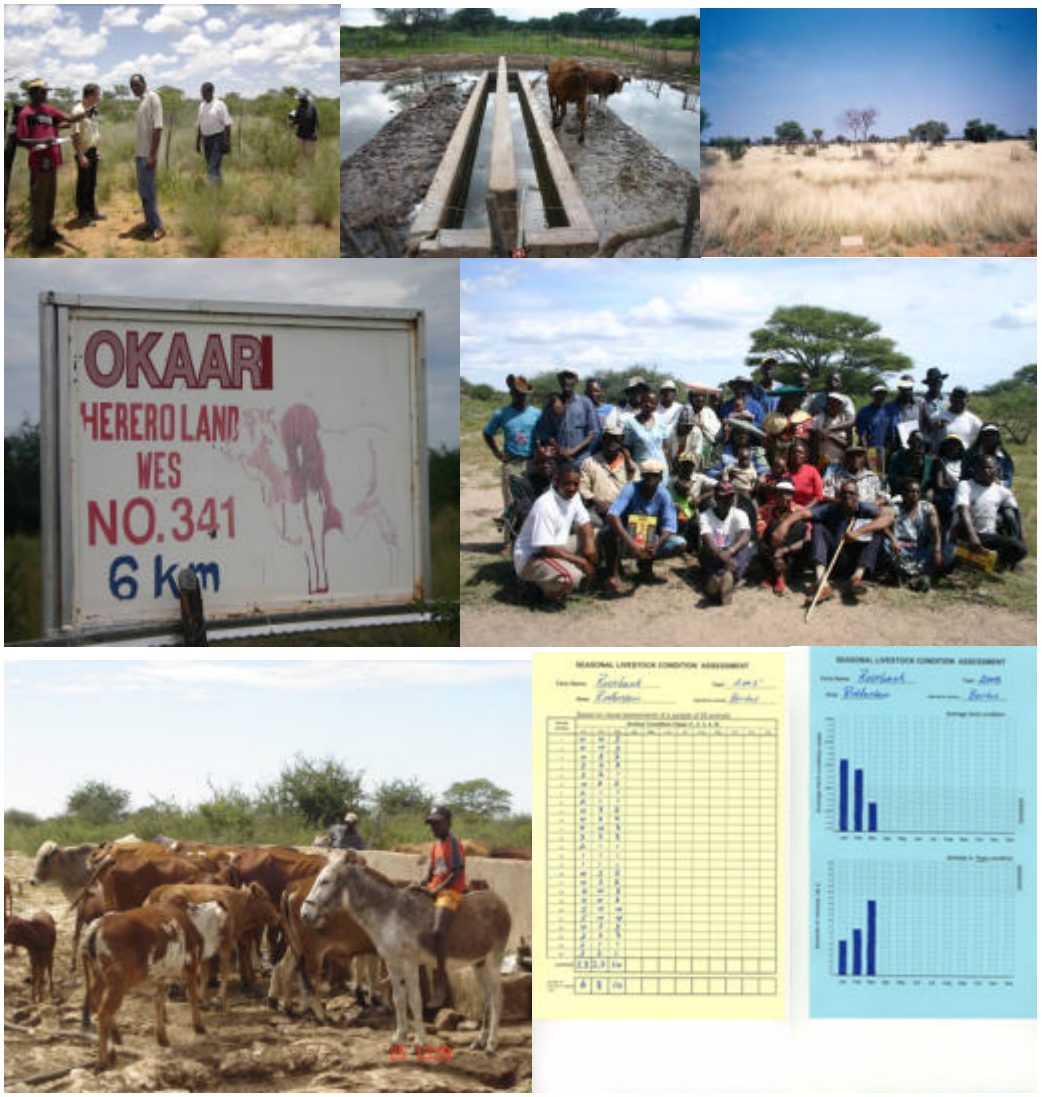
Desert Margins Programme (Namibia)

Towards Participatory Rangeland Management in the Eastern Communal Areas of Namibia

A Case Study from Orukune, Okaari and Omazera Villages



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(Draft)

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1. Introduction and Rationale

The eastern communal lands of Namibia comprises an area of 76 800 sq km (25,8% of the total non-freehold land in Namibia) with 50 600 people (2,6% of the national population) farming with 305 000 cattle, 132 000 goats and 53 000 sheep. Rainfall varies spatially from 350 in the south and far west to 450 mm per annum in the far north (Mendelsohn & El Obeid, 2002).

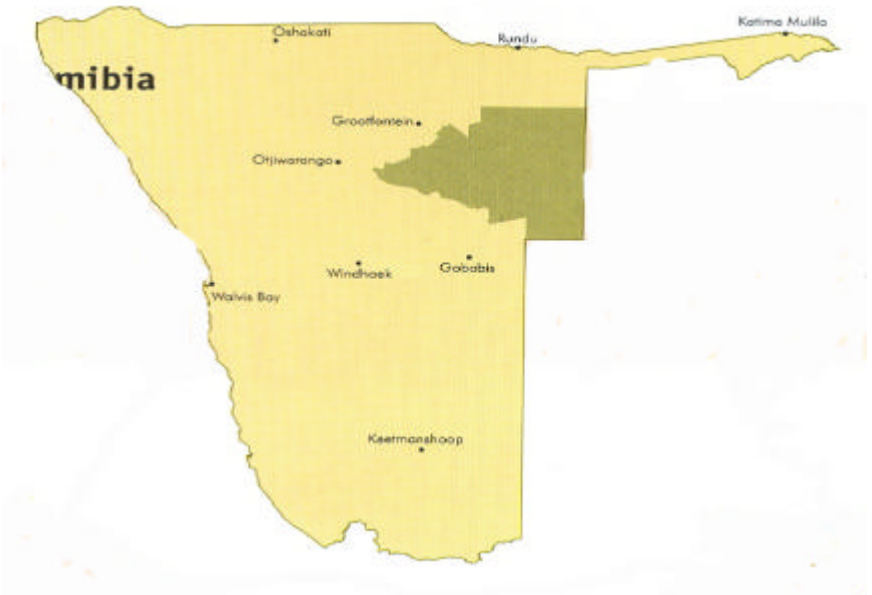

Figure 1: Map of Namibia depicting the location of the Eastern Communal Lands.

Three major land uses are distinguished in the eastern communal lands. In Rietfontein and Okamatapati people farm on officially fenced-off farms of around 5 000 hectares each, while the southern and western parts of the area consist of mainly unofficially fenced off and open areas that vary considerably in size. The remainder of the area is considered open communal land and usually uninhabited or very sparsely inhabited, mainly due to the absence of permanent water sources (Mendelsohn & El Obeid, 2002).

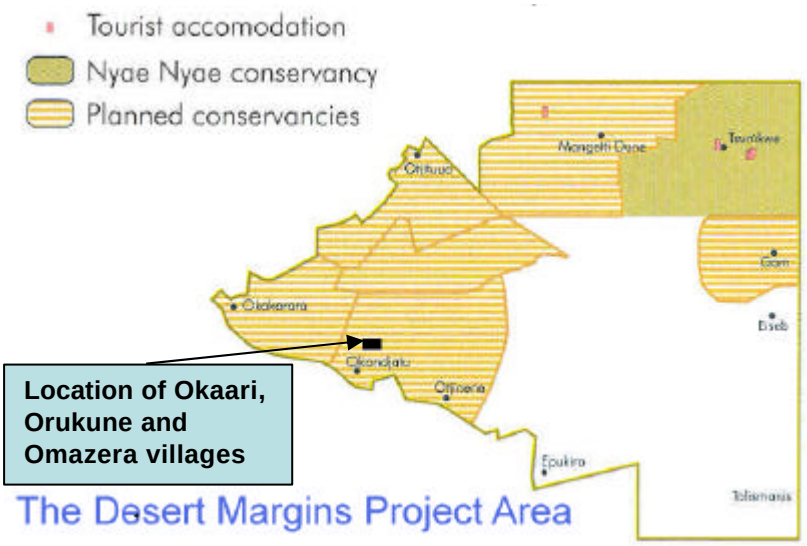

Figure 2: The Eastern Communal Lands of Namibia depicting the study sites in the Okondjatu area.

This case study focuses on three communities, namely Okaari, Orukune and Omazera about 10-15 km north of the settlement of Okondjatu in the Otjozondupa region. These communities are situated in an area where unofficial fencing by individuals and communities is taking place, although the extent thereof has not yet been established.

Livestock farming with cattle, goats and sheep is the major livelihood of most of the people living in these villages. High livestock densities, low and variable rainfall and degraded rangeland productivity, make these people and their livestock highly vulnerable to the adverse impact of severe seasonal rainfall variation and drought. Poor water distribution and a lack of appropriate camps for rotational grazing further compound the problem and people have very little options to cope during adverse climatic conditions. Regular destocking to align livestock numbers to available fodder sources and application of rotational resting to improve degraded rangeland, mainly around permanent water sources, is virtually impossible.

In order to address these issues, the Desert Margins Programme (DMP), implemented by the Desert Research Foundation of Namibia (DRFN), embarked upon a process of assisting these communities to become more responsive to rainfall variation and drought. This case study reflects on the results of this process and also aims to provide a guideline towards addressing similar problems in similar areas in Namibia and elsewhere.

2. Orienting Yourself

In order to get started, a community needs to realise that they have a problem and should invite outside intervention like extension officers or project staff to assist them in finding solutions to it. For this purpose a number of information meetings were held with traditional leaders, community members and other development partners in the area to reflect on the problems of rangeland degradation, the impact of drought and rainfall variation and decline in livestock productivity. At these meetings the communities showed major interest in becoming part of these initiatives and nominated several villages in the area for possible support and intervention. These villages included *Orukune, Okaari, Omazera, Omapumba, Okeserahi, Omutiondundu, Ekuenje, Okatjongeama, Okamaruru, Okonjainja* and *Okahitanda*. It was agreed upon to start in three villages namely *Orukune, Okaari* and *Omazera* and gradually expand the project support to others.

2.1. Developing a Village Resource Map

It is important to get an initial idea on the extent of the village, including its boundaries, location of households and other infra-structure like boreholes, reservoirs, pipelines, fences and roads. For this purpose the community was requested to develop a village resource map, using local materials.

Figure 3: Local people drawing a rough resource map on the ground.

After discussion of the village resource map, one of the team members transferred it to paper for future use.

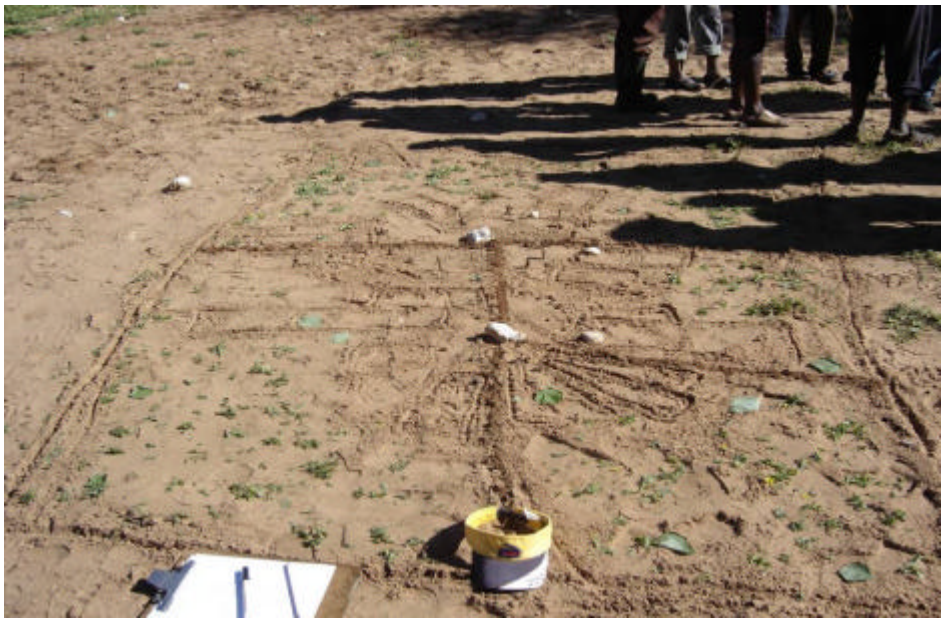

Figure 4: The completed resource map.

Figure 5: The resource map transferred to paper.

2.2. Identifying Major Constraints and Opportunities

Using the village resource map as focus point, a better understanding can be obtained about the location and condition of natural resources like grazing, wood, earth dams, poisonous plants and other features. At the same time information is shared regarding current land uses, major constraints and possible solutions to overcome these constraints. In the *Omazera* area for instance it became very clear that rangeland condition close to the water points are poor and that large areas are not properly grazed due to the absence of water. Farmers also realised that by extending a pipeline to those areas, better rangeland utilisation can be obtained and provision can be made for resting overused areas close to water points. Apart from the fact that the support team obtained a better understanding of the area, this exercise also provided the community an opportunity to get the bigger picture of their area and what the major constraints and opportunities were.

3. Improve Understanding of the Area

As indicted earlier, the village resource map was just an initial attempt to get oriented and to serve as connecting point between the external team and the community. This map is not to scale and does not provide exact information on for instance the real size of grazing area and the distances between water points. After discussing the village resource map, agreement was reached on the need for more accurate information. Information needs were then categorised into three major themes:

- socio-economic, that include number of households, size of households, income sources, etc.
- physical, that include number and size of camps, location of infra structure like boreholes and earth dams, location of roads, etc.
- natural, that include rangeland condition and productivity, livestock numbers and off-take figures

When collecting this information, care should be taken that it is done in a responsible and sensitive manner since individual households are approached. The next section illustrates the process of obtaining this information and presents some of the most relevant data.

3.1. Socio-economic Information

For the purpose of this exercise, a questionnaire was developed and most of the households in the village were interviewed.

Figure 6: Conducting a basic socio-economic interview with residents in the project area.

The following parameters were covered in the questionnaire:

- Livestock marketing
- Security of tenure over land and resources
- Application of livestock husbandry practices
- Application of rangeland management practices
- Knowledge base and experience regarding livestock farming

- Level of institutional support
- Income sources
- Involvement in infra-structure maintenance

(Insert socio-economic findings and discuss)

3.2. Physical Information

Using the village resource map as basis, agreement should be reached with the community to get geo-referenced information, using the GPS, on the following elements:

- The boundary of the area, whether totally or partially fenced or open.
- The total area (ha) of grazing land
- Number, position and length of fences
- Area of individually fenced-off areas or camps
- Position of water points (boreholes, dams and wells), including information of yield, water quality and the status of pumping infra-structure, if available
- Position and capacity of earth dams and other natural water areas
- Location of houses, if not too many
- Any other infra-structure relevant to livestock farming, e.g. auction pens, crush pens, etc.
- Communication, electricity and road infra-structure

Figure 7: By using a GPS, the most important features on the map are geo-referenced. In this case the position of internal fences was recorded.

Figure 8: Due to long distances and difficult terrain, donkeys and horses are often used to geo-reference important features.

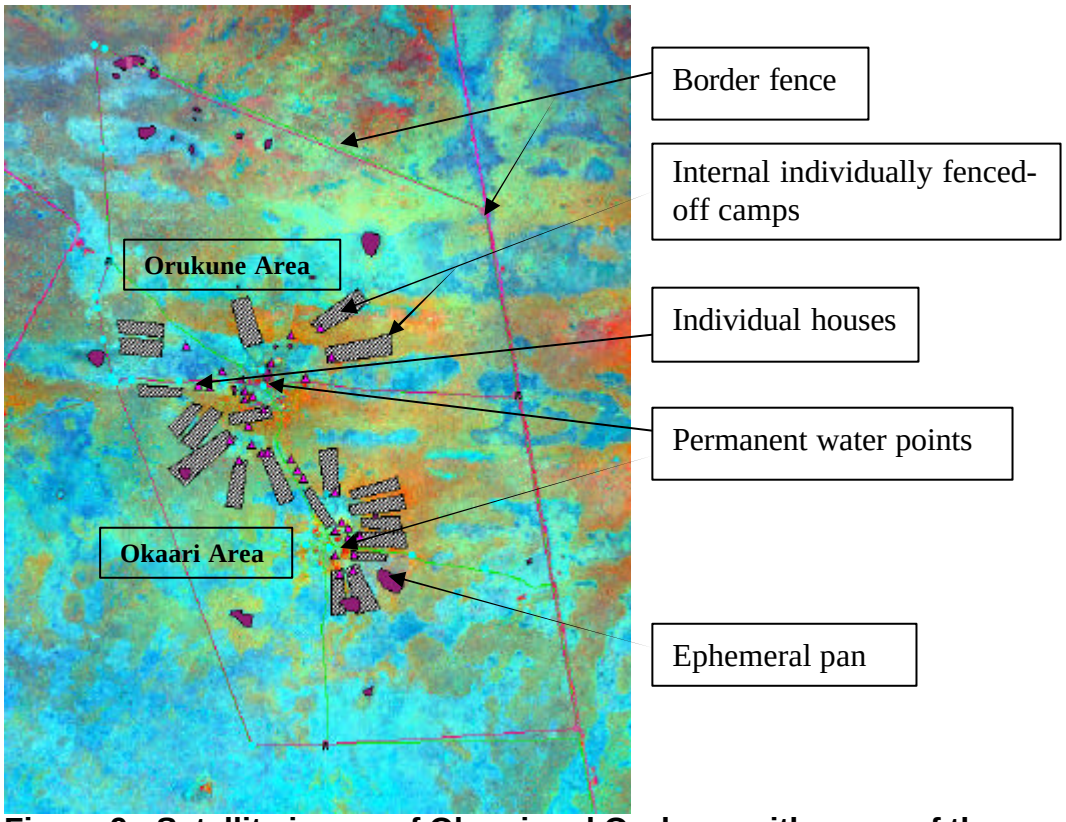

Figure 9: Satellite image of Okaari and Orukune with some of the important features geo-referenced.

3.3. Natural Resources information

Livestock and rangelands are the two most important natural resources used by livestock farmers in the eastern communal areas. This section provides more information on these aspects.

3.3.1. Rangeland condition.

It is important to get an idea on the condition of the rangeland. Due to continuous overgrazing over long periods of time rangeland condition tends to deteriorate, especially closer to permanent water points.

Figure 10: Close to water points mostly annual grasses are found, due to continuous overgrazing for long periods of time.

A simple step-point method was applied along transects of 100m, 500m, 1,000m and 2,000m from the water point and only annual and perennial grasses were recorded. One hundred points were recorded per transect. Some of the findings are presented and discussed.

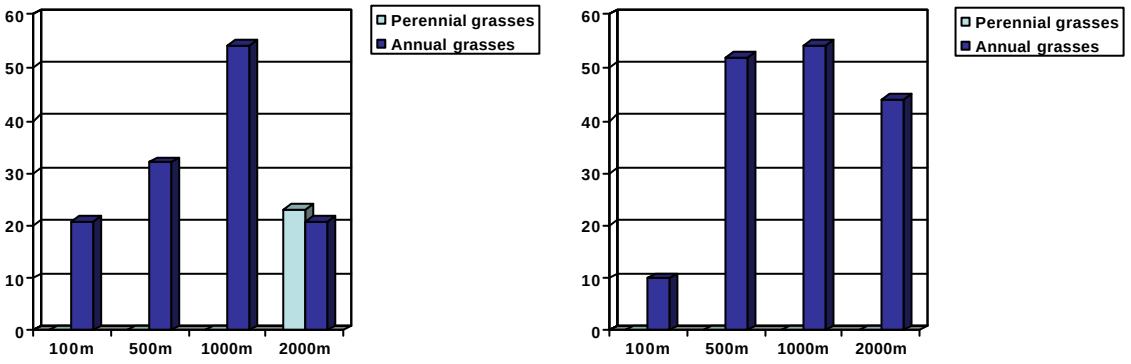

Figure 11: At Okaari (left) the first perennial grasses were recorded at 2 km from the water point. At Orukune (right) no perennial grasses were recorded within 2 km from the water point.

Data in Figure 10 clearly indicate an increase in the frequency of occurrence of annual grasses with increase in distance from the water point. Only at 2 km from the water point the first perennial grasses were recorded, clearly an indication of poor rangeland condition due to continuous overgrazing.

3.3.2. Livestock data

Access to livestock numbers is not always easy to obtain. These data are however extremely important to get an idea of current stocking rates. The water point committee members can play a big role in getting these data. The following table provides an overview of some of the livestock data collected by water point committee members in Orukune village.

Table 1: Livestock data from Orukune village in May 2006.

Livestock Type	Number of Animals	Number of Large Stock Units
Cattle		
Bulls	19	19
Cows	414	414
Oxen	3	3
Steers	68	68
Heifers	199	199
Calves	84	84
Total Cattle	**787**	**787**
Goats		
Rams	12	2
Ewes	485	81
Castrates	32	5
Lambs	104	17
Total Goats	**633**	**106**
Sheep		
Rams	13	2
Ewes	138	23
Castrates	16	3
Lambs	34	6
Total Sheep	**201**	**34**
Donkey, Horses and Mules	47	47
Total Livestock	**1704**	**1009**

Small stock numbers were divided by 6 to convert number of sheep and goats to large stock units. Table 2 provides a summary of livestock data for the three villages in the study area.

Table 2: A summary of the number of livestock and large stock units on three villages in the eastern communal areas of Namibia (May 2006).

Village	Number of Livestock	Number of Large stock Units
Okaari	1040	756
Omazera	2928	1980
Orukune	1704	1009

4. Creating Institutional Capacity

Strong community based organisations are important where natural resources like water and rangelands are managed in an open system. It is better to

make use of existing community-based structure than to create new ones. In the case of the three villages under discussion, existing water point committees were used.

4.1. Establishing an Appropriate Management Forum

In each of the participating villages operational water point committees were present. These water point committees were approached and requested to consider expanding their mandates to also include rangeland related functions. This was done in collaboration with the local Traditional Authority and the Directorate of Rural Water Supply.

Figure 12: Representatives from the water point committees of Orukune, Okaari and Omazera villages in the eastern communal areas of Namibia.

4.2. Developing a Terms of Reference

Terms of reference for water point committees were expanded to take care of participatory rangeland management. The next table provides an overview of the expanded terms of reference for the three water point committees.

Table 3: Expanded terms of reference for water point committees in Okaari, Orukune and Omazera villages.

Responsibility of Water Point Committee	How?
1. Ensure water is not wasted	Make sure taps are closed and children are not playing with taps.
2. Inform the rest of the community in the villages that did not receive training on local level monitoring.	Organize community meetings and pass the information through community events such as funerals, weddings, etc.
3. Safeguard and maintain water infrastructure.	Appoint specific committee members to supervise infrastructure.
4. Mainstream gender into water point committee activities.	Ensure women are always represented on the water point committees.
5. Facilitate further training to water point committee members.	Maintain trainings and drafting of by-laws and implementation.
6. Build up water point committee fund.	Collect water fees on a regular basis.
7. Improve understanding of natural resource base and support further research on rangeland and livestock.	Conduct rangeland surveys Look at livestock condition Explore other natural resources, e.g. devils claw, Collect rainfall records Asses fodder availability
8. Determine the size of the camp and its carrying capacity.	Use GPS to demarcate internal fences.
9. Use own collected information for better decision-making.	Feedback meetings will be held at the three pilot villages to report back on LLM findings and make joint decisions e.g. number of livestock and condition, fodder availability and size of camps. Schedule for follow-up meeting will be determined.

5. Introducing Local Level Monitoring

Existing methods to estimate fodder availably are often too time consuming for farmers to apply on a consistent basis. In order to enable farmers to use an easy method without much effort, a local level monitoring system was developed and implemented by the DRFN.

5.1. What is Local Level Monitoring?

The local level monitoring system for enhanced decision-making (LLM) is a methodology developed and implemented in numerous areas and with many communities all over Namibia. Using LLM, four indicators are considered by

livestock farmers as extremely important for pro-active decision-making. These indicators are livestock condition, fodder availability, rainfall and rangeland condition/bush density. By collecting regular data on these indicators and facilitating regular meetings to present and discuss these data, opportunities are created by farmers to keep record of the trends in these important indicators and to make timely decisions and how best to react to these changes. Having real time information also helps farmers to make pro-active decisions on rangeland management and livestock production.

5.1.1 Livestock condition

The general assumption and guiding principle for this indicator is that the condition of livestock reflects and approximates the condition of rangeland and is independent of breed, sex, age and body mass of the livestock. The indicator is measured by random selection of up to 25 animals from the farmers' herd. The field guide provides a photo guide showing livestock in five different condition classes, ranging from 1=very lean to 5=very fat.

Condition Class # 1

Condition Class # 2

Condition Class # 3

Condition Class # 4

Condition Class # 5

Figure 13: Livestock condition classes being used in the LLM field guide.

The farmer compares his livestock to the pictures and can then assign values to each selected head of livestock. The average herd condition is calculated and the number of animals in each class is recorded on a monthly basis. Information generated monthly, annually and over many years enables the farmer to monitor the status and changes in the condition of his animals.

5.1.2 Fodder availability

To assess rangeland productivity, i.e. how much fodder that is available, on a monthly basis, a set of photographs illustrating a range of fodder availability situations, from bare ground (1=extremely poor) to the best possible vegetation condition for the specific area (5=excellent). The farmer selects a number of sites that are representative of the grazing area and visit them on a monthly basis. By identifying the picture that most resembles the situation at the point of observation the farmer can determine the fodder availability of his land. A table in the field guide provides the farmer with information about the corresponding fodder availability (kg/ha) and recommended stocking rate

expressed as number of large stock units per 1000, 2000, 3000, 4000, and 5000 ha to each of the photographs.

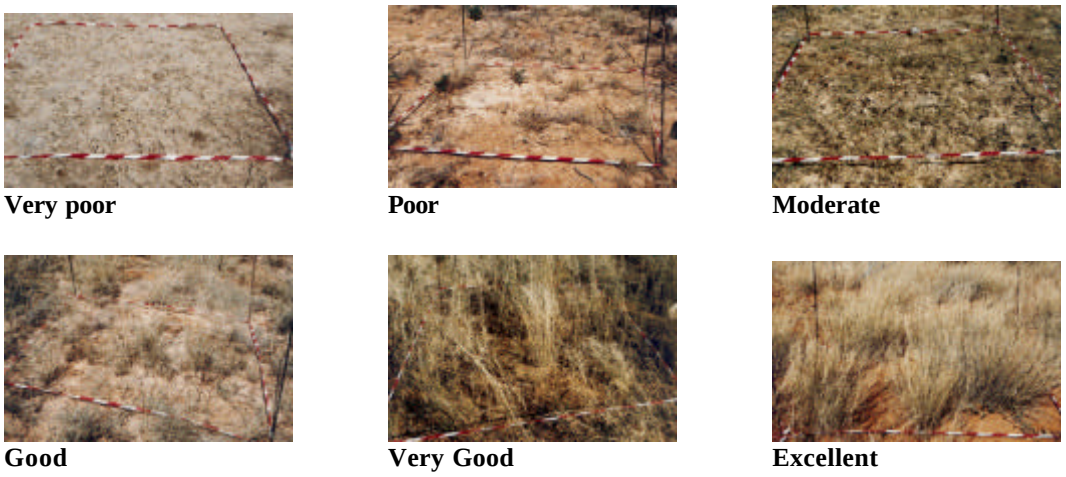

Figure 14: A range of photographs depicting different fodder availability scenarios.

Plant Dry Matter (kg/ha)		Biomass Stocking Rate (kg/ha)	Stocking Rate (ha/LSU) (LSU=Large stock unit)	
461		42	11	
Number of LSUs on 1000 ha	Number of LSUs on 2000 ha	Number of LSUs on 3000 ha	Number of LSUs on 4000 ha	Number of LSUs on 5000 ha
94	187	281	374	468

Figure 15: Farmers can read from a table a lot of information regarding their rangeland productivity.

5.1.3 Rainfall

Rainfall readings are taken from the rain gauge at a fixed time every day (08.00 am). Each day recordings are made on the sheet for daily recordings and added up at the end of the month. The monthly totals are transferred to the sheet for monthly records and at the end of the rainfall year monthly recordings are added up and transferred to the sheet for annual/long-term recordings.

5.1.4 Rangeland Condition/Bush Density

To assess and monitor rangeland condition and bush densities (bush encroachment) in a simple and uncomplicated way over time, the farmer selects a specific location where a benchmark photograph is taken. Optimal time for taking the photograph is at the end of the growing season. The farmer has to note the position and the direction in which the photo is taken. Thereafter the farmer returns to the same position once a year (at the same time as the photograph was taken) and compares the current rangeland condition with the benchmark photograph. Notes are made about whether the rangeland condition is better, unchanged or worse compared to precious seasons. The same is done for the woody vegetation, noting if there are fewer, the same or more bushes in the area.

Figure 15: Analysis of fixed point photographs can provide useful information on changes in rangeland condition and bush densities.

5.2. Providing Training on the Use of LLM

Selected individual farmers and community based organisations received training in the use of local level monitoring. A field guide was developed and the training consisted of both theoretical and practical sessions.

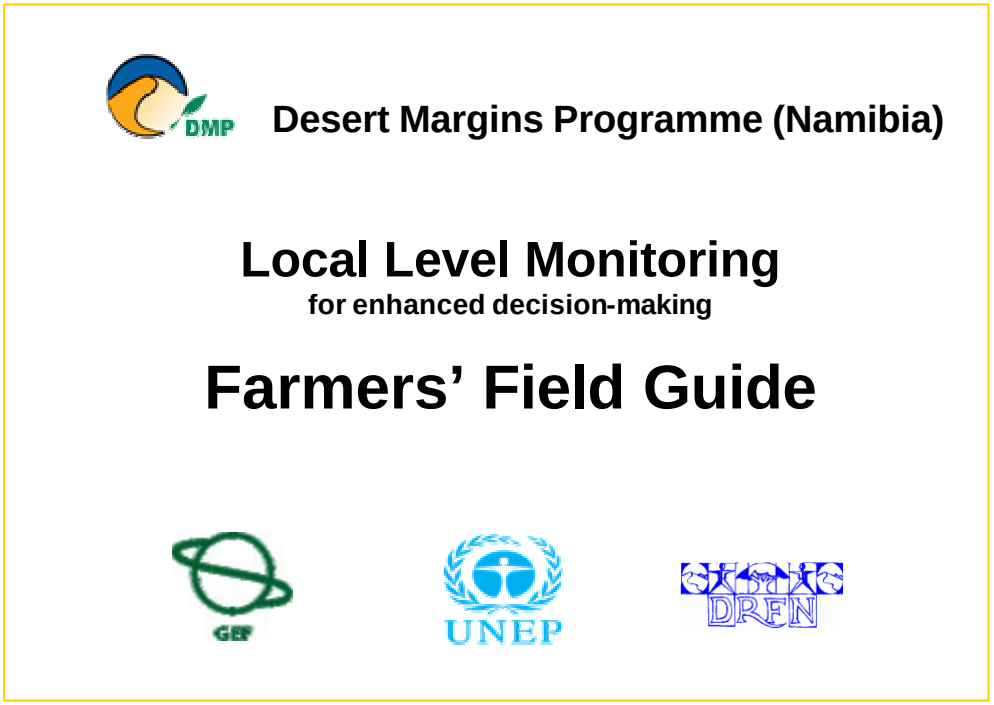

Figure 16: A farmers' field guide is developed for applying local level monitoring.

Farmers are given enough time and backstopping in the field to master the use of the field guide.

Figure 17: Farmers receiving training on the use of the LLM field guide.

5.3. Setting up Monitoring Sites

It is important to identify sites where regular data collection takes place. These sites should be representative of the different rangeland condition classes in the area and should be situated in both good and bad rangeland condition as well as near the water point and further away. These sites are visited regularly (monthly?) to assess fodder availability and annually at the end of the rainy season to assess rangeland condition and bush density.

Figure 18: A monitoring site should be permanently marked and GPS readings should be taken.

5.4. Collecting Data

Once training is completed, farmers should start collecting their own data. Backstopping by extension staff or development agents at this point is extremely important to keep up the momentum. The Local Level Monitoring Farmers' Field Guide, together with a set of data forms are needed to do this job.

6. Using LLM for Informed Decision Making

Collecting data is only part of the process. Data collection alone without understanding and using it for improved decision-making is a useless exercise. Several steps are suggested to support communities and farmers to use their data.

6.1. Supporting Communities in Data Interpretation and Analysis

After three months of data collection a meeting was held with those farmers that participated with the idea to look at their data and supported them in analysing and understanding it. This step was very important because it helped the farmers to understand their data and served as an incentive to continue collecting data.

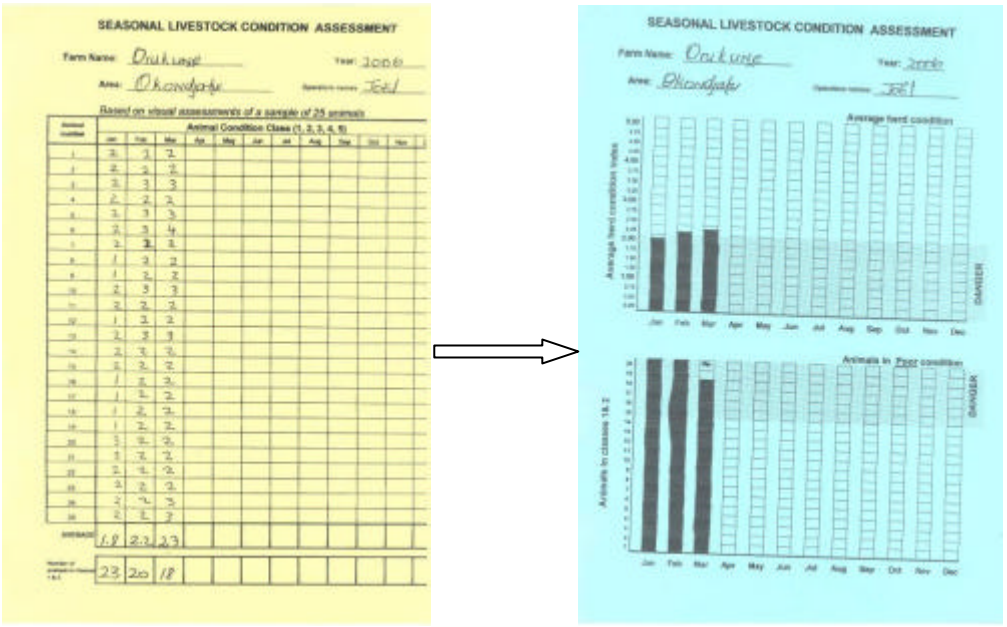

Figure 19: Support farmers to transfer their livestock condition data from the yellow form to the blue form is important to improve understanding.

Similarly fodder availability and rainfall data should be transferred from the field forms (yellow) to the monthly sheets (blue) to improve understanding.

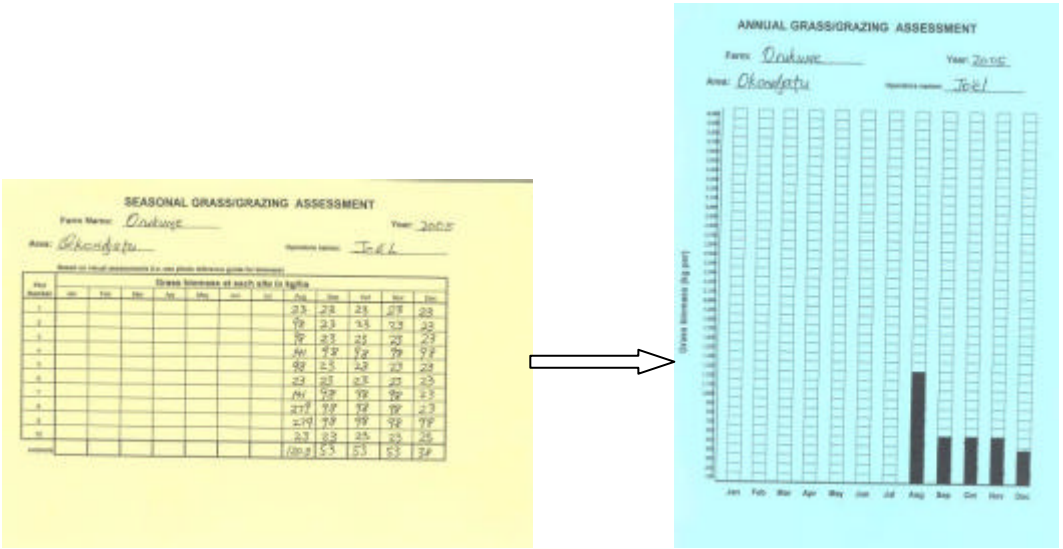

Figure 20: Fodder availability data transferred from the field form (yellow) to the monthly data sheet (blue).

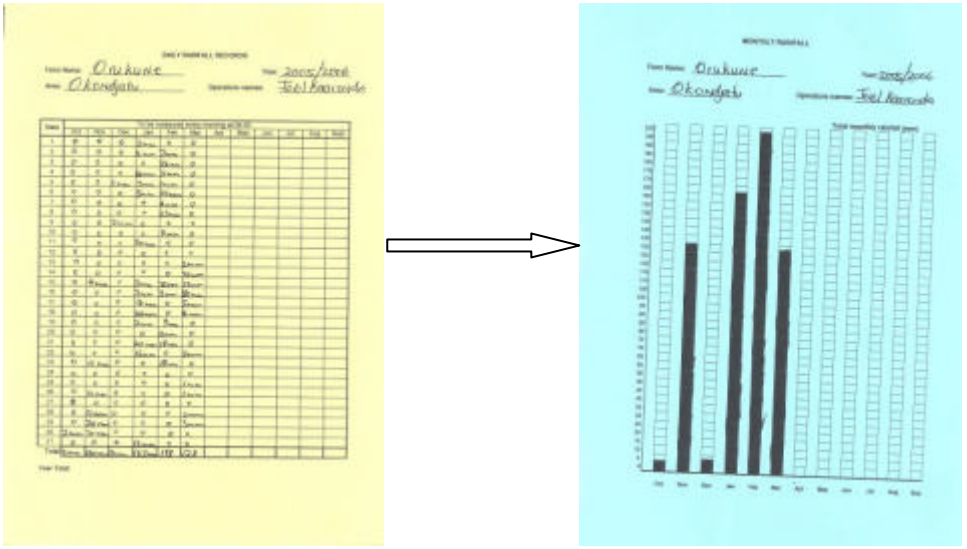

Figure 21: Transfer of daily rainfall data (yellow form) to total monthly rainfall (blue form).

6.2. Presenting Data to Community

Since rangeland resources are commonly used, it is important that the bigger community is regularly briefed on its condition and productivity. To do so, extension agents supported the water point committees to collate all data from individuals in the area. These data were then combined and an overall picture regarding the different indicators was presented.

Figure 22: Data presentation by a development agent at Orukune

Figure 23: Joel Kaaronda, a local farmer, presenting his data to the community of Orukune.

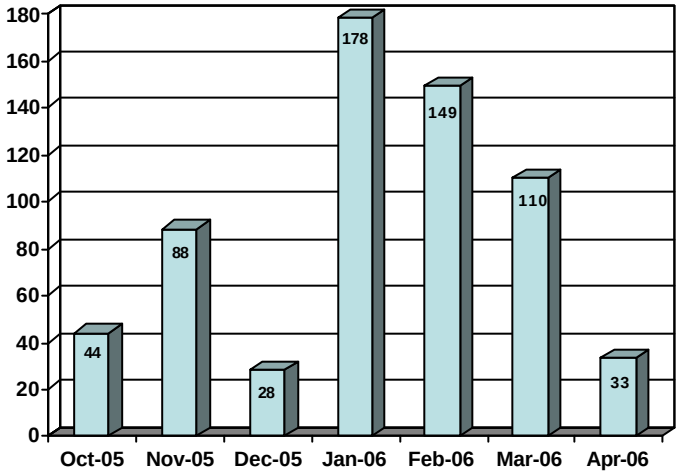

Figure 24: Rainfall variation in the project area between October 2005 and April 2006.

The 2005/06 rainfall season was above average with the area receiving a total of 630 mm. January to March 2006 received exceptionally good rainfall and no rainfall was recorded beyond April 2006.

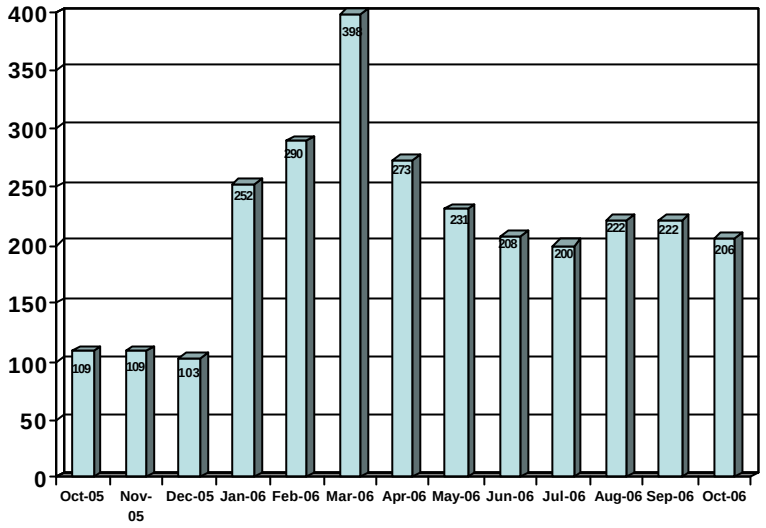

Figure 25: Variation in fodder availability (kg dry matter per hectare) in the project area from October 2005 to October 2006.

Fodder availability shows a similar trend to rainfall received. It is interesting to note that fodder availability at the end of the dry season in October 2006 was significantly higher than for the corresponding time the previous year. Is this mainly because of the good rainfall or does the reduction in livestock numbers in May 2006 had something to do with it?

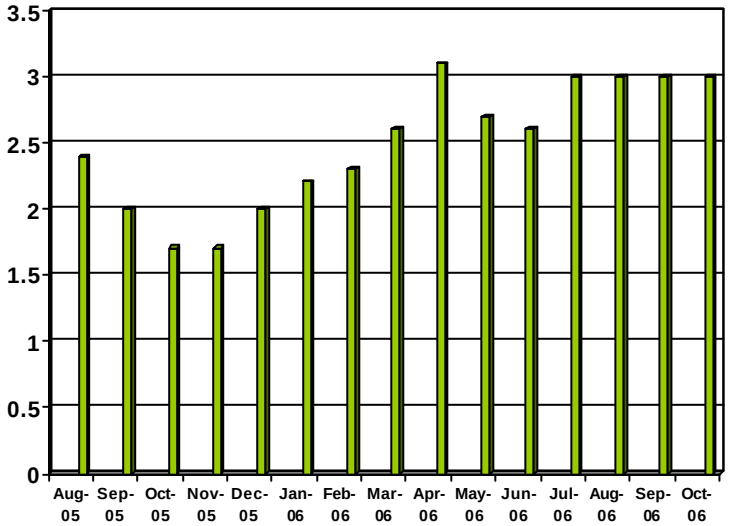

Figure 26: Variation of average body condition score of cattle in the project area for the period August 2005 to October 2006.

Cattle body condition score seems to be highly related to fodder availability over the same period of time. It is interesting to note that the average body condition score for cattle at the end of the rainy season (October 2005) was very poor (only 1.5) while it is average (3) for the same period in 2006. Again,

is this the result of the good rainfall received or also the impact of destocking that took place in May 2006?

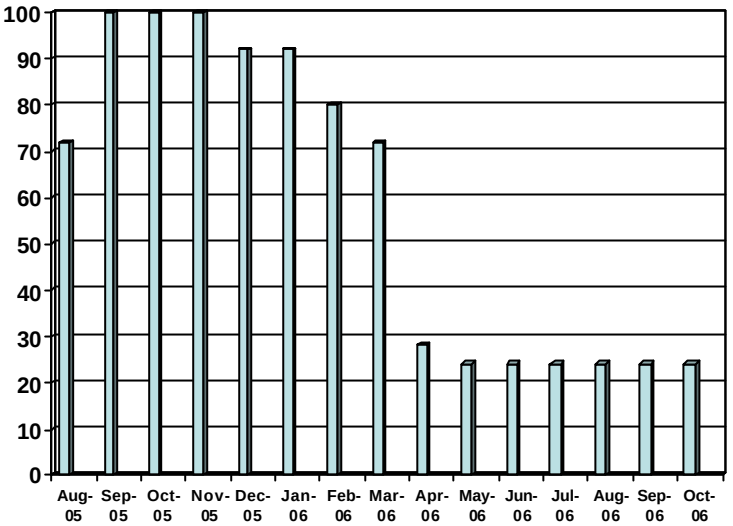

Figure 27: Variation in the percentage of lean (#2) and very lean (#1) cattle in the project area between August 2005 and October 2006.

At the end of the dry season in 2005 (October) the total herd was either in very lean or lean condition, while for the same time this year, only 25% of the heard fell into those categories. Again, is it the effect of the good rainfall, or could destocking that took place in May 2006 have contributed towards this phenomenon?

Table 4: Livestock numbers and fodder availability from three villages in the eastern communal areas of Namibia (May 2006).

Village	Area (ha)	Current LSU	Recommended LSU (using LLM)	Potential LSU (GRN)	Difference (%)
Okaari	4 000	765	222	400	345
Omazera	25 783	1 980	737	2 574	269
Orukune	6 000	1 010	333	600	303

In all three villages, livestock numbers exceeded by far the availability of fodder for the dry period ahead. In the total grazing area of Okaari (4 000 ha) the current number of large stock units (LSU) is 765 that exceeds the recommended number of LSU (222) with 345%. A similar situation is true for Omazera where current livestock numbers (1980) exceeding the recommended number (737) with 269 %. Similarly, in Orukune current stocking rate exceeds the recommended stocking rate by 303%, despite an extremely good rainfall season where more than 660 mm were recorded. Over the short term, farmers realized that they are over stocked and livestock are in danger of running out of fodder long before the end of the dry season. Uncertainty about the start of the next rainy season further compounds the situation.

6.3. Facilitating Elaboration of Options

It is important to allow farmers to ask questions about the data. It will largely contribute towards their improved understanding and acceptance of the data.

Figure 28: Farmers of Orukune, Okaari and Omazera listening carefully to the presentation of livestock, rainfall and rangeland data.

Towards the end of the process, participants should be guided towards elaborating possible management options to address the different concerns raised during the presentation and subsequent discussions.

Two of the major constraints identified by the farmers, based on their understanding of their own data, include:

A: They have too many livestock for the available fodder sources

B: Rangeland condition is poor, consisting mainly of annual grasses.

It is clear that there is a short term (inadequate fodder) and a longer term (poor rangeland condition and productivity) problem that need to be addressed. In order to address these constraints, the following options were elaborated by the farmers:

- Market excess animals in good condition as soon as possible to ensure good prices.
- Find alternative grazing resources to divert to towards the end of the dry period.
- Start giving proper lick supplementation to maintain livestock body condition as much as possible.
- Buy additional fodder to supplement grass resources and to feed vulnerable livestock during times of fodder scarcity.
- Do nothing and wait for government to provide support.

The major reason for poor rangeland condition, especially closer to the water points, is that animals roam freely around the water point, resulting into continuous over grazing and not allowing the grasses to recover from grazing pressure. Farmers realised that overgrazing is taking place and indicated that they are willing to consider taking down some of the private internal fences to divide the whole grazing area into a number of paddocks. They were also willing to distribute water more evenly over the whole area allowing them to do more controlled rangeland management practices. They realised that this is a long term solution and that they have to commence with it as soon as the next rainy season starts.

7. Regular Monitoring, Evaluation and Adjustment

Getting involved with farmers this way is a long term commitment. Extension staff and development agents will have to visit communities regularly to help them interpreting their data and to facilitate meetings where discussion can take place and options are developed. The biggest challenge still remains the ability of farmers under communal conditions to implement these management options.

8. Out scaling and Up scaling

These results are achieved within a relatively small pilot site north of Okondjatu in the communal areas of Otjozondjupa Region. During the final phase (2007-2008) of DMP it will be out scaled to other areas in the DMP project t area. This technology however also has the potential to be applied under similar conditions in other communal areas in Namibia and beyond. For this to happen, involvement of locally based Agricultural Extension Technicians and mainstreaming thereof into the broader system of agricultural extension service provision is required. The Agricultural Extension Services in the Ministry of Agriculture, Water and Forestry have a vast number of Agricultural Development Centres well distributed over the entire country.

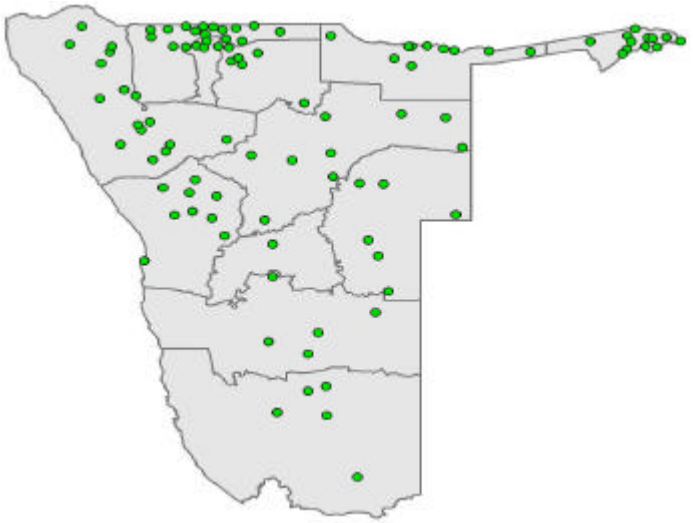

Figure 29: Distribution of Agricultural Development Centres in Namibia.

Using local level monitoring at a national scale has the potential to provide decision-makers at higher levels (regional and national) with real time information regarding livestock condition, fodder availability, rainfall and rangeland condition. If these data are coordinated at a national level, regular "state-of-the-nation" livestock condition or fodder availability reports could be produced that can be invaluable for decision-making regarding potential drought support to farmers. It will also urge farmers to "take control" over their rangeland and livestock farming enterprises and reduce their dependency on government support during droughts. This is in line with the National Drought Policy in the Ministry of Agriculture, Water and Forestry.

9. References and Acknowledgements

Mendelsohn, J & El Obeid, S., 2002. The Eastern Communal Areas of Namibia. Raison, Windhoek.

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