

Production systems Southern regions (Karas, Hardap)

Small stock farming

Because of the arid nature of the Hardap and Karas regions it is predominantly suitable for small stock (Sheep and goats)

Geography of the system

Two distinct production systems exist namely commercial farming area where farms are demarcated by definite boundaries and title deeds are registered for each of them and secondly a communal farming system with unclear boundaries. Farmers are subsistence orientated with open access to natural resources in the area. The title deed areas consist of surveyed farms in Mariental, Keetmanshoop, Karasburg, Maltahöhe and Luderitz districts. Within these broad boundaries Namaland the main communal component with Hochanas, Gibeon, Bondelswarts and Warmbad as separate communal units. The whole of Namaland is 2 145,098 ha in size. The Bondelswarts area to the west of Karasburg is 171,126 ha. The Bondelswarts area to the west of Karasburg is 171 126 ha in extent. With 14 523 ha, Warmbad is the smallest of the three communal areas. (Vigne 2005; Lourens 2004).

There is a tendency for high concentrations of people and livestock near to permanent water sources, while other areas remain potentially under-utilised due to a lack of water. Animal numbers tend to be geared more to the quantity of reliable water than to the reliable quantity of forage (Lourens 2004).

Presently Namaland is divided amongst two administrative regions, the Hardap and Karas regions. Gibeon and surrounding areas fall in the Hardap region. For the purpose of this study Namaland is treated as one unit.

The most recent census shows that the total population for Hardap and Karas regions is 68,249 and 69,329 respectively. The corresponding household sizes are 4.4 and 4.1. The two regions cover an area of 270,825 km² (Hardap 109,651, Karas 161,215) with a population density of 0.51 persons per square kilometer.

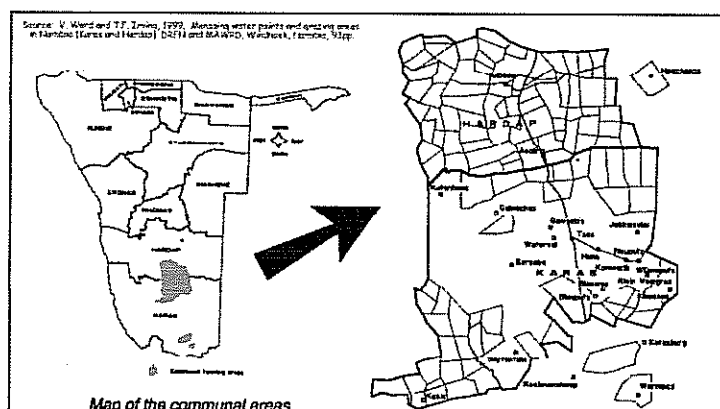


Figure 1.1: Map of the Communal Areas in the Hardap and Karas Regions

Source (Lourens 2004; Vigne 2005)

Table 1.1 gives an indication of the main sources of income of people in these two regions but does not reflect a the real dependence range on agriculture.

Table 1.1: Percentage distribution of households by main source of income

Area	No HH	Per cent						
		Farming	Business, non-farming	Wages & salaries	pension	Cash remittance	Other	Not stated
Hardap	15,039	8.5	4.8	61.4	15.2	6.7	2.2	1.2
Karas	15,481	7.2	4.5	68.6	10.2	6.2	2.0	1.3

Source: Population and Housing Census (2001)

It is noted from the above information that only 7 to 9 per cent (± 1700) of the households are making a living solely from agriculture. According to the Ministry of Agriculture, Water and Forestry Extension offices Mariental and Keetmanshoop) the number of households solely dependent on agriculture in the southern communal areas, totals to $\pm 2,100$. Only 20% of them have a "decent income" which is described as more than N\$50,000.

The ownership of livestock is highly unequal. Nearly a quarter of all households own no livestock at all. Out of stock-owning households, most own goats but far fewer own sheep, cattle, horses or donkeys.

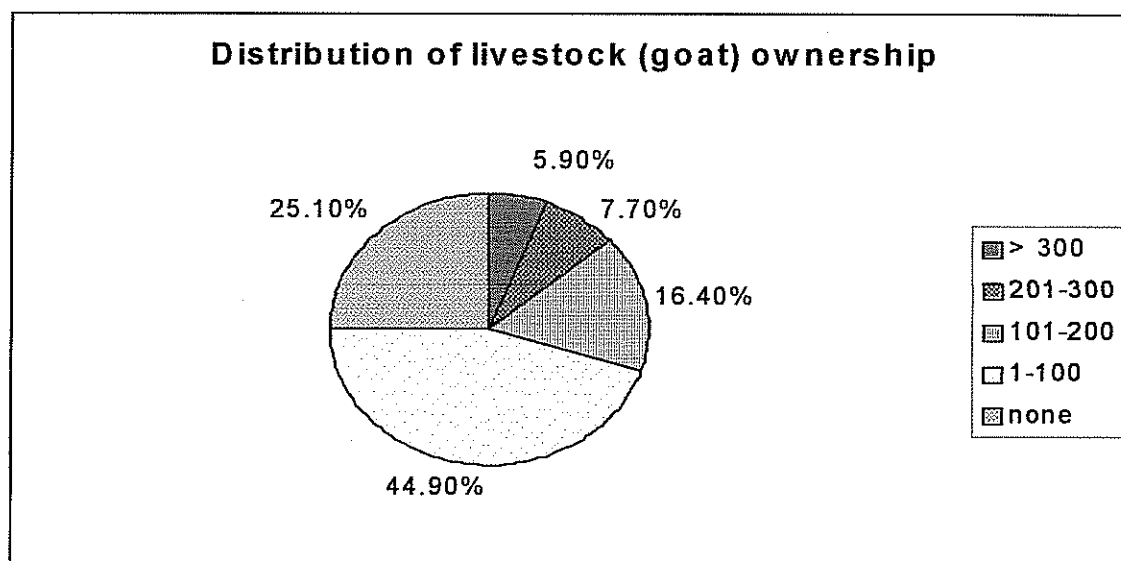


Figure 1.2: Distribution of livestock (goat) ownership

Data source: Moorson et al, 1993: 27 (As cited by DRFN 2003)

Stock-owning households can be divided into three categories:

- *Small farmers*: a third of all households own 50 goats or less, from which they get only a small part of their daily food needs. They can only sell goats for cash in emergencies.
- *Medium farmers*: another third of all households own between 51 and 200 goats each. They can supply their daily food needs and get small cash income from selling their animals.
- *Large farmers*: a small minority, one in seven of all households, owns more than 200 goats. They can earn moderate to good cash incomes from selling their animals.

Some stockowners are only part-time farmers. For instance, a quarter of registered farmers in the Berseba district of Namaland is part-time and has other paid jobs or businesses. Large farmers are commonly also part-time and absentee stockowners (Moorson et al. 1993: 10)

According to the findings of two separate surveys carried out by Agenbach (2005) and Lourens (unpublished) less than 25% of the farmers in Hardap and Karas own more than 200 goats but the bigger percentage own only between 1 and 100 goats. Approximately 80% of farmers in the south own between 0 and 10 cattle and another 13-20% between 11 and 50 cattle. In terms of sheep the picture does not look better. About 75% of them own between 0 and 50 sheep with less than 10% having more than 200. It is important to note that those who own goats do not necessarily own sheep and cattle and vice versa. For up to 63% of the households pensions and remittances are important supplements in their strive for survival.

The Rehoboth farmers are somewhat better endowed. Approximately 25% and 30% of them have between 0 and 50 goats/sheep respectively. About 32% of them have more than 200 goats and more than 200 sheep. As far as cattle are concerned 65% own less than 50 cattle with only 20% more than 100. With these low livestock numbers and the large percentage of people who do not own any livestock it is clear that many people are to a large extent dependent on old age pensions as a source of income (Agenbach 2005).

In 70% of the households, the head provides the main income while other members contribute very little or nothing at all. Pensions are the main sources of income in 40% of the households. Of these, 50% are extended families and woman-headed households. Very few nuclear families depend on pensions, they sell livestock to provide for a cash income or are formally employed. Karakul pelts also provide an important source of income for nuclear families. (Moorson et al. 1993: 22). The sources of income for southern households have been ranked as follows: pension, animal sales, wage employment, self-employment and remittances (Republic of Namibia, 1994: 24)

For some families wages (2 in 10) and remittances (1 in 10) are also important main sources of income. Self-employment is important to very few people (1 in 10) since only a few shops and small businesses are in the area. The informal sector provides income from sales of liquor, skins and handicrafts (Moorson et al. 1993: 22) (As cited by DRFN 2003).

Agenbach (2005) found that only 50 % of the basic nutritional needs of farmers in Namaland are derived from agriculture. In the Rehoboth area the figure is just more than 60%.

The labour market is largely un-organized or limited in scope. Labour absorption is at times very limited and the labour-force is largely self-employed. The unemployment rate amongst males is 31.4% and amongst women is 46.2% (Agenbach 2005).

The 1993/94 Household Income and Expenditure Survey revealed that 4.1% of the Karas region's households spend more than 80% of their income on food. Furthermore, 32.2% of households spent more than 60% of their total income (in cash and kind) on food. This is a generally accepted indicator of severe poverty (CSO, 1996).

Climate, topography

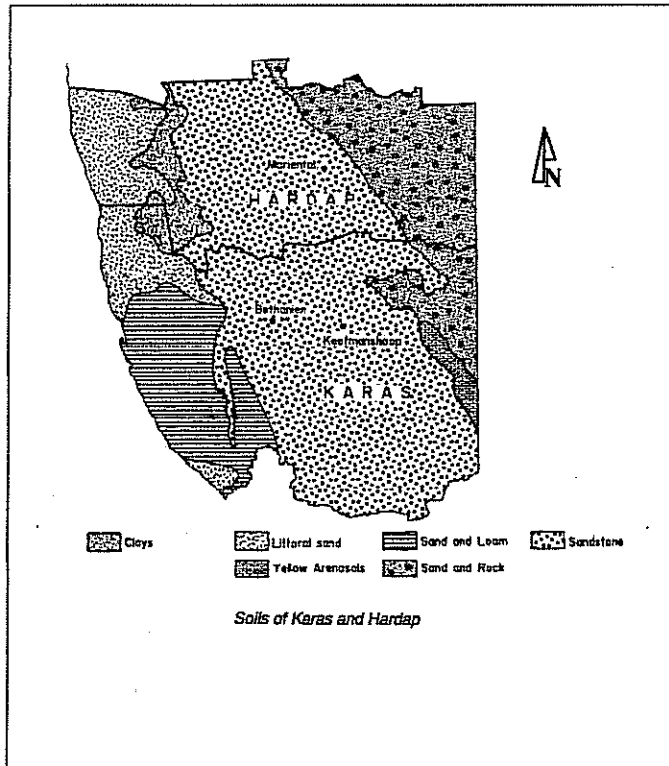
Rainfall

The Hardap and Karas regions are characterised by agro-ecological diversity. The western part of these regions comprises a belt of Namib desert with Luderitz having an average annual rainfall of 18 mm and a coefficient of variance of 93. The rainfall increases gradually in a south-eastern direction to 300mm north east of Aranos. The main rainy season is during January to April with 75 to 81% of the annual rainfall occurring during these months. In the vicinity of Aus only 57% of the rain occurs during these months with an additional 29% during May to August. The rainfall is highly variable with Coefficients of Variation between 77% (Bethanien) and 53% (Aranos) (See Table 1.2). The rainy days in the areas where farming is practiced vary between 9 in the south-west to 30 in the eastern part. Summer temperatures are very high while winters are fairly mild with occasional frost.

Table 1.2: Average rainfall, median values, coefficient of variation and main rainfall months for various towns in the south.

	Bethanien	Aus*	Karasburg	Keetmans hoop	Maltahöhe	Mariental	Aranos
Average rainfall	114	86	128	148	167	191	207
Median	82	78	115	129	138	182	204
Coefficient of variance	76.9	64.2	58.8	67.0	67.4	59	52.6
Rain: J,F,M,A	77	57	76	75	81	78	80

* During May, June, July and Aug Aus also receive 29% of its annual rainfall.



Soils of the Karas Region

The soils in Karas Region originate from the ancient Karoo and Nama sediments which underlie the whole southern area of Namibia. For the most part these soils are shallow, stony, and contain little organic matter. They are low in fertility and do not support much vegetation. They have a clay content of less than 5%, and thus have a very low water holding capacity.

The map on the left shows that most of the soils in Karas (and Hardap) are sandy and stony (As cited by Lourens 2004).

Figure 1.3. The soils of the Karas and Hardap Region.

Source: Managing water points and grazing areas in Namibia, Karas and Hardap, Desert Research Foundation.

Carrying capacity

Various agro-ecological zones can be distinguished and the productivity of the two regions under discussion will be dependent on the carrying capacity of each individual zone. Carrying capacities vary from 1 SSU/ 2 ha in the north-east to as low as 10 ha/SSU. Table 1.3 presents the total extent of each of these areas with the corresponding number of small stock that can be kept on a sustainable basis. In addition the number of surveyed farms and the average farm size in each of these AEZ's is indicated. Subsequently the number of small stock that can be farmed with on these farms are shown. It is important to note that the smaller farm units in the higher carrying capacity areas can sustain much more animals than the large farms in low production potential areas. Therefore one cannot use average farm sizes to determine economic farming units in the south.

Table 1.3: Total carrying capacity, average farm size of southern regions

Landtype carrying capacity (SSU:ha)	Carrying capacity Kg live body	Area (Ha)	*Carrying Capacity (SSU)	Average farm size (Ha)	SSU/farm
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	mass per ha				
1:2-2.5	16-22	534,000	237,337	5,194	2,308
1:03	13-15	3,137,292	1,045,764	6,212	2,070
1:04	9-11	2,420,984	605,246	7,990	1,997
1:05	8-9	4,303,205	860,641	7,089	1,417
1:06	6.5-7	2,080,620	346,770	9,958	1,659
1:08	3-4	1,721,256	215,157	13,041	1,630
1:10	3	1,638,720	165,872	14,299	1,430
Total commercial		15,836,077	3,476,787	8,052	
Nama 1:6	6.5-7	2,145,098	357,516		
Bondel 1:7	5	171,126	24,446		
Total communal			381,962		
Total South			3,858,749		

*Based on 45-50kg live body mass

The total number of small stock units in the southern regions is 2,902,087 (Cattle converted to SSU on the basis of 1 cattle unit = 6 SSU) which represents 72.9% of the theoretical carrying capacity of the south. On the face of it seems as if the south is substantially under stocked. The following aspects should be kept into consideration:

- The carrying capacities for the southern regions were determined from experience with karakul sheep. Karakul ewes weighed 45-50 kg on average and their lambs, except for substitution purposes, were all slaughtered immediately after birth.
- In the case of Dorper sheep the ewes are on average 65-70 kg and they have to raise their lambs until 4-5 months of age. One Dorper ewe with her lamb can be regarded as at least 1.6 Karakul sheep.
- The same applies for goats.

If the present total number of SSU are converted to karakul units it means a total stocking rate of 4,643,342 karakul equivalents which could be as much as 120% of the theoretical carrying capacity. The south is therefore inherently overstocked. It is furthermore doubted whether the land productivity is still the same as when these capacities were initially determined.

Vigne (2005) found that *Keetmanshoop* district was stocked as is shown in Figure 1.4

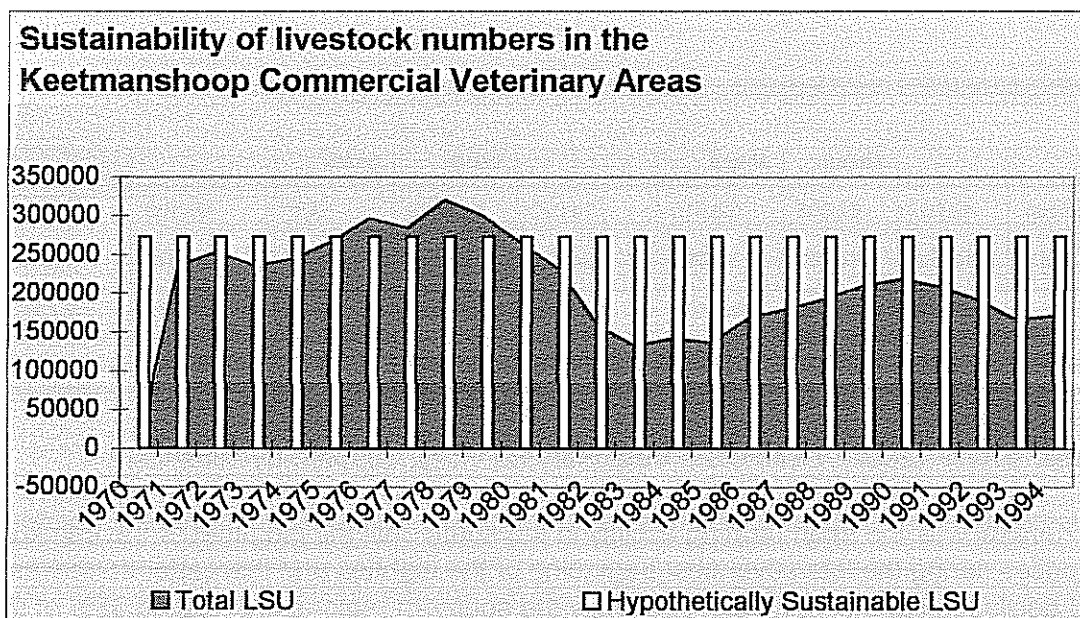


Fig. 1.4: Actual livestock numbers in relation to the long-term carrying capacity in Keetmanshoop district (1970 to 1994)

The vast majority of the sheep consist of Dorpers and the remarks pertaining to Table 1.3 also applies for figure 1.4.

Livestock production and marketing

Small stock farming is the main agricultural activity in the southern regions. In the commercial farming areas sheep farming is the dominant production system (72-74%) followed by cattle (15-20%) and goats (7-10%) for Hardap and Karas respectively. The communal farmers on the other hand place much less emphasis on sheep (23-29%) with cattle and goats as the main sources of income. See Table 1.4.

Table 1.4: Occurrence of various species in commercial and communal areas of Hardap and Karas expressed as a percentage of the total number of livestock in these regions

Region	%		
	Cattle	Sheep	Goats
Hardap commercial	20.04	72.41	7.55
Hardap communal	38.91	29.17	31.92
Karas commercial	15.41	74.24	10.35
Karas communal	17.55	22.61	59.84

[Large stock (LSU) were converted to small stock units (SSU) on the basis of 1LSU = 6 SSU – Ratios determined on the basis of land utilized by each production system]

Table 1.5: Livestock numbers in commercial and communal farming areas of Hardap and Karas regions

Area : 2004	Cattle	Karakul	Dorper	Other	Total	Angora	Boerbok	Other	Total

		sheep	sheep		sheep	goats			goats
Hardap Commercial	42,169	62,005	778,419	74,022	91,4446	320	91,109	3,922	95,351
Hardap communal	18,169	14,367	12,794	54,561	81,722	0	86,072	3,371	89,443
Karas commercial	30,898	93,828	652,953	146,143	892,924	3,360	118,418	2,736	124,514
Karas communal	4,572	22,610	2,588	10,152	35,350	3	93,507	21	93,531
Total	95,808				1,924,442				402,839

Source: MAWF (2004), Directorate Veterinary Services, adapted by consultant

The Karakul was the main farming activity in the south until the plummet of the karakul pelt prices during the late seventies/ beginning of the eighties and thereafter there was a rapid decline in karakul numbers. Presently the southern regions are hosting 95% of the karakul population. This breed is well known for its pelts, which are exported to Europe on a rather small scale and are sold at fur-auctions as Nakara-pelts. The breed is very well adapted to the conditions in the southern regions.

Since 1980 there was a rather quick switch over to Dorper sheep/mutton production. Today the sheep population in the title deed areas of these two regions consists of 79% Dorper and 8.6% Karakul sheep. This is also in agreement with the findings of Agenbach (2005).

Goats are predominantly Boer goats and commercial and communal herds on average comprise 95.3% and 98.1% respectively of this breed. The Boer goat is a hardy breed, well adapted to the semi-arid and arid conditions of southern Namibia (Table 1.5).

The southern regions host 20.25% of the total Namibian goat population of 1,990,197 and in the case of sheep 73.49% of the national herd of 2,618,834.

The 1985 livestock census data showed a figure of zero for Boerbok and 70,686 for "other" goats, but during the subsequent years the picture changed dramatically. From 1996 to date Boerbok have dominated the scene. Of all the goats kept over the past 15 years, Boerbok figures have shown an average of 96%. Today the Boerbok is a hardy and well-adapted breed for semi-arid regions.

The type of sheep preferred by farmers in the communal areas is the Karakul. During 1985 to 2000 the average sheep numbers have been 52,903 and of these, 95% are Karakul (DRFN 2003). According to the 2004 livestock census of the Directorate Veterinary Services, Karakul sheep comprised 64% of the total number of sheep in the Karas region with only 18% in Hardap. There is however a trend in favour of Dorpers and other sheep too.

The Dorper breed is kept solely for meat production, and is predominantly farmed with on the commercial farms. Herding is a must in most communal areas and since the Dorpers are not easy to herd, goat farming in these areas is the dominant farming activity.

According to the 2004 census of the Ministry of Agriculture, Water and Rural Development the national ostrich population counts 30,762 of which 73.8% and 20.8% occur in the Hardap and Karas regions respectively. The vast majority of these birds are kept under intensive/semi-intensive conditions which is very expensive. Presently there are strong indications that the ostrich abattoir and processing unit south of Keetmanshoop is going to scale down its ostrich component drastically (Or even close it). The main reason for this state of affairs can be ascribed to a poor supply of ostriches. The abattoir is already being utilized as a sheep slaughtering facility with a throughput of \pm 1500 - 1600 sheep per day (Swarts pers. comm.).

Out-grower ostrich chick rearing which used to offer an opportunity for the 47 resource-poor communal tenure farmers to benefit from this industry is therefore seriously threatened (Lourens 2006 pers. comm.).

Chickens are generally free-ranging and scavenging, although some owners practise housing and feeding (Lourens 2004).

Marketing

In terms of marketing infrastructure, the Hardap region alone has 34 auction pens across the region, 2 in the communal areas, 6 on the border of communal and commercial areas, and 22 in the commercial sector. The Rehoboth area has 4 auction pens (Vigne 2005; Agenbach 2005; Lourens 2004). There are auction facilities at Gibeon and Asab, to serve the needs of farmers. These auction facilities have a capacity of between 1,200 and 1,500 SSU each. The auction facilities have intake pens, holding pens and a loading bay, all in good condition (Werner 1997: 10; Metzger 1994: 31).

At the moment there is one EU accredited export abattoir operating in Mariental, namely Farmer's Meat Market (FMM). Another FMM abattoir, which is mainly slaughtering fat-tail and C-grade sheep, is in operation in Rehoboth. The Rehoboth operation is not EU accredited and slaughters chiefly for the local market. However, because of supply constraints, the abattoir is only operating at roughly half its capacity. The total slaughtering capacity is 787,710 sheep per year (Vigne 2005). As has been mentioned above the (ostrich) abattoir at Keetmanshoop has been changed to slaughter sheep.

Table 1.6: Slaughter capacity of small stock abattoirs in southern Namibia

Name	Small stock p/day @ 105 slaughter days	Annual capacity @ 210 slaughter days
Farmers Meat Market	1200	252000
Farmers Meat Market (Rehoboth)	400	42000
Blaauberg Meat (Aranos)*	1000	210000
OPN	1200	252000
Southern Abattoir*	300	31500
Total		787710

Source: Abattoir Association, July 2004. Note: The slaughter capacity was calculated by the Abattoir Association as half of the capacity indicated by the owner. * to be commissioned by July 2004.

a) Sheep

During 2004 a total of 469,416 small stock were exported to South Africa from these two regions which represents 38.14% of all slaughterings/exports in/from Namibia. (The corresponding figure for 2003 is 802,495 and 53.05%).

The main destinations for Namibian sheep is Gauteng, North Cape and West Cape where 11.7%, 71.1% and 15.1% of the total exports are absorbed. The 2004 turnover for the south is 24.4%.

Table 1.7: Total live small stock exports to South African markets and the numbers marketed at Namibian factories and butchers (1992 to 2004)

TOTAL PRODUCTION OF SMALL STOCK - (n)				
YEAR	TOTAL LIVE EXPORTS SOUTH AFRICA	NAMIBIA FACTORIES	NAMIBIA BUTCHERS	NAMIBIA TOTAL PRODUCTION
1992	1045 809	147 603	152 492	1345 904
1993	817 608	102 319	118 231	1038 158
1994	888 410	115 290	96 481	1100 181
1995	1008 662	52 907	121 829	1183 398
1996	928 614	2 198	128 522	1059 334
1997	865 951	0	87 714	953 665
1998	1086 320	2 552	105 213	1194 085
1999	908 153	236 919	196 670	1341 742
2000	755 363	214 754	192 795	1162 912
2001	965 713	254 966	153 706	1374 385
2002	1149 149	318 713	45 414	1513 276
2003	1123 102	366 454	23 155	1512 711
2004	756 464	435 676	38 427	1230 567

The annual production of small stock varies between approximately 1 million and as much as 1.5 million.

Table 1.7 shows that from 1992 to 2003 seventy percent of the total production was destined for live exports while only 30% was slaughtered locally.

As a result of these large exports figures the Small Stock Marketing Scheme (SSMS) was introduced in April 2004 – presently only for sheep. There is a firm arrangement that farmers can only export one sheep every two sheep slaughtered locally.

Almost all of the ± 90,000 karakul pelts that are marketed annually have their origin in Hardap and Karas.

During the course of a year the producer/farmer will also shear the sheep; the wool is brought to Agra and sold at the Port Elizabeth auction in Republic of South Africa (RSA). During 2002, a total of 748 bags of wool were sold with a total weight of 89,852 kg (Agenbach 2005).

b) Goats

Appollus (2001) states that more than 90% of all goats sold in Namibia are destined for the South African market as live animals. Nearly 90% of all Namibian goats traded in South Africa are bought by the Zulu population while the other 10% is sold to the Muslims. Both these two groups purchase the goats primarily for sacrificing at religious festivals and sacrificial ceremonies which gives goats the so-called bleeding value. The 2004 Annual Report of the Meat Board of Namibia states that 95% of the 2004 off-take of 262972 goats went to South Africa.

The total income from goats sold in these markets is more than N\$40 million. Appollus also suggests that prices fetched in these markets are almost double the local meat prices. For this reason farmers are getting much higher prices for their goats destined for the abovementioned markets than the value paid for the meat in Namibia. Communal farmers in these two regions can be regarded as the main beneficiaries of these lucrative markets (See Table 1.8).

Table 1.8: Marketing of goats per district

DISTRICT	RSA MARKETS		TOTAL	
	2003	2004	2003	2004
Tsumeb	0	253	0	253
Grootfontein	0	110	0	110
Outjo	5,568	5,461	5,568	5,461
Otjiwarongo	7,399	5,405	7,399	5,405
Okahandja	0	0	0	0
Omaruru	0	0	0	0
Karibib	0	0	0	0

Gobabis	4,099	579	4,099	579
Windhoek	1,420	340	1,420	340
Sub-Total	18,486	12,149	18,486	12,149
Rehoboth	0	0	0	0
Mariental	108,778	79,853	108,778	79,853
Maltahohe	9,202	3,212	9,202	3,212
Keetmanshoop	133,390	159,282	133,390	159,282
Bethanie	1,219	0	1,219	0
Stamriet	211	0	211	0
Karasburg	12,160	8,477	12,160	8,477
Sub-Total	264,960	250,823	264,960	250,823
TOTAL	283,446	262,972	283,446	262,972

c) Cattle

Out of a total of 95,808 cattle in the south only 3,021 were slaughtered at local export abattoirs while 19,798 were exported on the hoof to South Africa. Since there is presently a restriction on the live body mass of 450kg that can cross the border it can be assumed that the live exports mainly consist of weaners and some stores. Only 696 cattle were slaughtered for local consumption. The total turnover for the south is 24.5% which is also indicative of a substantial level of speculation.

d) Ostriches

Plans to develop slaughter lines for sheep at the OPN abattoir at Keetmanshoop have already materialised. Presently they are slaughtering between 1,500 and 1,600 sheep per day. The future of the abattoir for the ostrich industry is not clear yet. If the facility is not going to accommodate ostriches anymore it will be the end of the ostrich era in Namibia.

Livestock management

Communal farmers

Communal farmers do not implement a breeding season because it is difficult to implement in a communal grazing system (Agenbach 2005; Metzger 1994). In most cases farmers do not purchase superior genetic material from recognized breeders but

instead raise their own rams. This has the risk of inbreeding which is evident in some herds. Wealthier farmers however do buy rams from commercial farmers (Metzger 1994:13)

Agenbach (2005) however found that there is a wide range of ram suppliers (Goats and sheep) in the country and farmers are making good use of these breeders. A small percentage (10-20%) makes use of own-bred rams/bulls. The mothering ability, milk production, fertility and the meat production, according to the farmers are the most important when looking at the selection of the female animal (Agenbach 2005; Lourens 2004).

Farmers do not keep proper records, thus the unproductive and old animals stay in the herd (Agenbach 2005).

Especially in the Namaland area there is little planning going into marketing of animals. Almost 80% of farmers will sell animals as the need for money arises and when they sell 75-80% of them sell at auctions (Agenbach 2005; Lourens 2004).

Goat and sheep are penned overnight. Goat ewes with single lambs are milked in the morning. Lambs are kept in the kraal while the herd is let out to the pastures. Livestock have access to water only in the afternoons. Watch-boys or dogs are accompanying the herd to prevent them from getting lost or being stolen or preyed upon. In most cases farmers use their own pre-school children for herding. Once the children go to school most herds are left on their own, because farmers can not afford supervision. These farmers are thus hardest hit by losses, because their herds fall prey to thieves and wild animals (Metzger 1994:15)

All livestock-keeping farmers are aware of vaccinations for most of the common diseases. In theory they know what should be vaccinated for and when. Vaccinations however are not conducted regularly but only when diseases break out. In the Gibeon area farmers vaccinate their goats against Botulism in April, their sheep against Pasteurellosis in April and Enterotoxaemia (Pulpy kidney) in October/November.. Farmers dose and dip their animals themselves (Metzger 1994:15). Clostridium septicum became more problematic in recent years and farmers are also vaccinating as a preventative measure (Lourens 2004).

In the case of cattle however, farmers expect the Directorate of Veterinary Services to vaccinate their animals against anthrax (Directorate of Veterinary Services, 1997).

Rangeland management is not practiced and the lack of infrastructure is given as the main reason for this state of affairs.

Often farmers have to supplement the diet of their animals with licks and feeds. They however claim that it is too expensive and they can not afford it. Often they mix maize (33,3%) Kalorie 3000 (16.7%) and course salt (50%) to make supplements for their animals. Sometimes, especially during drought government offer subsidies for feed purchases, but this does not include licks (Metzger 1994: 18). In the Rehoboth area, the farmers provide supplementary feeding or licks to the animals mainly because they own more cattle (Agenbach 2005).

Commercial farmers

In general farmers are familiar with the principles of good rangeland management and they know their pastures.

Although the present livestock figures for the south show that they are applying conservative stocking rates it should be realized that farmers switched over to a meat (Dorper) production system which puts much more pressure on the natural grazing than was the case with Karakul sheep.

Lambs are marketed at the age of 4 to 5 months (A-grades) with an average live body mass of 32 kg. Karakul pelts are still marketed at auctions in Europe.

Most of them apply mating seasons and buy their rams. Seasonality of breeding seasons is naturally regulated by photoperiods. i.e. where the production of hormones, which control reproductive activity, is governed by seasonal changes and daylight. In general autumn is the time of peak breeding efficiency and the best for mating. In rams the semen quality and libido should also be best (Bester et al. undated).

Herd compositions of Karakul is 3% rams, 75% ewes and 15% replacement; for Dorper it is 6% rams, 60% ewes and 15% replacement while for goats the corresponding figures are 3%, 50% and 15%.

Most farmers supply good licks during the winter.

As far as animal health is concerned good vaccination and dosing programmes are followed. They vaccinate against botulism, pulpy kidney and pasteurellosis. In exceptional years (wet) vaccination against blue tongue, Slenkdal en Wesselsbron is also included.

Constraints in livestock farming

According to Vigne (2005) farmers are dealing with a number of constraints which include the following:

- At the moment little research is carried out Gellap-Ost and the Kalahari Research Stations. Field visits indicated that local farmers would like to see more applied research targeted towards their problems.
- The market for goats is seasonal which affects the livelihoods of many communal farmers and households. Diversification is needed in order to improve the cash flow situation of small holders. In fact, discussions with some commercial farmers indicated they have diversified portfolio of small stock ranging from goats, Karakul, other fat tailed sheep and cattle and this affords them to better manage price risks.
- The cost of vaccines has prompted some farmers to adopt a no vaccination strategy that has proved counter-productive as lots of small stock subsequently die. The affordability of vaccines is critical for farmers. Typical diseases are

botulism, which is caused by toxins in decaying animal material which animals can feed on to supplement phosphorus deficiency. Pasteurella is another common cause of livestock mortality, particularly goat deaths in communal areas. Scabby mouth also affects a lot of goat farmers in the south and causes lamb deaths. Communal farmers complain that they are often far removed from livestock medicine.

- The issue of dipping infrastructure is under-addressed in communal areas forcing farmers to travel long distances to dip livestock for mange and other external parasites.
- Due to drastic budget cuts in the 2003-04 annual budget extension officers' traveling budgets have been reduced from 2,500 km/month to 1,000 km/month. This limits farmer visits and training.

Farmers are also experiencing problems with predators that are causing serious losses (Lourens 2006).

Dryland agronomy

Because of the arid nature of the south no rain-fed agronomic production is possible.

Irrigation

Agronomic production is only possible where irrigation is possible. In the immediate vicinity of the **Hardap dam**, with a capacity of 294,593 million m³, about 2,300 hectares are irrigated by 34 farm owners. This figure includes an experimental farm of 135ha (MAWF) as well as a unit of 20 ha of the Department of Prisons and Correctional Services in the Ministry of Safety and Security.

Table 1.10: Farm sizes and number of farmers in each category

Number of farmers	Farm size (Ha): % in each category (n=34)								
	0-15	16-30	31-45	46-60	61-75	75-90	91-105	106-120	>120
	2	3	4	8	3	5	5	1	3

A unit of 30 hectares was initially envisaged to be an economic unit when the irrigation scheme started during the early sixties. Because of very difficult soil conditions (high soil salinity, exacerbated by varying depths of impermeable subsurface layers) yields were very poor and it became obvious that the size of farms should be in excess of 50 hectares. This means that in the order of 50% of the present farming units are too small to make a decent living (Table 1.10).

Presently 1,400 ha are used for rotational crops such as maize, cotton and wheat, 100 ha for table grapes, 30 ha for vegetables and the balance is used for lucerne. The Hardap scheme also provides a livelihood to four dairy farmers and 1,500 permanent workers (Van der Merwe pers. comm.). According to the Agriforum of March 2006 Hardap contributes 80% of the total wheat production in Namibia, 30% of all maize and 40 to 50% of lucerne.

Flood irrigation is applied on 85% of the total irrigation area (Van der Merwe pers. comm.).

The major crops with their corresponding annual yields are shown in Table 1.11.

Table 1.11: Annual yields of Main crops grown at Hardap irrigation scheme.

Crop	Average annual yields (Tonnes/ha/year)
Lucerne	20-25
Wheat	5
Maize	8
Cotton	4
Grapes	30
Raisins	5

Source: MAWRD: Directorate of Extension and Engineering Services, Mariental.

Stampriet

Approximately 22 farmers are making use of artesian underground water near Stampriet to irrigate about 457 hectares. Farms sizes vary from two to 56 hectares and the number of plots, in various size categories, are shown in Table 1.12. The main crops are lucerne, maize, watermelons and vegetables. No information is available pertaining to yields.

Table 1.12: Number and percentage of irrigation plots at Stampriet

	Plot size				
	1-10 ha	11-20 ha	21-30 ha	31-40 ha	41-50 ha
Number	6	7	7	0	1
%	28.6	33.3	33.3	0	4.8

Maize and wheat are sold to local millers while the vast majority of cotton, grapes and raisins are exported to South Africa. Feeds are sold on the local market.

Naute

Downstream of the Naute dam the Namibia Development Corporation established a 130 ha irrigation scheme for date production. Presently 82 ha are under dates and 48 ha with grapes. At the Naute dam the water requirement for dates under micro, drip and flood

irrigation is 2,537, 2,399 and 3,595 mm per annum respectively. This means that this kind of production system is only possible where there is a lot of water available.

The success of this project resulted in Namibia being regarded as the lead country in date production technology in southern Africa.

Yields obtained with various cultivars are as follows:

Medjool: 70 to 75 kg /tree; 70-80 pack out percentage

Barhee: 150 kg/tree; 60 pack out percentage (De Wet pers. comm.)

During 1996 the farm gate price for dates was U\$3.50/kg. With 125 trees per ha the income could be substantial. Modern facilities are in place at Naute for the sorting, grading and packing of dates for export purposes. According to experts in this field dates are the best crop, especially under harsh climatic conditions, and financially outperform any other farming activity (Botes and Zaid 1999).

Date production offers potential for both communal and private tenure farmers who have access to small irrigated plots.

Orange river:

Several irrigation schemes/farms occur along the Orange river and they are listed as follows:

Aussenkjer

Commercial grapes companies)	1000 ha (Belonging to 6 owners – mainly
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Government project

Dates	10 ha (+ 27 ha dates under planning)
Mangos	30 ha
Citrus	30 ha
Grapes	25 ha
Lucerne	30 ha
Total	125 ha

Small scale farmers (20)

Grapes	40 ha
Dates	9 ha
Vegetables (Developed but not planted)	31 ha
Total	80 ha

Noordoewer (15 owners)

Grapes	40 ha
Mangos	10 ha
Vegetables and cash crops	228 ha
Total	278 ha

Haakiesdoring (Two farmers)

Mangos	5 ha
Lucerne and other crops	145 ha
Total	150 ha

Stolsenfels + Komsberg (1 company)

Grapes	187 ha
Dates	Still in planning phase
Total	187 ha

TOTAL ORANGE RIVER 1,820 ha

There is potential for expansion of irrigation along the Orange River, as well as potential for dam construction in various locations (Lourens 2004).

The total area under irrigation in the south comprises 4697 ha cultivated by 91 farmers/companies

Farm sizes

Table 1.13: Number of surveyed units for each category

District	Category size (ha)								
	0-100	101-1000	1001-2500	2501-5000	5001-7500	7501-10000	10001-15000	15001-20000	>20000
Betanie	14	8	22	28	63	35	47	7	6
Karasburg	196	12	19	90	77	61	62	21	23
Keetmansh	37	41	50	177	160	76	89	13	4
Luderitz	15	5	8	8	12	7	26	18	26
Maltahohe	7	10	20	48	63	44	50	15	6
Mariental	231	31	56	296	222	73	47	4	1

Await additional MLRR data

Livestock holdings

Await MLRR data

Income derived from various commodities

See separate chapter dealing with income

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