has such a high proportion of stockless households.

5.11 Another important element in village differentiation is that of the presence of government services such as secondary schools or clinics. These provide employment and thus off-farm income to particularly male villagers. A somewhat more developed local economy is often reflected in the presence of non-traditional housing and small stores.

Perceived Problems Constraints and Opportunities

5.12 At village level, the principal needs were perceived to be water, clinics, food aid and schools. (Since in almost every village there is a school either in the village or close by, the need refers to either infrastructure, i.e. school buildings, or to the inclusion of higher grade teaching in already existing schools). In Ovambo water for both human and livestock consumption was considered a major constraint. In Kavango water is obtained mostly from the river or from boreholes but the need for water development for cattle on the river zone grazing land was indicated. Since the wet season grazing areas are situated south of the crop land the cattle frequently has to be taken through the cropland (and homestead area) to the river, and back. Electricity was considered a need only in some of the relatively better-off Ovambo villages, while in several inland Kavango villages the need for shops to buy household essentials was indicated (Table 2).

5.13 Problem assessment among the interviewed households was strongly influenced by the drought related crop failure in 1992; lack of food was mentioned by 71% (n=49) as the main problem. Lack of income and the obviously related problem of unemployment were mentioned 26 times, while lack of water was indicated as a major problem by 8 Ovambo households (26%, n=31) (Table 34). Solutions were perceived to be providing employment, government assistance in general terms, food aid and, in Kavango, government assistance in providing crop areas (Table 35).

5.14 With regard to crops, drought and insects were the most frequently mentioned problems in Ovambo, by 42% and 45% of respondents (n=31). Kavango households mentioned bird damage, lack of draught power, poor quality seed and lack of labour 9Table 30). The use of insecticides ("medecine" or "poison") was mentioned as
a solution for insect problems, while in Kavango government assistance in providing draught power was suggested for the ploughing constraint (Table 32).

5.15 Livestock problems centered around L/S diseases (of cattle and goats), lack of grazing and lack of water. In Kavango, the labour involved in herding cattle (in the wet season) was also mentioned as a constraint (Table 33). Suggested solutions included veterinary assistance, the development of new grazing areas and in Kavango, fencing of grazing land 1/

5.16 The perceived problems and their causes, the models they pertain to, priority needs and possible opportunities for intervention are summarized in the following table.

---

In two Kavango villages the colonial Ministry of Agriculture had experimented with fencing in grazing land in the early eighties, with the apparent purpose of introducing rotational grazing. The village population liked the idea particularly since it obviated the need for herding, thus freeing labour and/or allowing school age boys to go to school. The advantage of grazing management through rotation was also recognized. Unfortunately in one village the fence was destructed by elephants, while in the other a major problem was that because of lack of water cattle still had to be herded to and from the river.
<table>
<thead>
<tr>
<th>Perceived problems</th>
<th>Priorities</th>
<th>Model</th>
<th>Causes</th>
<th>Possible solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of food</td>
<td>Food security</td>
<td>A,B,C,D</td>
<td>-Crop failure as a result of drought -Low soil fertility -Unfavourable agroecological conditions -Limited yield potential indigenous varieties -Ploughing constraint (Model A and B) -Lack of income</td>
<td>-Improve agricultural productivity through: -Improved seed -Chemical fertilizers -Increased use of farm yard manure -Crop rotation -Improve access to draught power (Model A and B) -Surplus production for storage, sale and small livestock feed</td>
</tr>
<tr>
<td>Lack of income</td>
<td>Income generation for buying food, basic expenditure and building up reserve fund</td>
<td>A, B, to a lesser extent C</td>
<td>-Lack of income generating activities -Low crop production</td>
<td>Small livestock production. -Small scale irrigation projects near boreholes, dams -Off-farm employment</td>
</tr>
<tr>
<td>Land preparation constraint reduces crop area and food self-sufficiency</td>
<td>Gain access to draught power</td>
<td>A, to lesser extent B, particularly in Kavango</td>
<td>Lack of access to draught power</td>
<td>Assistance with draught power</td>
</tr>
<tr>
<td>Labour shortages</td>
<td>Cultivate enough land to satisfy food needs</td>
<td>A, to a lesser extent B, C, D</td>
<td>-Off farm work of men -School attendance children -Labour requirements for herding cattle during rainy season</td>
<td>-Labour saving technology: mechanical weeding -Fencing crop land -Intensification of crop cultivation:</td>
</tr>
<tr>
<td>Herding prevents school attendance of boys</td>
<td>-School attendance children -Free labour for crop cultivation</td>
<td>C,D</td>
<td>Free roaming cattle causes crop damage</td>
<td>Fencing</td>
</tr>
<tr>
<td>Livestock diseases</td>
<td>Minimize deaths, maximize herd size (reserve fund)</td>
<td></td>
<td>-Vaccination and treatment not always effective -Limited possibilities for acquiring remedies</td>
<td>-Training and extension. -Availability of drugs</td>
</tr>
<tr>
<td>Lack of water for cattle in dry season</td>
<td>Maximize herd size (reserve fund)</td>
<td>Overstocking in densely</td>
<td>Oshanas and pans dry up, ground water hard to get at with hand dug wells</td>
<td>Boreholes, dams and other water catchment measures</td>
</tr>
<tr>
<td>Lack of grazing</td>
<td>Maximize herd size (reserve fund)</td>
<td>C,D</td>
<td>Overstocking in densely populated areas</td>
<td>-Opening up underutilized grazing areas through water development -Cultivation of forage crops -Improved fodder and forage species -Quotas for cattle ownership</td>
</tr>
</tbody>
</table>
6. IMPLICATIONS FOR A LIVESTOCK PROJECT

6.1 The main components of the strategy proposed for the NCAs at the time of IFAD general identification were:

(a) animal health. The construction of a cordon fence across the northern international borders of Namibia and improvement of animal health services and infrastructure;

(b) animal productivity. The strengthening of livestock extension and introduction of a scheme of herd genetic improvement;

(c) marketing. Apart from benefits to be gained from relocation of the cordon fence in increasing market outlet for cattle, the establishment of a more organized and responsive marketing system and also the upgrading of bush slaughter facilities;

(d) access to grazing land and pasture improvement. The development of water resources in under-utilized areas, establishment of grazing rights for smallholder groups and upgrading pastures through the introduction of pasture species;

(e) group organization. The development of local responsibility for maintaining infrastructure, and taking an active role in extension, animal health and marketing.

6.2 Whilst the study confirmed the value of livestock in farming systems and household food security within the project area, it also identified animal production is of secondary importance to crop production, particularly in respect to low income households. The diagnostic study further suggests that greater availability of animal traction would be a principal means of increasing crop production and thus providing greater food security and could be included as a possible project component and provide linkage to the proposed future crop development project 1. Opportunities also exist to increase production of all livestock species in the region. Concurrent development of crop production to provide feedgrain to pigs and poultry would support further livestock

1/ Northern Crop Development Project (programmed to be prepared by IFAD in early 1993)
diversification. Fish farming and bee keeping would be additional prospective livestock activities.

6.3 The project would also need to address the present attitudes of individuals and local communities towards help from government and aim at engendering more initiative and the need for greater co-responsibility in local development. In view of the absence of good base planning maps and to assist generally in future coordination of information between donors, the project should also consider providing financial support for geographic information systems (GIS) using satellite data. Sustainable land use and project planning could benefit from such support.

6.4 The study has revealed that no tangible significant benefits could be expected in the NCAs in the short to medium term through relocation of the cordon fence. This applies particularly to small-scale livestock producers who represent the bulk of livestock owners. Whilst the relocation of the cordon fence may be considered by some elements as a national objective, it presently represents little interest to northern livestock producers and furthermore, if constructed according to present intentions, would cause social disruption and interference with present herding practices. Consequently, the mission would not recommend that IFAD support the relocation of the fence along the northern borders with or without the possible requirement for a 50 km fenced buffer zone.

6.5 In respect to the need for improvement of animal health services, the study confirms that a number of crush pens have in fact, been destroyed during the independence war or are unserviceable and will require replacement. In Ovambo there is also irregular stock inspection due mainly to disruption of planned programmes during the war years. There is therefore a possible need to recruit additional field staff and to provide housing and suitable transport and should be looked at closely during project preparation. Further in-service training to all AAHIs would be expected to be an important sub-component. No dipping of livestock is practised, or recommended by DVS and with the availability of viable treatment alternatives it is unlikely that the construction of dips would be required, except possibly in Caprivi. There only appears to be a limited requirement for establishment of animal health clinics. Greater attention to the treatment of internal parasites, would require an increased supply of veterinary drugs and could receive project assistance.

6.6 Greater animal productivity could be expected as a result of improving livestock extension. Considerable improvement to reproduction rates and livestock management is possible. The training of AAHIs could therefore be broadened to cover all management aspects of both small and large livestock improvement. Contrary to project general identification, there appeared little evidence of herd genetic degradation resulting from inbreeding and hence only limited gains could be expected through improved genetic introduction. This situation is due to the high level of male castration
practised, the mixing of herds that occurs naturally during the dry season and the customary exchange practices of old animals for young animals that occur when beasts have to be marketed. These practices mean a natural intermingling of blood and natural selection for improvement already occurs.

6.7 With the introduction by Meatco of a uniform price for grade for both commercial and communal areas and an incentive price premium to encourage early disposal of mature livestock in time of drought, most if not all the concern of the project general identification in respect to fair pricing of animals appear to be satisfied. Whilst the upgrading of slaughtering facilities in urban areas could be considered during project preparation, improvement to present practices in rural areas is not a perceived need of the people nor do they appear to be justified on health grounds. Any requirements for improved facilities are likely to be met by the EC meat marketing project.

6.8 The further development of water resources, particularly to allow greater access to under-utilized range resources could also offer further settlement and cropping opportunities and could be expected to interest a large number of households. Collection of surface water in oshanas is feasible in many areas and can be complemented with bores to provide groundwater. Piped water reticulation from bores could enable more cost efficient supply of water and if combined with a management strategy would provide improved utilization of grazing areas. The development of water resources solely to provide access to under utilized grazing areas is however more likely to advantage cattle owners with medium to large stock numbers unless parallel development of access roads, clinics, schools and other facilities also occur and encourage households to move and resettle in the new areas.

6.9 There is little evidence that group grazing rights are presently needed to improve access of poor households to grazing areas. Stock fencing, where it occurs, is generally well removed from areas of settlement and the movement of stock of smallholders does not appear to be unduly affected at the present time. Nevertheless, the general policy of traditional authority not to allow fencing of grazing areas where it can affect future regional development is appropriate. As identified, opportunities would appear to exist to introduce improved pasture legumes to upgrade feed availability for feeding of selected animals for work or milk.

6.10 Promoting community involvement to provide greater participation and assume increased responsibility for development efforts is both appropriate and necessary and proposals should be carefully considered and assessed during project preparation.

6.11 For a successful livestock project, more households have to have a mechanism of credit to enable animal purchase. The channelling of credit for purchase of oxen and small ruminants could be facilitated through supporting the development of credit-union type groups and meeting some of the high operating costs of offering small
amount of credit. This would be seen as preferable to having a line of credit made available to existing commercial banks which may only support the purchase of additional livestock of existing livestock owners.

Constraints Analysis: Before and After Diagnostic Study

6.12 The following table compares findings on target group perceptions with the constraints identified by the general IFAD identification mission.
<table>
<thead>
<tr>
<th>Before diagnostic</th>
<th>After diagnostic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overgrazing in densely populated areas</td>
<td>Confirmed</td>
</tr>
<tr>
<td>Health problems for cattle</td>
<td>Confirmed. Although reasonable effective vaccination programs are in place, curative veterinary services require development. Disease problems also affect smallstock (chickens, goats in Ovambo)</td>
</tr>
<tr>
<td>Need for translocation of fence to expand marketing opportunities</td>
<td>Local marketing opportunities more attractive. No economic or social benefits within NCAs to translocate the fence</td>
</tr>
<tr>
<td>Marketing problems for cattle</td>
<td>Marginally relevant for target groups: very little offtake even of larger herds, only in case of urgent cash needs local sales</td>
</tr>
<tr>
<td>Genetic constraints to productivity</td>
<td>Local breeds adapted and little inbreeding evident. No advantage to breed improvement at this stage.</td>
</tr>
<tr>
<td>Encroachment on communal grazing rights</td>
<td>Currently not a major problem. Although private fencing is evident in underutilized areas, target group are unaffected. In long term may limit possibilities for resettling people from overpopulated areas.</td>
</tr>
<tr>
<td></td>
<td>Large percentage of households own no livestock. Credit and delivery/recovery mechanisms required if poor households are to own stock</td>
</tr>
</tbody>
</table>
Environmental Implications

6.13 In project design, consideration would need to be given to the impact of increased livestock populations on rangeland resources. Preference for surface water storages should be given over groundwater development where this is economically and socially feasible. The siting of water points will also further influence grazing pressure and hence close co-ordination between the Department of Water Affairs and regional authorities will be necessary.

6.14 Community education of the processes of environmental degradation will become increasingly necessary as population pressure and uncontrolled harvesting of timbered areas for fuelwood and construction materials results in increased deforestation. The increased access into these areas brought about through provision of permanent water and roads is likely to delay community responsiveness to problems of the environment unless education accompanies development.

Estimated Project Cost

6.15 Based on the components as discussed, the approximate cost of a possible project would be:

<table>
<thead>
<tr>
<th>Component</th>
<th>US$ M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal health</td>
<td>0.8</td>
</tr>
<tr>
<td>Animal productivity</td>
<td>0.2</td>
</tr>
<tr>
<td>Training</td>
<td>0.2</td>
</tr>
<tr>
<td>Infrastructure (water, roads)</td>
<td>3.3</td>
</tr>
<tr>
<td>TA</td>
<td>0.4</td>
</tr>
<tr>
<td>Project management</td>
<td>0.5</td>
</tr>
<tr>
<td>Base-line study</td>
<td>0.1</td>
</tr>
<tr>
<td>Credit</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7.5</strong></td>
</tr>
</tbody>
</table>
7. RISKS AND ISSUES

7.1 A major risk that would be encountered during project implementation relates respect to the expectations of the people that it is the role of the government to solve their problems at no or little cost to beneficiaries. Nevertheless, many have expressed willingness to try to contribute to the cost of suggested interventions and could be given encouragement to develop initiative and vision to see possible solutions to problems. Previous administrations, unfortunately, have not encouraged initiative and community-styled self-help mechanisms to address constraints and overcome obstacles to development and production. As a result the take up of opportunities provided by the project would be slow, where beneficiaries are expected to contribute towards the cost of interventions. In many areas, traditional support has either broken down or suffered from the effects of changes required for independence and it will take many years to restore community support mechanisms.

7.2 Associated with the opportunity to provide oxen and small livestock packages is the problem of credit delivery and recovery. At preparation there will be a need to examine proposals being presently considered by Government to facilitate credit to communal farmers and how a possible project could support these mechanisms.

7.3 The government is also faced with a number of difficult decisions in respect to subsidies on services such as tractor ploughing, fertilizer and the more recently introduced - marketing of cattle. Bores are being constructed and maintained at full cost to government, not only to meet the needs of small communities but also for commercial livestock production. If subsidies were to be removed it is likely to result in a contraction of existing production and a lag phase in development until adjustment is achieved. The continuation of a subsidy on tractor ploughing, on the other hand, is likely to encourage a dependence on this form of land preparation and could be seen to support the view that ploughing with oxen is an out-moded alternative.

7.4 The continuation of the construction of the veterinary cordon fence along the northern borders and/or requirement for a 50 km buffer zone along the northern rivers will result in severe disruption to both human and animal movements without any assurance of counter balancing benefits to an IFAD target group. If the GON continues with the erection of the fence, it is only likely to benefit large scale livestock owners who would be prepared to re-settle in the southern parts of the NCAs and be away from interference caused by the fence.

7.5 The success in targeting benefits to poor households using watering points will be strongly influenced by their location and proximity to other support services such
as health clinics and schools. The siting of bores in under-developed areas which are remote from these services, or where regional planning does not make provision for these services, is only likely to interest large stock owners who are not interested in settling these areas but only to take advantage of grazing resources. Alternatively, the placement of bores in areas likely to achieve the extension of existing boundaries of the present cropping areas are more likely to benefit the greatest number of potential beneficiaries.
8. FOLLOW-UP

GON/FAOR

8.1 A preparation mission is planned to visit Namibia in early September 1992. Due to the close timing of the mission, the MAWRD was asked at the wrap-up meeting to provide a rapid response to the findings of the mission and specifically to comment on the scope of components of a possible project. It was stressed that these comments would be valuable to assist in determining the composition of the team and the emphasis that should be placed on each of the possible components. The FAOR undertook to follow-up this request to Government as a matter of urgency.

IFAD

8.2 Clarification is sought from IFAD as to the project area for the livestock project. The study, while concentrating on findings in Ovambo and Kavango, will draw conclusions addressing the needs of the NCAs in general and in the context of a livestock project. Ovambo, Kavango and Kaokoland were originally conveyed by IFAD as being the project area but, as indicated above (para 2), GON has requested that the project include Caprivi.
Table 1. Proposed Forest Reserve Areas in NCAs

<table>
<thead>
<tr>
<th>REGION</th>
<th>AREA TO BE (sq km)</th>
<th>RESERVED (%)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovambo</td>
<td>10,000</td>
<td>19</td>
<td>marked on ground</td>
</tr>
<tr>
<td>Kavango</td>
<td>20,544</td>
<td>45</td>
<td>not yet marked</td>
</tr>
<tr>
<td>West Caprivi</td>
<td>2,526</td>
<td>23</td>
<td>marked on ground</td>
</tr>
<tr>
<td>East Caprivi</td>
<td>3,000</td>
<td>57</td>
<td>within existing game reserve</td>
</tr>
<tr>
<td>TOTAL</td>
<td>36,070</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Summary of Human and Livestock Populations of the Northern Communal Areas

<table>
<thead>
<tr>
<th></th>
<th>Kaokoland</th>
<th>Ovambo</th>
<th>Kavango</th>
<th>Caprivi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (sq km)</td>
<td>49,500</td>
<td>51,800</td>
<td>45,655</td>
<td>11,877</td>
</tr>
<tr>
<td>Population ('000)</td>
<td>27</td>
<td>615</td>
<td>137</td>
<td>71</td>
</tr>
<tr>
<td>Livestock numbers ('000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>80</td>
<td>350</td>
<td>93</td>
<td>98</td>
</tr>
<tr>
<td>Sheep</td>
<td>35</td>
<td>12</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Goats</td>
<td>140</td>
<td>360</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>Pigs</td>
<td>ND</td>
<td>2</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>Chickens</td>
<td>ND</td>
<td>20</td>
<td>40</td>
<td>34</td>
</tr>
<tr>
<td>Ducks</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Donkeys</td>
<td>5</td>
<td>120</td>
<td>0.4</td>
<td>-</td>
</tr>
<tr>
<td>Horses</td>
<td>1</td>
<td>4</td>
<td>0.3</td>
<td>-</td>
</tr>
<tr>
<td>Total LSU (450 kg)</td>
<td>86</td>
<td>386</td>
<td>71</td>
<td>69</td>
</tr>
<tr>
<td>Stock density (LSU/sq km)</td>
<td>1.8</td>
<td>7.5</td>
<td>1.5</td>
<td>5.8</td>
</tr>
<tr>
<td>LSU/head of population</td>
<td>3.2</td>
<td>0.6</td>
<td>0.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

ND: no data available
LSU calculated using population conversion factors of 0.7 for cattle, 0.17 for sheep, 0.14 for goats, 0.7 for donkeys and 0.8 for horses (equines have relatively greater impact than bovines on vegetation).
Table 3. Basic Data for Northern Areas

<table>
<thead>
<tr>
<th>Population ('000)$^3/$</th>
<th>Owambo</th>
<th>Kavango</th>
<th>Caprivi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita cereal consumption, seed and waste (kg/cap/yr)$^2/$</td>
<td>140</td>
<td>130</td>
<td>120</td>
</tr>
<tr>
<td>Gross consumption (tons'000)</td>
<td>89.6</td>
<td>15.6</td>
<td>6.0</td>
</tr>
<tr>
<td>Imports (tons'000)$^2/$</td>
<td>25.0</td>
<td>7.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Normal production (tons'000)</td>
<td>64.6</td>
<td>8.6$^4/$</td>
<td>5.3</td>
</tr>
<tr>
<td>Composite yield (kg/ha)</td>
<td>270</td>
<td>300</td>
<td>700</td>
</tr>
<tr>
<td>Normal cereal area (ha'000)</td>
<td>239</td>
<td>29</td>
<td>7.6</td>
</tr>
</tbody>
</table>

| Individual cereals (normal year) | |
|----------------------------------|--------|---------|---------|
| Millet:                          |        |         |         |
| Area                             | 215    | 23      | 5.7$^4/$|
| Yield                            | 267    | 288     | 700$^4/$|
| Production                       | 57.4   | 6.6     | 4.0$^4/$|
| Sorghum:                         |        |         |         |
| Area                             | 24.0   | 6       | 1.9$^5/$|
| Yield                            | 300    | 330     | 700$^5/$|
| Production                       | 7.2    | 2.0     | 1.3$^5/$|

Diet more varied in several populations of Kavango and especially in wetter area of Caprivi.
National commercial maize meal consumption 54,000 tons, of which 46% sold in Owambo, 9% in Kavango. Estimated 700 tons imported from Zambia into Caprivi. Wheat imports and informal movement of grain between regions not included.
Maize.
Includes millet.
Excludes FNDC farms.
Table 4. Cattle Herd Size Distribution in Kavango

<table>
<thead>
<tr>
<th>HERD SIZE</th>
<th>NUMBER OF CATTLE</th>
<th>PERCENTAGE OF CATTLE</th>
<th>NUMBER OF OWNERS</th>
<th>PERCENTAGE OF OWNERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>5,849</td>
<td>6.3</td>
<td>752</td>
<td>21.4</td>
</tr>
<tr>
<td>11-20</td>
<td>17,505</td>
<td>18.7</td>
<td>1,091</td>
<td>31.1</td>
</tr>
<tr>
<td>21-30</td>
<td>17,018</td>
<td>18.2</td>
<td>674</td>
<td>19.2</td>
</tr>
<tr>
<td>31-40</td>
<td>13,591</td>
<td>14.6</td>
<td>390</td>
<td>11.1</td>
</tr>
<tr>
<td>41-50</td>
<td>10,080</td>
<td>10.7</td>
<td>228</td>
<td>6.5</td>
</tr>
<tr>
<td>51-60</td>
<td>6,790</td>
<td>7.3</td>
<td>125</td>
<td>3.6</td>
</tr>
<tr>
<td>61-70</td>
<td>6,394</td>
<td>6.8</td>
<td>88</td>
<td>2.5</td>
</tr>
<tr>
<td>71 -80</td>
<td>4,435</td>
<td>4.7</td>
<td>58</td>
<td>1.7</td>
</tr>
<tr>
<td>81-90</td>
<td>2,554</td>
<td>2.7</td>
<td>36</td>
<td>1.2</td>
</tr>
<tr>
<td>91-100</td>
<td>1,890</td>
<td>2.1</td>
<td>24</td>
<td>0.7</td>
</tr>
<tr>
<td>100+</td>
<td>7,268</td>
<td>7.8</td>
<td>44</td>
<td>1.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>93,374</td>
<td>100.0</td>
<td>3,510</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 5. Herd Composition data (%) for the NCAs

<table>
<thead>
<tr>
<th>CLASS</th>
<th>KAOKOLAND</th>
<th>OVAMBO</th>
<th>KAVANGO</th>
<th>E.CAPRIVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>36</td>
<td>40</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>Bulls</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Oxen</td>
<td>11</td>
<td>25</td>
<td>20</td>
<td>17</td>
</tr>
<tr>
<td>Steers</td>
<td>12</td>
<td>11</td>
<td>NR</td>
<td>11</td>
</tr>
<tr>
<td>Heifers</td>
<td>12</td>
<td>NR</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>Calves</td>
<td>26</td>
<td>21</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>SOURCE</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

NR: not recorded
Source: A - Paskin (1990)  
B - Tapscott (1990)  
C - DVS data  
D - DVS data
Table 6. Crop and Household Seasonal Calendar

<table>
<thead>
<tr>
<th></th>
<th>CROP TASKS</th>
<th>OTHER HOUSEHOLD TASKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>Ploughing &amp; planting contd.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some weeding</td>
<td></td>
</tr>
<tr>
<td>Feb</td>
<td>Finish ploughing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weeding</td>
<td></td>
</tr>
<tr>
<td>Mar</td>
<td>Weeding</td>
<td></td>
</tr>
<tr>
<td>Apr</td>
<td>Finish weeding</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Prepare threshing floors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Start harvesting (if rain finished)</td>
<td></td>
</tr>
<tr>
<td>Jun</td>
<td>Harvesting</td>
<td>Make clay bricks</td>
</tr>
<tr>
<td>Jul</td>
<td>Threshing</td>
<td>Make baskets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dig wells</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collect poles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Build/repair houses</td>
</tr>
<tr>
<td>Aug</td>
<td>Threshing (if good harvest)</td>
<td>as above</td>
</tr>
<tr>
<td>Sep</td>
<td>Resting</td>
<td>as above</td>
</tr>
<tr>
<td></td>
<td>Any special jobs</td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td>as above</td>
<td>as above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Build/repair grain stores</td>
</tr>
<tr>
<td>Nov</td>
<td>Spread manure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repair crop fences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prepare for next season</td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td>Ploughing &amp; planting</td>
<td></td>
</tr>
</tbody>
</table>

Note: Fishing takes place from January to March in Ovambo, and most times of year except when river too high in Kavango.
Table 7. Livestock Seasonal Calendar

<table>
<thead>
<tr>
<th>Month</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>Herding</td>
</tr>
<tr>
<td></td>
<td>Milking</td>
</tr>
<tr>
<td></td>
<td>Calves born</td>
</tr>
<tr>
<td>Feb</td>
<td>as above</td>
</tr>
<tr>
<td>Mar</td>
<td>as above</td>
</tr>
<tr>
<td>Apr</td>
<td>as above</td>
</tr>
<tr>
<td>May</td>
<td>as above</td>
</tr>
<tr>
<td></td>
<td>Castration Vaccinations</td>
</tr>
<tr>
<td></td>
<td>Move main herd to cattle post</td>
</tr>
<tr>
<td>Jun</td>
<td>Castration Vaccinations</td>
</tr>
<tr>
<td></td>
<td>At cattle post</td>
</tr>
<tr>
<td>Jul</td>
<td>At cattle post</td>
</tr>
<tr>
<td>Aug</td>
<td>At cattle post</td>
</tr>
<tr>
<td>Sep</td>
<td>At cattle post</td>
</tr>
<tr>
<td>Oct</td>
<td>Return from cattle post</td>
</tr>
<tr>
<td>Nov</td>
<td>calves born</td>
</tr>
<tr>
<td>Dec</td>
<td>Herding</td>
</tr>
<tr>
<td></td>
<td>calves born</td>
</tr>
</tbody>
</table>

Notes: 1. Majority of calves born during summer months but some born in winter.
2. Kavango cattle do not move to cattle post.
3. Birth and castration periods also apply to goats.
Table 8. Agro-ecological Zones (AEZ) in the NCAs

<table>
<thead>
<tr>
<th>Region</th>
<th>AEZ</th>
<th>Area (Sq km)</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaokoland</td>
<td>1</td>
<td>11,440</td>
<td>desert: very little possible</td>
</tr>
<tr>
<td></td>
<td>2C</td>
<td>9,300</td>
<td>semi-desert: extensive small stock</td>
</tr>
<tr>
<td></td>
<td>3A</td>
<td>564</td>
<td>bush savanna: extensive (large) stock</td>
</tr>
<tr>
<td></td>
<td>3B</td>
<td>27,678</td>
<td>bush savanna: extensive (small) stock</td>
</tr>
<tr>
<td>Ovambo</td>
<td>3A</td>
<td>515</td>
<td>bush savanna: extensive (large) stock</td>
</tr>
<tr>
<td></td>
<td>3B</td>
<td>4,976</td>
<td>bush savanna: extensive (small) stock</td>
</tr>
<tr>
<td></td>
<td>5B</td>
<td>20,150</td>
<td>oshana area: dryland cropping</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>2,944</td>
<td>Okavango river area: dryland cropping</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>6,624</td>
<td>Etosha plains: extensive stock farming conditional on water supply - saline</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ground water</td>
</tr>
<tr>
<td></td>
<td>8B</td>
<td>21,164</td>
<td>forest: large stock with limited arable on alluvial soils, but lacks water</td>
</tr>
<tr>
<td>Kavango</td>
<td>4</td>
<td>255</td>
<td>plateau: marginal cropping, mainly stock</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>18,497</td>
<td>Okavango river area: crops &amp; livestock</td>
</tr>
<tr>
<td></td>
<td>8B</td>
<td>22,948</td>
<td>forest: large stock with limited arable on alluvial soils, but lacks water</td>
</tr>
<tr>
<td>Caprivi</td>
<td>10</td>
<td>11,534</td>
<td>Eastern Caprivi: extensive stock farming and crop production</td>
</tr>
</tbody>
</table>

Source: SWA, *A five year plan for development of the native areas* (Windhoek n.d. [1966]), Table xv.
RURAL SERVICES SUPPORT PROJECT

Organogram of Ministry of Agriculture, Water and Rural Development

Ministry of Agriculture, Water and Rural Development

Honorable Minister

Honorable Deputy Minister

Permanent Secretary

Deputy Permanent Secretary

Directorate:
Planning, Marketing, Pricing and Cooperatives

Directorate:
Agriculture

Directorate:
Veterinary Services

Directorate:
Rural Development

Directorate:
Forestry

Directorate:
Agricultural Training

Directorate:
General Services
APPENDIX 4: OPTIONS FOR A DRAUGHT POWER COMPONENT

As indicated in the main report, 50 to 60% of Ovambo and Kavango farmers do not have cattle. Less than 20% of this group has goats. A livestock project, then, will not benefit the bottom half of the population unless a component is included that entails the distribution of cattle amongst this group. For the poor, this is a perceived need: many households had cattle before but lost them as a result of drought, disease and the upheaval caused by the independence war. Cattle is needed for draught, manure, milk and as a reserve fund, to be drawn upon in time of need.

Herd rebuilding should focus in the first instance on supplying stockless households with draught power, i.e., oxen. Cows could be added to give the herd growth potential (bulls could be borrowed within the community). In the longer run calves could be used for replacement of oxen. In the short run offtake for sale would allow beneficiaries to contribute to project expenses, i.e., the payment of loans. In addition to supplying draught power this project component would provide beneficiary households with milk and could contribute to improving soil fertility (or at least reduce the rate of soil deterioration) through the use of manure.

In project formulation two crucial issues have to be looked into. The first concerns payment: is cattle supplied in the form of a grant, a loan, or some intermediate form. The second issue is what would be the most adequate way of supplying cattle to households: individually or via groups.

As for payment, two fundamental arguments can be made against extending cattle in a scheme based on "commercial" credit. One is that commercial credit should be given only when there is capacity for repayment, that is, when the investment generates enough benefits both to significantly improve the situation of the beneficiaries and to pay back the loan plus interest. In the present situation, this will almost certainly not be the case. Providing draught power will enable beneficiaries to cultivate
larger crop areas, thereby increasing food production and therefore, food security. If this project component succeeds, the additional production will enable households to convert current deficits into self sufficiency. In good years, some surplus may be produced - which could be stored for poor harvest years. However, under present circumstances it is very unlikely that enough production could be obtained to significantly improve food production and pay back the loan for a pair of oxen. Only if the supply of draught power is brought into a general crop development project which would, say, double or triple production could full payback be imagined.\

It might be argued that increased food production will diminish needs for the purchase of food (mainly maize meal), thus liberating cash for repayment. However it should be taken into account that more household labour will have to be dedicated to cultivating the larger area. This would decrease availability for off-farm labour and thus, income generating capacity. To a certain extent, then, supplying stockless households with oxen would imply an overall increase of food supply as well as a shift of the source from which the food is obtained. That is, before project implementation stockless households would obtain a larger proportion of their millet from other households than after.

The second argument that can be made against extending cattle in a scheme based on "commercial" credit is that of risk. Stockless households are already living at a minimal subsistence level and have no risk absorption capacity whatsoever. In case of a crop failure, death of an

\[1/\] To make a very rough estimate of repayment capacity estimate the consumptive requirements of millet, the main staple, at 2 kg a day for a family of eight. This would put the yearly requirement at 365x2 = 780 kg. Current production can be estimated at 250-300 kg/ha. For an area of 2 ha this means a total production of between 500 and 600 kg. Assume that with oxen the cultivated area could be extended to 3 ha. The production of the 250 to 300 kg produced from the extra hectare is likely to be used to obtain self sufficiency; at best a surplus of 120 kg (3x300 - 780 kg) may be obtained. Even if this is not stored but sold, obtained cash benefits would be only some R150. That would barely be enough to cover (subsidized) interest payments on a loan of some R2000 for the purchase of a pair of oxen, but not the payback of the principal.
animal or other forms of loss such as theft - all frequently occurring phenomena in the project areas - the household involved would have no way to meet repayment obligations. As households have no collateral, no effective sanctions can be taken against debt defaulting other than exclusion from future development credit or development activities. Since default is quite likely to occur while consequences for defaulters are non-observable, credit discipline would suffer. That may seriously impede future development projects where credit could be used in a more feasible and sustainable manner. The argument, then, is not to compromise credit discipline by providing project assistance in the form of credit, in a situation in which chances of default are high and no feasible sanctions for defaulters are available.

The above leads to the conclusion that providing stockless households with cattle should take place in what amounts to at least a partial grant. That makes the choice of who is to benefit, that is, who should be assisted (and who not) extremely difficult. If left purely to individual choice and if some form of (even a token) payment were required, it is unlikely that the poorest households would take up the opportunity. The heads of these households would be most prone to perceive that the risk of participation, i.e. of a loan (however lenient the conditions) would be too great, as the household would lack the reserves to needed in case of repayment problems. In addition female headed households might perceive that cattle management, a traditionally male task, would be out of their range. On the other hand, households with more repayment capacity would be more inclined to take up the opportunity - particularly if they would see potential of getting a return on their investment by providing ploughing services for non-participating households.

One way to address the above problems would be through collective rather than individual ownership: groups of households, numbering anywhere from two or three up to ten to fifteen, could own and manage a herd collectively. Participation would in the first instance be a
household choice, but collectively (in village assemblies) people could decide on who would be allowed to participate. At village level decisions could also be made on the size of the cooperative: one single group representing all interested households, or several smaller groups.

Working with groups rather than individuals would have the following advantages:

- More rational use of resources, as one team of oxen could serve two to three households
- Consequently a lesser repayment burden on individual households (important even if this form of assistance is heavily subsidized)
- Within a group arrangements could be made to assist female headed households with no adult male labour with ploughing services
- Spreading of risk: loss of one or two oxen would not mean loss of draught power and repayment capacity for a particular household but could be absorbed by the group.
- In extending a group herd the project could add a few cows to the basic herd of oxen, to provide substitute animals, milk and repayment capacity (through the sale of part of the offspring)

Obviously, group herds would also have disadvantages:

- Potential for tensions among group members, leading to poor cooperation and the demise of the group effort.
- No direct responsibility for the animals, which might result in reduced interest to take care of them. The same would be valid for the obligation to repay an incurred debt.
- Lack of experience in organization as well as literary and management skills may impede effective functioning and create possibilities for abuse by some members.
In the project preparation mission these issues will have to be looked at more closely, and pro's and cons's of group as against individual ownership must be weighed. Thereby the opinions of the target group should be a factor of primary importance. Also, if group ownership is considered a feasible alternative, indications will have to be given to optimal group and herd sizes.

One additional issue that will need to be addressed is that of access to women, i.e. female headed households, to group herds. As cattle management is perceived - by men as well as women - to be men's work, female headed households may have trouble incorporating themselves in groups. In addition, as indicated above, some form of arrangement would have to be found for the rendering of ploughing services to these households, as ploughing is typically a male task.

As a final issue the possibility of using donkeys rather than oxen should be considered in the same terms as assistance in the form of oxen (i.e. feasibility of a credit scheme, individual or group ownership, creation of repayment capacity, etc.). The veterinary department in Kavango expressed serious doubts as to the introduction of donkeys for ploughing in Kavango (they are not used currently), fearing an increase in the deterioration of grazing land. This issue will have to be assessed for both Ovambo and Kavango.
APPENDIX 5: OPTIONS TO ADDRESS THE PROBLEM OF EXCEEDING
THE CARRYING CAPACITY OF GRAZING LAND

The problem of overgrazing has been discussed extensively in the main report, and the opening up of new grazing areas through water development has been indicated as a possible solution. In the longer run, however, this is not going to solve the problem that with current target group attitudes successful livestock development will compound the problem of overgrazing. There are basically two ways to address this problem. One is to develop a different perspective on cattle ownership. Cattle should no longer be considered as a savings account to be addressed only in times of need, but as a productive asset to be exploited for income generation through regular offtake. This involves a radical change in deeply ingrained attitudes and as such, can be expected to be only a long term solution.

The second possibility is imposing limits on the numbers of cattle held by households. In the longer run, this could even entail a shift from transhumance to settled cattlefarming. The latter is not such a big change as one might think, since a considerable proportion of cattle is already held permanently around the village or at cattle posts. Persuading villages to impose a quota system of heads of cattle could be one way to address the issue. Such a system would limit livestock numbers and, by dividing livestock owning rights equitably among village households and making them negotiable on a yearly basis, would offer stockless households the possibility to obtain, for example, ploughing services or income in cash or kind from stock owners who own more cattle than can be allotted under the quota system.

This option could meet with opposition from larger cattle owners. The way to address this problem would be twofold: inducement and social control. Larger scale cattle owners might be induced to cooperate or at least limit their opposition by providing them with adequate veterinary services and where feasible, improved water supply in the village, at cattle posts or both. On the other hand, negotiable cattle ownership rights would work to the advantage of non-cattle owning households and those with only a few head of cattle - a majority in most villages. This fact, as well as assuring cooperation of these households through a draught power project component, could go a long way to imposing village level control mechanisms for compliance with allocated stock numbers.

Another problem with a quota system would be that regional implementation would require establishing an administrative network that might well exceed current administrative capacity. The system might also be prone to corruption. Still, a solution to this problem can be imagined. In each village or cluster of villages making up some 40 to 50 households, a local 'livestock agent' could be appointed to keep track of livestock numbers. An adequate educational level should be required, and appointment should be on a yearly basis, to be confirmed annually by the village population. This would offer villagers a way to control anomalies. After receiving the necessary training - possibly an IFAD project component - this agent could also monitor the animal health and grazing situation and serve as a mediator in the trade in cattle owning rights. In addition this person could function as a collector of a yearly tax to be levied for each head of cattle. This tax should function both as a means to stimulate offtake of
unproductive animals as well as a way to finance government programs. One could also imagine a more general role for the livestock agent in village administration and agricultural development, as well as one in an early warning system for food supply problems and the adequate distribution of food aid.