

DESERT MARGINS PROGRAM IN KENYA: INTEGRATED SOCIO-ECONOMICS ANALYSIS OF BENCHMARK SITES

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Abstract

This paper presents socio-economic analysis of the Desert Margins Programme (DMP) benchmark sites in Kajiado and Makueni Districts in Southern rangelands, Marsabit District (Kalacha, Kargi, Korr and Ngurunit) and Turkana District (Turkwel ecosystem). DMP is addressing land degradation and loss of biodiversity in marginal areas. It focuses research and development activities on *people* (livelihoods, food security, leadership, culture, indigenous knowledge system, level of modern knowledge/training, poverty); environment (vegetation trends, land degradation, biodiversity, land use systems) and natural resources management (NRM) policies. During characterisation of benchmark sites, stratified random sampling was used to sample 180 respondents. Data was collected by questionnaire and analysed using the Statistical Package for Social Scientists (SPSS). The livelihoods approach was used to describe, explore and predict interactions between livelihood assets, natural resources management strategies, policies, institutions and processes, livelihood strategies and livelihood outcomes. The sample of 97 male and 83 female respondents from 157 male-headed and 23 female-headed households, revealed fair gender parity. Results indicated age and gender as important demographic characteristics in decision-making structures and resource-ownership regimes. The main occupations were crop and livestock production, which were perceived to pose challenges to maintaining environmental integrity. Other livelihood strategies included pottery, basketry, carvings, sale of firewood and charcoal, sale of medicinal plant extracts and bee keeping. Constraints to marketing crops and livestock were noted. To secure and sustain current livelihood assets (human, financial, social, natural and physical) of the people, this paper recommends facilitation of relevant policies, institutions and processes, transfer of relevant knowledge and enhanced marketing opportunities.

Introduction

Desert Margins Programme (DMP) is a sub-programme of the Environmental Science and Research of the United Nations Environmental Programme (UNEP). The programme focuses the people (livelihood, food security, leadership, culture, indigenous knowledge system, level of modern knowledge/training, poverty, etc); the environment (vegetation trends, land degradation, biodiversity, land use systems etc) and policies on NRM in ASALs. The overall objective of the DMP is to arrest land degradation in Africa's desert margins through demonstration and capacity building activities. This project will contribute to the programme by way of addressing issues of global environmental importance, in addition to the issues of national economic and environmental importance, and in particular the loss of biological diversity, reduced sequestration of carbon, and increased soil erosion and sedimentation. The project will make a significant contribution in reducing land degradation in the marginal areas and help conserve biodiversity. The gradient of aridity from the core of the deserts to the neighbouring arid and semi-arid lands acts as a natural screener of genetic adaptation to aridity. Although total number of species is lower in these areas than other biomes, the percentage of endemism is very high. The spatial heterogeneity based on the pattern of soil texture, rainfall distribution and re-distribution of surface water by run-off enhances the biodiversity of these ecotones in spite of extreme ecological condition for plant and animal lives. This paper presents analyses of the people thrust within benchmark sites in Kenya. The analysis is based on communities' livelihood assets including a mention of access and control of resources and an account of interactions between various resources within the environment. It seeks to contribute to the

understanding of livelihoods and the broader context in which they exist and also to depict how different aspects relate to one another. The paper includes an exposition of demographics such as age, gender, household size, and ethnicity. This is followed by a description of the available livelihood assets including human, social, financial, physical and natural assets, which serves as a background to understanding livelihoods and diversification strategies.

Materials and methods

Site delineation

The geographic locations of DMP sites are found within Kajiado and Makueni Districts in the southern rangelands, Marsabit District (Kalacha, Kargi, Korr and Ngurunit) and Turkana District (Turkwel ecosystem). The broad areas were decided upon during project formulation but clearer site delineation was left to the project implementation phase. The selected sites are priority sites for dryland conservation and rehabilitation having been identified in a consultative process encompassing national stakeholders at all levels. Principal biophysical diversities that were used in selection of these sites included aridity, soil erosion and environmental degradation. Figure 1 shows the outer boundaries of the project sites in southern rangelands, Marsabit and Turkwel ecosystem.

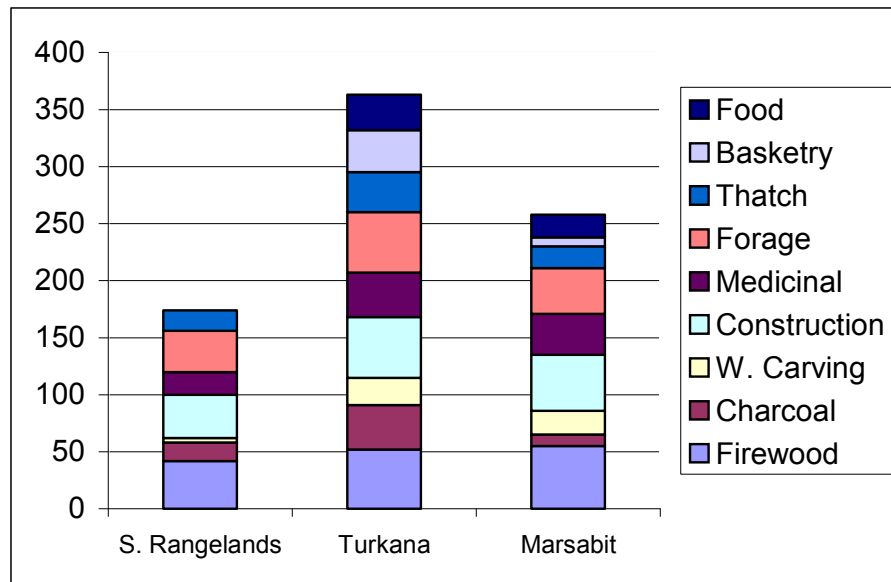


Fig. 1–Livelihoods strategies within the DMP sites

Site stratification criteria and questionnaire development

Site characterization by a national taskforce, led to the selection of the three benchmark sites in Kenya. The sites were stratified according to salient livelihoods and biophysical characteristics using secondary data and local informants. The stratification ensured that socio-economic and biophysical diversities were adequately sampled within sites. Based on this pre-characterization stratification, it emerged that there were four strata in Southern rangelands. These were riverine criterion for activities along the rivers, settlements/agricultural criterion especially with regard to Masongaleni and Muuni settlement schemes, pastoral criterion for the predominant Maasai community and agropastoral criterion for community members who engaged in both agriculture and livestock production were determined. Five strata were determined for Turkana as agropastoralists, pastoralists, farmers, fishermen and a combination of fishermen with other livelihoods. In Marsabit, 4 strata including agropastoralists, pastoralists, riverine farmers and oasis farmers were determined.

The team also developed a questionnaire that was adapted as a suitable tool for collecting socio-economic and biophysical data. The questionnaire was administered uniformly in the three sites because the majority of these people depend on rainfed agriculture and natural rangelands, which are particularly vulnerable to climate change. These people continue to face the impacts of land degradation and increasing aridity.

Sampling procedure

Stratified random sampling was used to sample 180 respondents, 60 per site. In the Southern rangelands the distance between the farthest two sample points was used to estimate the distance between samples within a site, 120 km were estimated to be covered along the main Nairobi – Mombasa highway, while 80 km was to be covered within the pastoral community to the West of the highway. Respondents were picked at 2 km intervals in more populated areas and at >4 km intervals in less populated areas. Distances were estimated using the vehicle odometer. Highway effects were eliminated by choosing the next interior household, where a sample household occurred close to the road networks, mostly, homesteads that were at least 1 km from the transect drive. The GPS readings at the sample households were also taken. Turkana and Marsabit: sites were similar since community members have cluster settlement patterns such as Kalemunyang and Kangatosha in Turkana and Kalacha and Ngurunit in Marsabit. Because of this factor, long distances of over 100 km were covered between the major settlements, distances of between five and ten kilometres were covered between settlement clusters (*manyattas*) and very short distances covering a few meters between respondents of one house and the next within a settlement cluster.

Prior to data collection, field assistants were exposed to project objectives and trained for data collection. They were then paired off with the characterisation technical team. The numerical responses on the questionnaire were coded. After fieldwork, the biometrician developed the data entry template and entered the numerical data entry in SPSS. After completion of the data entry process, the technical team and the biometrician reconvened to clean and probe the data, and this was followed by final outputs acceptable to all. The technical team members separately summarised the narratives.

Results and discussions

Demographics

Age and gender were important demographic characteristic linked to decision-making structures and resource ownership regimes. Age was revered and was equated to wisdom. The narrative from the questionnaires indicated that men made most decisions with regard to the utilisation of the natural resource base. Overall the sample was made up of 97 male and 83 female respondents revealing fair gender parity between respondents. There were 157 male-headed and 23 female-headed households. The mean household size for the sites was 8.24. The Southern rangelands registered a household size mean of 10.03, Turkana 7.13 and Marsabit 7.57. Ethnic representation in the Southern rangelands, were the Akamba (41), Maasai (17) and Kikuyu (2), and all of the 60 respondents in Turkana were of the Turkana ethnic tribe while the Rendille (31), Samburu (15) and Gabbra (14) ethnic tribes represented the Marsabit region.

Livelihoods

The livelihoods approach (DFID, 2000; Longley and Maxwell, 2003) provided the means to describe livelihood assets and strategies that people in the benchmark sites use. A livelihood comprises the capabilities, assets (including both material and social resources) and activities that one engages in for survival (Ellis, 1999). Livelihoods are often described as being either sustainable or unsustainable. A sustainable livelihood is that which “can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the resource base” (Scherr, 2000). Sustainable livelihoods comprise of stocks of natural resources (natural capital), networks, membership of groups, relationships of trust, access to wider institutions of society (social capital), the skills, knowledge, ability to labour and good health (human capital), basic infrastructure such as transport, shelter, water, energy and communications and the production equipment and means (physical capital), and peoples savings, supplies of credit or regular remittances or pensions (financial capital).

Diversification in livelihood strategies: Livelihood diversification is the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living (Ellis, 1999). This was noted within and between sectors. Livelihood strategies included crop and livestock production, business and employment, cottage industries such as pottery, basketry, carvings, and exploitation of the natural

resource base found in woodlands through sale of firewood and charcoal, sale of medicinal extracts from plants and bee keeping. These income-earning strategies yielded different income levels with some more lucrative than others (Table 1).

In cropping systems, crops grown included cereals (maize, sorghum, millet); pulses (beans, cowpeas, pigeon peas, green grams, *Dolichos* sp.); root crops (cassava and sweet potatoes); vegetables (kales, amaranthus) and fruit trees (bananas, mangoes, pawpaw, oranges and guava). Most crops were grown in the southern rangelands where there is more arable land than in Turkana and Marsabit Districts. The assumed indigenous knowledge for this kind of diversification is that a diversity of crops protects the farmer against complete crop failure in the event of a drought. For example, while pulses might fail the farmer will fall back on root crops for food security.

In the livestock rearing systems individual farmers kept cattle, goats, sheep, camel, donkey, bees, chicken and poultry. All animal categories were reared in all sites except for the camel that was not found in the Southern rangelands. Goat was the most frequently kept livestock in all the sites. This sort of smallholder diversification generates income-earning opportunities while providing an important means by which to insure against risks and accumulate capital for investment in human, physical, and even natural assets. It is also indicative of the various capabilities and skills available among communities in the benchmark sites. The lack of such skills and capabilities have been termed as “entry barriers” which often impede rural communities from taking advantage of livelihood strategies offering greater upward income mobility (Barrett *et. al.*, 2001).

Table 8—Annual income earnings by site for each livelihood activity

Benchmark site	n	Crops	Livestock	Forestry	Pottery	Business	Cottage	Employment
Southern Rangelands	n	35	49	2	3	13	2	8
	Min.	130.00	1,200.00	400.00	2,000.00	6,000.00	1,000.00	1,400.00
	Max.	300,000.00	800,000.00	2,000.00	30,000.00	360,000.00	4,500.00	120,000.00
	Mean	47,091.71	75,955.10	1,200.00	14,000.00	59,384.62	2,750.00	41,675.00
	Median	12,000.00	17,000.00	1,200.00	10,000.00	36,000.00	2,750.00	22,500.00
Turkana	n	35	47	15		7	34	3
	Min.	400.00	800.00	100.00		1,200.00	100.00	1,200.00
	Max.	60,000.00	72,000.00	16,800.00		37,000.00	14,400.00	12,000.00
	Mean	7,584.29	13,908.51	3,449.33		17,885.71	3,564.48	7,733.33
	Median	3,000.00	6,000.00	1,800.00		12,000.00	1,800.00	10,000.00
Marsabit	n	6	58	1	1	7	7	1
	Min.	5,000.00	1,500.00	-	-	3,000.00	500.00	-
	Max.	50,000.00	140,000.00	-	-	60,000.00	20,000.00	-
	Mean	17,500.00	26,942.76	1,400.00	2,000.00	18,557.14	6,014.28	120,000.00
	Median	10,000.00	22,000.00	-	-	12,000.00	2,700.00	-

Markets

Results of the utilisation of markets indicate that crops had the widest range of markets, which included the local, national and even export markets. Livestock was sold at all levels except the export market (Table 2). The data is suggestive of the need to develop markets for livestock and livestock products since this is the most common mode of livelihood. Both crop and livestock marketing faced five marketing constraints, namely, seasonality, market availability, price fluctuations, transport, and availability of market information. However, overall, 36 respondents reported that price fluctuations were a constraint, to crop marketing making it the greatest constraint (Table 3). This was attributed to a liberalised market in which market forces determine prices from day to day. Price fluctuation in livestock markets was the overall constraint in the three sites, however, 20 people mentioned market availability as a constraint in Turkana and 26 in Marsabit, and 7 in Southern rangelands (Table 4). The situation was attributed to the distances that the livestock keepers cover to get their animals to the terminal markets in Nairobi. Traders from Marsabit District cover greater distances than those covered in the Southern rangelands. It was also observed that physical infrastructure including roads and secondary livestock markets in the Southern rangelands were better than those found in either Turkana or Marsabit.

Table 2–Types of markets available for sale of crops and livestock by benchmark sites

Item for sale	Type of market	Benchmark sites			
		Southern rangelands	Turkana	Marsabit	Total
Crops	None	5	2	1	8
	Local	30	34	6	70
	Local+National	4	0	0	4
	Export	2	0	0	2
	Total	41	36	7	84
Livestock	None	2	0	0	2
	Local	44	46	57	147
	National	0	0	2	2
	Local+National	6	0	1	7
Total		52	46	60	158

Table 3–Constraints of crop marketing

Benchmark site	Respondents facing various crop marketing constraints %				
	Seasonality	Market availability	Price fluctuations	Transport	Market information
Southern rangelands	9	7	24	10	13
Turkana	15	5	11	16	6
Marsabit	1	3	1	2	0
Total	25	15	36	28	19

Table 4–Constraints of livestock marketing

Benchmark site	% of respondents facing various livestock marketing constraints				
	Seasonality	Market availability	Price fluctuation	Transport	Market information
Southern rangelands	10	7	29	8	11
Turkana	22	20	30	26	11
Marsabit	27	26	37	21	9
Total	59	53	96	55	31

Agriculture – environment interactions

The interaction between agricultural development and the environment seeks to ensure long-term sustainability of production systems and to mitigate negative effects on locally (and globally) important ecological goods and services (Scherr, 2000). However, agricultural activities were in this study found to pose serious challenges to achieving environmental improvements. Most of the respondents (66 out of 85), discerned negative impacts to the environment in cropping systems with only 5 out of 85 recording positive impacts as shown in Table 5. These negative trends were reported more in the Southern rangelands and Turkana than in Marsabit. The fact that more people in the two sites discerned this trend may be attributed to crop production systems where the effects of degradation, through soil erosion and nutrient depletion are noticeable in the short term. This is unlike in the mobile grazing systems found in Marsabit where such changes may take a long while to be apparent. Depletion and poor management of soils could be a big issue especially in those areas that traditionally have not been used for farming but which have, through migration, now been opened to cropping by communities that were hitherto not farming communities. The lack of knowledge and experience, either traditional or acquired, of land husbandry would aggravate the problem of environmental degradation.

Table 5– Interactions between crop growing and the environment in benchmark sites

Crop environment impacts	No. of responses of perception of impacts per benchmark site			
	Southern rangelands	Turkana	Marsabit	Total
Negative	40	24	2	66
Positive	3	0	2	5
Neutral	3	9	2	14
Total	46	33	6	85

Livestock – environment interactions

Livestock rearing is the mainstay for most of the respondents interviewed. However, 102 respondents out of 149 respondents reported negative impacts occasioned by livestock rearing on the environment as shown in Table 6. More respondents in the southern rangelands (44) discerned negative impacts in their areas. The negative impacts could be as a result of keeping large numbers of animals in small land areas leading to overexploitation of grazing resources, natural causes including poor and slow regeneration of plant species, frequent and prolonged droughts, presence of invasive species, as well as human mismanagement.

Table 6–Interactions between livestock rearing and the environment in benchmark sites

Livestock environment impacts	No. of responses of perception of impacts per benchmark site			Total
	Southern Rangelands	Turkana	Marsabit	
Negative	44	34	24	102
Positive	1	1	12	14
Neutral	7	9	17	33
Total	52	44	53	149

Conclusions and recommendations

Most of the communities within these sites have to contend with existing harsh ecological conditions that are worsened by overgrazing, poor cultivation practices and subdivision of land into uneconomical parcels. Under these circumstances, Kenya’s dry lands record some of the highest levels of poverty (Central Bureau of Statistics, 2003). Since poverty is multidimensional the sustainable livelihoods framework offers a ready means for handling these various dimensions. Socioeconomic activities in these areas should seek to:

- secure the current assets (human, financial, social, natural and physical) of the people through facilitation of relevant policies, institutions and processes.
- transfer knowledge and available tools for increased livestock production because this livelihood strategy promotes the best opportunity for people in the DMP sites to build up assets.
- evaluate and test suitable crops with high productivity and higher economical value in ASALs.
- enhance marketing opportunities (including volume and quality of products and by-products, marketing strategies and policy), locally, regionally and internationally for higher prices.

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