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ROLL sub-catchments land degradation hotspots Identification and prioritization

Desktop assessment

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MINISTRY OF ENVIRONMENT AND FORESTRY ROLL PROJECT

Contents

Introduction

The Government of Lesotho through the Ministry of Environment and Forestry in close collaboration with other relevant Ministries and Development Partners (DPs) is implementing the Regeneration of Landscapes and Livelihoods (ROLL) project from June 2022 to May 2029.

ROLL is implemented in the six districts of Lesotho which are Thaba-Tseka, Butha Buthe, Leribe, Qacha's Nek, Quthing, and Berea. A total of 18 sub-catchments have been selected in the six districts with 20 landscape units associated with 1000 villages identified. The landscape units are smaller areas within sub-catchments and constitute different natural resources such as rangelands, forests, croplands, wetlands, conservation areas, etc.

The objective of ROLL is to ensure that rural communities adopt transformational practices for regenerated landscapes and sustainable livelihoods leading to improved nutrition and adaptation to climate change. This is underpinned by four outcomes, namely, 1) changed resource use practices, 2) the reduction of environmental degradation, 3) improved livelihoods, and 4) the establishment of an effective facility and fund for landscape regeneration.

To achieve outcome 2 (the reduction of environmental degradation), there is a need to assess the status of degradation in selected sub-catchment. It is with the results of this assessment that well informed decisions will be made towards the implementation of interventions to rehabilitate the areas affected by identified forms of degradation.

Objectives

To identify and prioritize land degradation hotspots on all ROLL sub-catchments. This would be the first step towards ensuring the project resources are channelled to the areas which demonstrate utmost need for regeneration. The identification of the hotspots will later be followed by engagement of stakeholders for integrated interrogation and planning for implementation of interventions on landscapes affected and so ensuring improved livelihoods of the communities.

Methodology

This activity will adopt the degradation hotspots identification and prioritization tool, which was developed by ReNoka Data Reference Group (DRG) for Integrated Catchments Management (ICM). The tool uses available datasets such as land cover, land cover change statistics and ICM indicators to identify degradation hotspots as per the United Nations Convention to Combat Desertification (UNCCD) SDG 15.3.1 definitions. Figure 1 gives the summary of the whole process from identifying hotspots to implementation of interventions. The exercise will only go as far as identification of degradation indicators (Step 4). This will be a desktop assessment with a possibility of sites visits for further on ground validation in case of limitations in local knowledge.

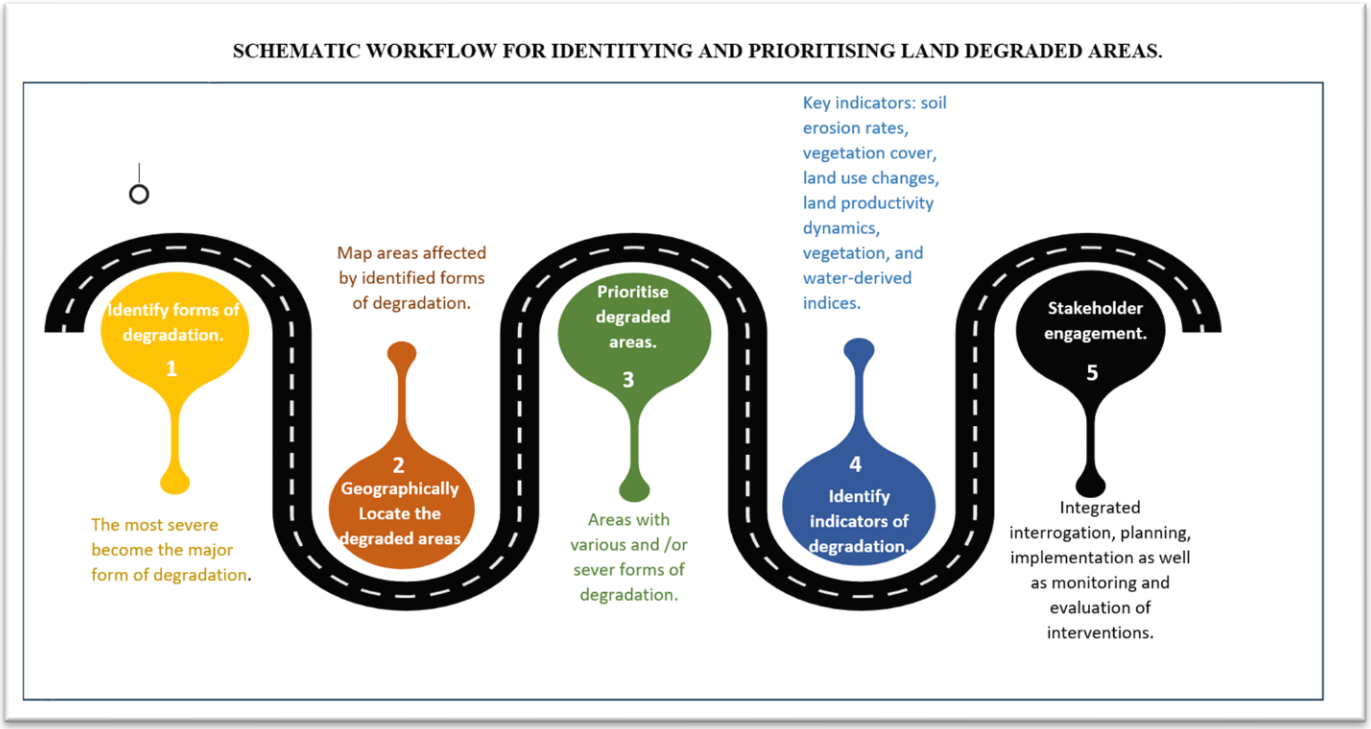


Figure 1: Schematic workflow for identifying and prioritizing land degradation hotspots.

Based on three of the land degradation indicators the degradation hotspots are determined. The three indicators are **Landcover change**, **Productivity and soil organic carbon**. Either integrating the results of all three or any two or using them independently of each other the hotspots can be located because if one of the indicators show negative change irrespective of other indicators the land in question is considered degraded (United Nations Convention to Combat Desertification, 2018) . One of the land change examples that signifies degradation is the grassland into shrubland transition. These shrubs constitute of invasive species which outgrow the grasses. They lower the quantity and quality of forage, interfere with grazing and poison animals as well as slow down animal weight gain (TheReporter, 2023).

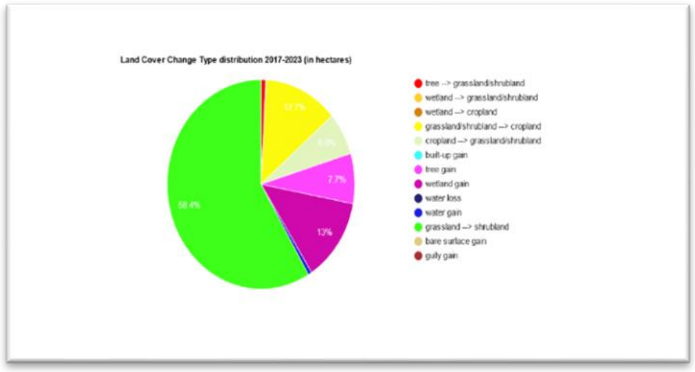
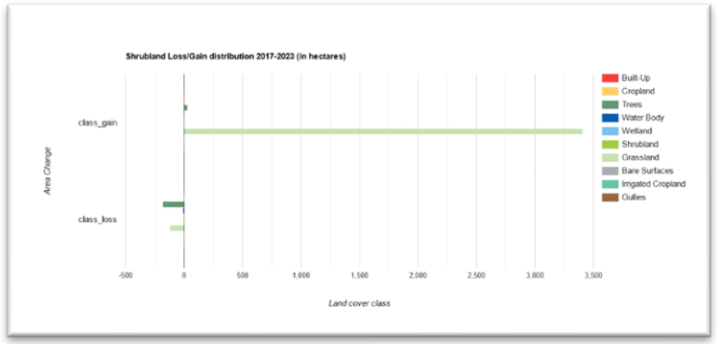
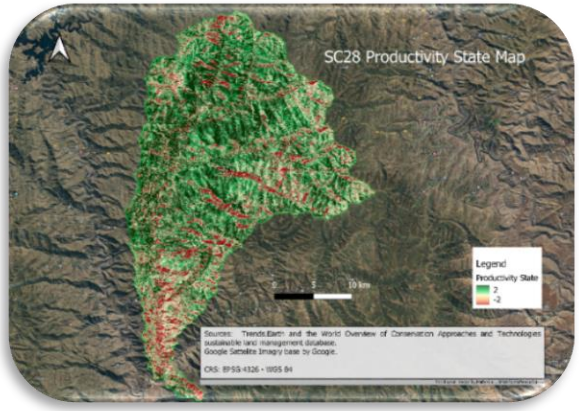
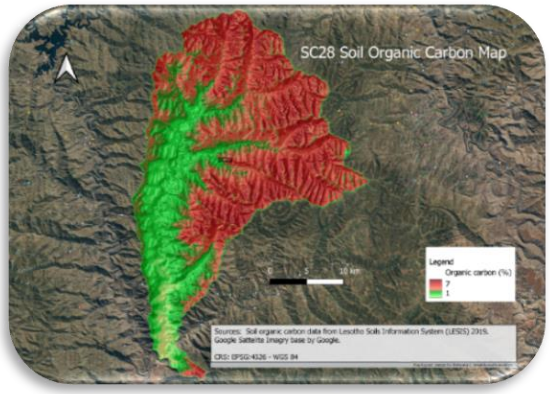
With the productivity state we identify degraded Rangeland area. As will be shown on productivity state maps, the areas coloured reddish are the areas with poor productivity state (values ≤ 2). If the difference in class between the baseline and the comparison period is ≤ 2, then that pixel could potentially be degraded (Trends.Earth, 2017-2023).

For aggregate stability, soil organic carbon minimum value for maintaining a stable structure of the soil is above 2%, while values below 2% usually result in rapid instability (Musinguzi Patrick, 2013).

The exercise will be desktop assessment with a possibility of sites visits for further on ground validation.

District: Thaba-Tseka

Sub-catchment: SC28

Major forms of degradation (In order of severity)	
1. Land cover change: Shrubland encroachment into grassland  *Figure 2: SC28 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)*	 *Figure 3: SC28 2017-2023 shrubland loss/gain (ReNoka Data Reference Group DRG, 2023).*
2. Productivity: Low productivity state  *Figure 4:SC28 Productivity state map.*	3. Soil Organic Carbon: Low soil organic carbon  *Figure 5:SC28 Soil organic Carbon (LESIS, 2019) .*

Areas affected (hotspots map)

Degradation hotspots

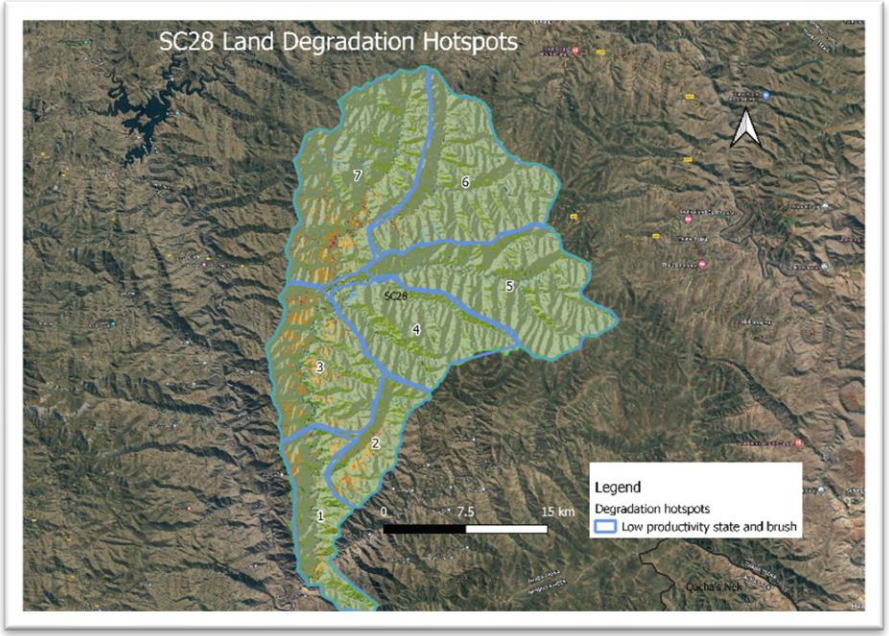


Figure 6: SC28 Degradation hotspots.

Prioritized hotspots

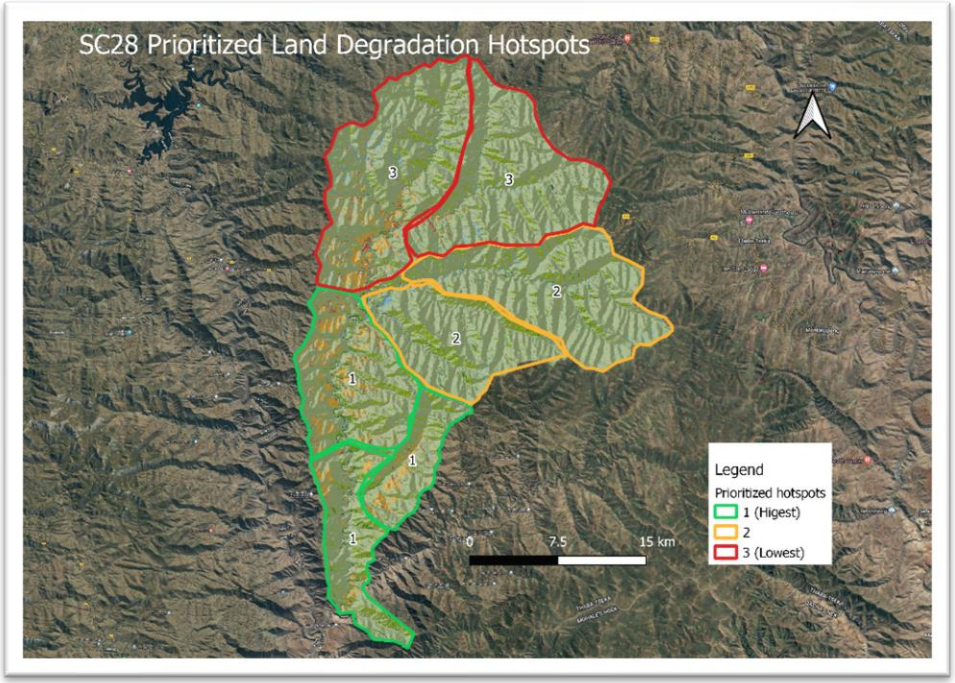


Figure 7: SC28 Prioritized degradation hotspots.

Discussion:

The catchment is mostly affected by encroachment of shrubland into the grassland and as a result the productivity state of the rangelands is reduced(figure4). The other form of degradation is low soil organic carbon percentages affects the low altitude areas of the catchments as illustrated by figure 5. Figure 6 and 7 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	low organic carbon, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 1 SC28 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	SC28	Low productivity state and brush	1	6566.581
2	SC28	Low productivity state and brush	1	4633.575
3	SC28	Low productivity state and brush	1	10289.8
4	SC28	Low productivity state and brush	2	9305.34
5	SC28	Low productivity state and brush	2	13764.13
6	SC28	Low productivity state and brush	3	13906.95
7	SC28	Low productivity state and brush	3	16393.05

Sub-catchment: SC30

Major forms of degradation (In order of severity)

1. Land cover change: Shrubland encroachment into grassland

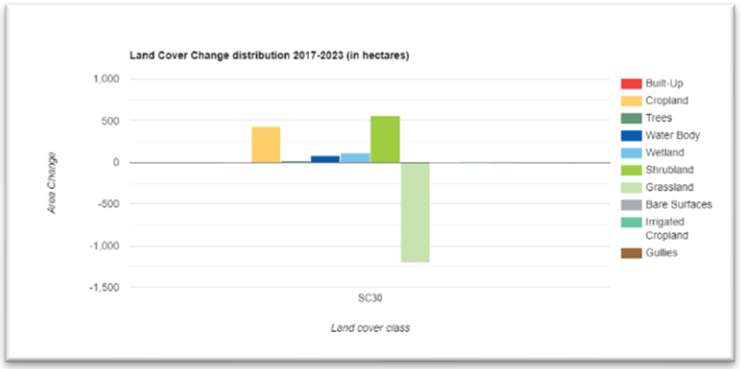


Figure 8: SC30 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023).

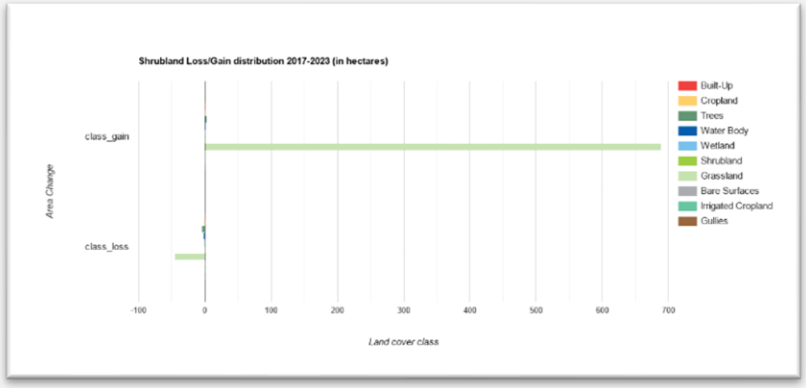


Figure 9: SC30 2017-2023 shrubland loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Productivity: Low productivity state

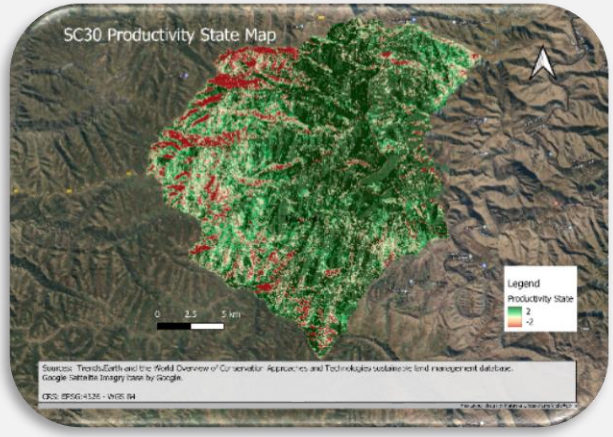


Figure 10: SC30 2019 productivity state map

3. Soil Organic Carbon: Low soil organic carbon

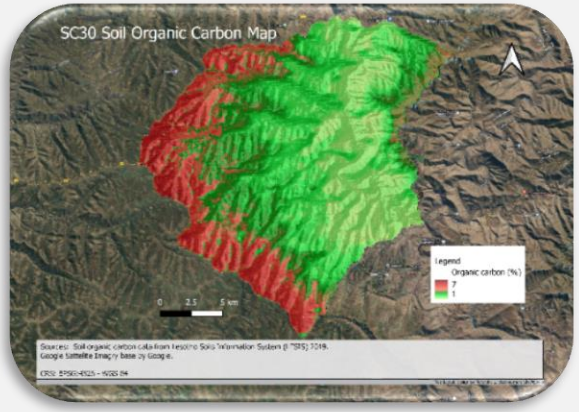


Figure 11: SC30 Soil Organic Carbon (LESIS, 2019).

Areas affected (hotspots map)

Degradation hotspots

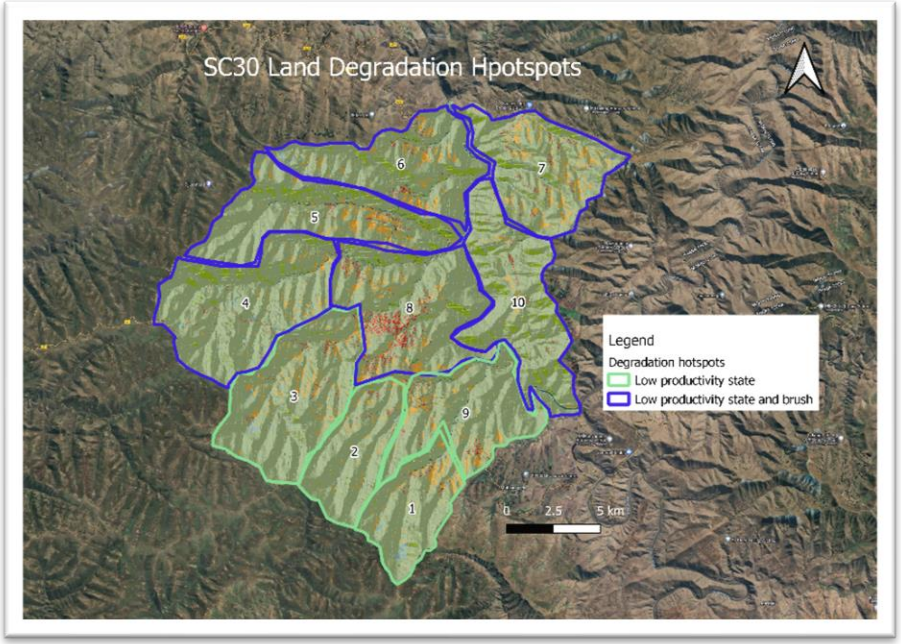


Figure 12:SC30 Land Degradation Hotspots

Prioritized hotspots

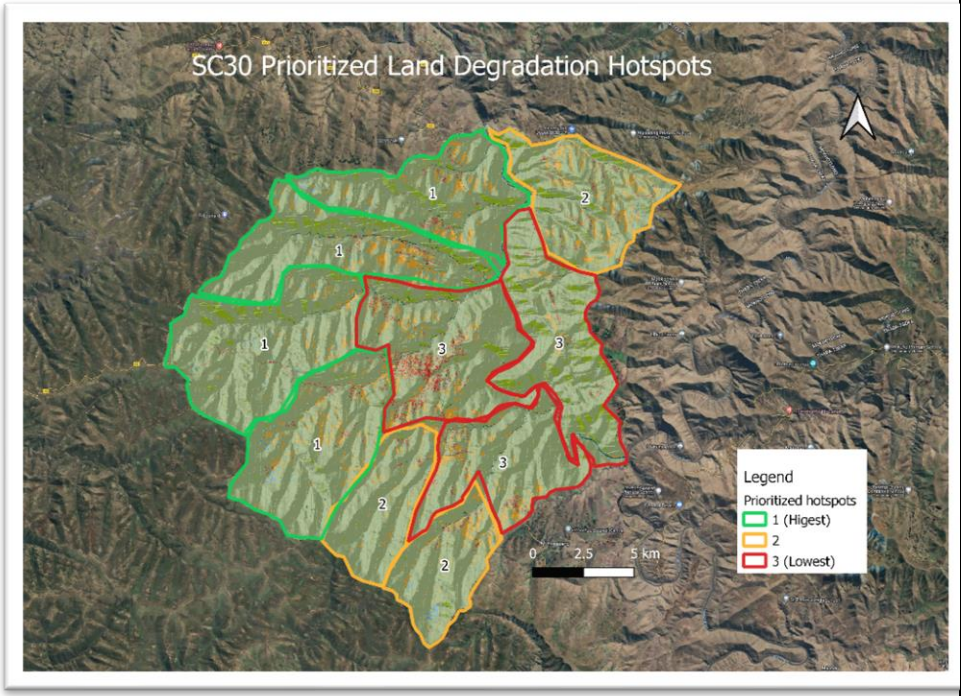


Figure 13: SC30 Prioritized hotspots.

Discussion:

The major forms of degradation in SC30 are loss of grassland into shrubland, and low productivity state of the rangelands. Figure 8 and 9 shows a tremendous gain in shrubland at the expense of grassland. The eastern part of the sub-catchment also demonstrates below threshold levels of soil organic carbon (<2%) (figure 11). Figure 12 and 13 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	low organic carbon, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 2 SC30 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	SC30	Low productivity state	2	2344.221
2	SC30	Low productivity state	2	2471.172
3	SC30	Low productivity state	1	4397.102
4	SC30	Low productivity state and brush	1	4883.933
5	SC30	Low productivity state and brush	1	3877.675
6	SC30	Low productivity state and brush	1	3515.503
7	SC30	Low productivity state and brush	2	3486.347
8	SC30	Low productivity state and brush	3	4497.189
9	SC30	Low productivity state	3	3217.091
10	SC30	Low productivity state and brush	3	3997.036

Sub-catchment: SC35

Major forms of degradation (In order of severity)

1. Productivity: Low productivity state

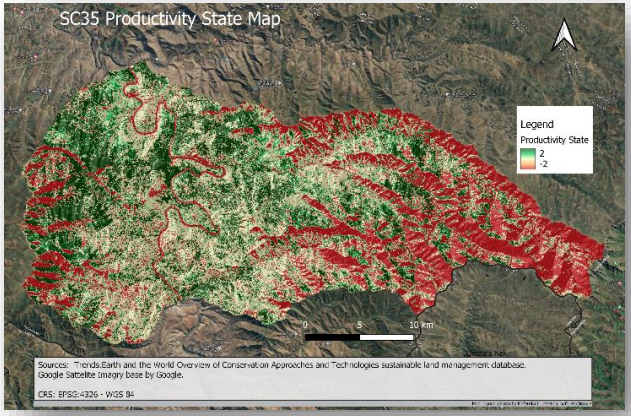


Figure 14: SC35 productivity state map

2. Land cover change: Shrubland encroachment into grassland

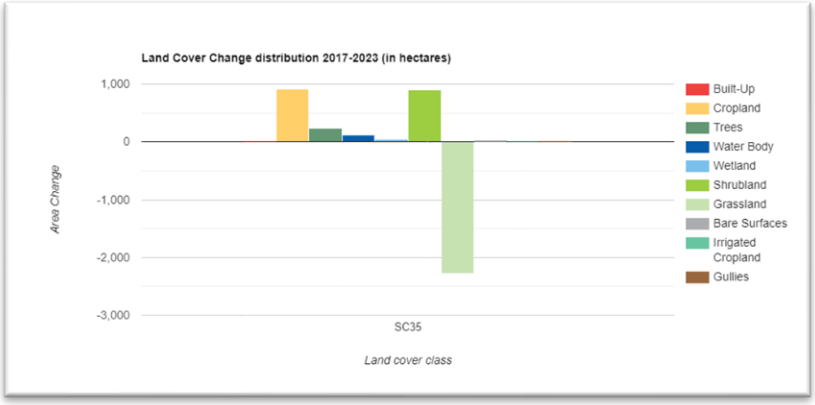


Figure 15: SC35 2017-2023 Land cover change distribution (ReNoka Data Reference Group DRG, 2023)

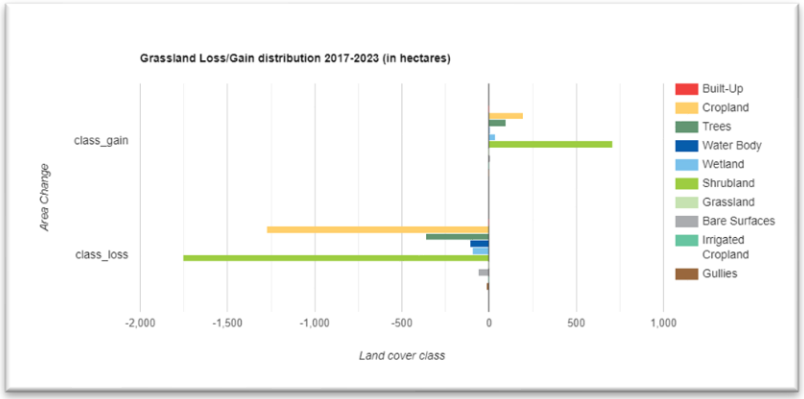


Figure 16: SC35 2017-2023 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Soil Organic Carbon: Low soil organic carbon

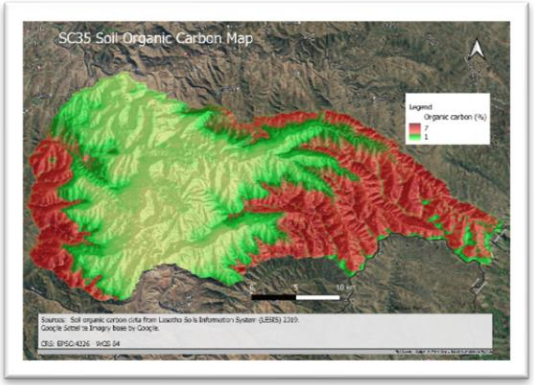


Figure 17: SC35 Soil Organic Carbon (LESIS, 2019).

Areas affected (hotspots map)

Degradation hotspots

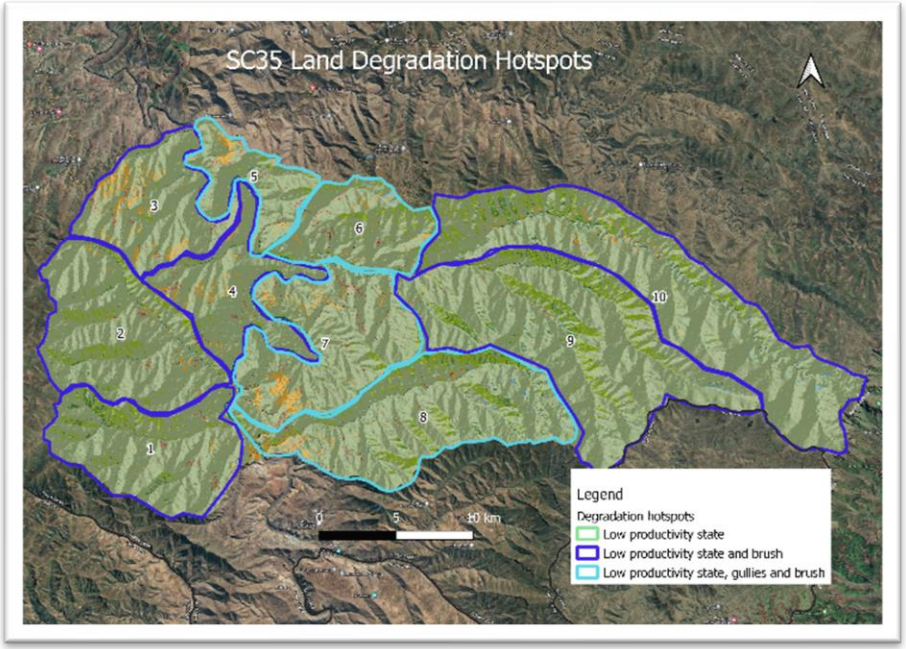


Figure 18: SC35 Land Degradation Hotspots.

Prioritized hotspots

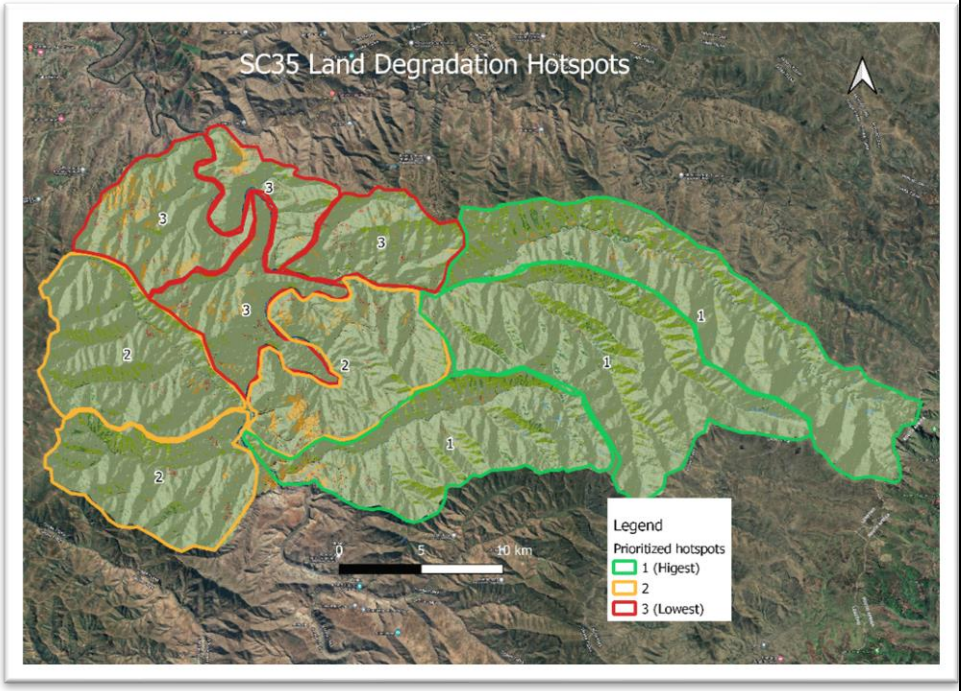


Figure 19: SC35 Prioritized Hotspots.

Discussion:

The main problem of SC35 is the productivity state of the rangelands. Figure 14 illustrates poor productivity state of almost the entire rangelands.

The other major form of degradation is in terms of land cover change where we see encroachment of shrubland into grassland (figure15 and 16).

The mid-section of the sub-catchment also shows below threshold levels of soil organic carbon. Figure 18 and 19 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	low organic carbon, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 3 SC35 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	SC35	Low productivity state and brush	2	7326.262
2	SC35	Low productivity state and brush	2	8777.345
3	SC35	Low productivity state and brush	3	5657.904
4	SC35	Low productivity state and brush	3	4879.734
5	SC35	Low productivity state, gullies, and brush	3	3302.063
6	SC35	Low productivity state, gullies, and brush	3	4409.821
7	SC35	Low productivity state, gullies, and brush	2	8159.18
8	SC35	Low productivity state, gullies, and brush	1	10315.5
9	SC35	Low productivity state and brush	1	14792.54
10	SC35	Low productivity state and brush	1	14139.75

District: Qacha's Nek

Sub-catchment: SC41

Major forms of degradation (In order of severity)

1. Productivity: Low productivity state

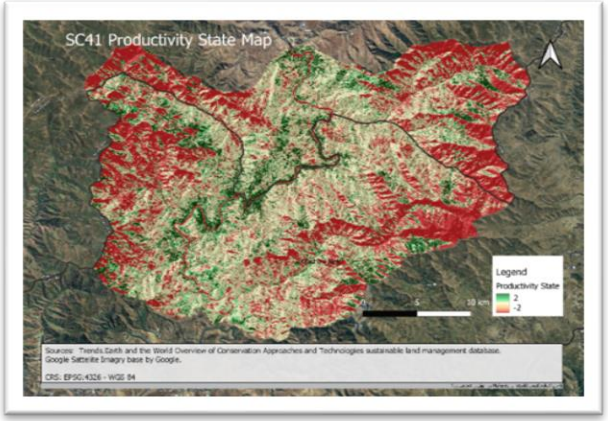


Figure 20:SC41 Productivity state map

2. Land cover change: Shrubland encroachment into grassland

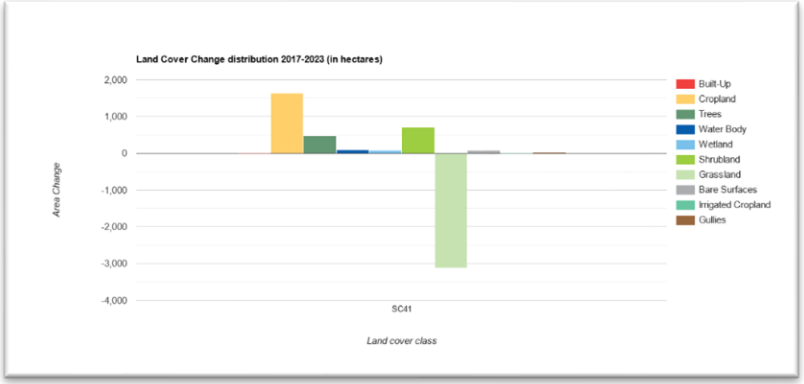


Figure 21:SC41 2017-2019 Land cover change distribution (ReNoka Data Reference Group DRG, 2023)

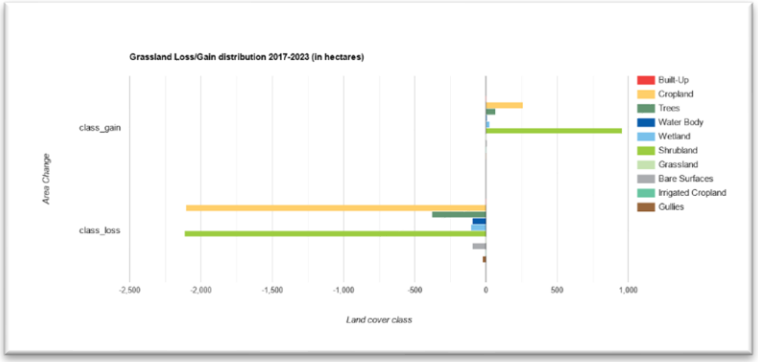


Figure 22:SC41 Grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Soil Organic Carbon: Low soil organic carbon

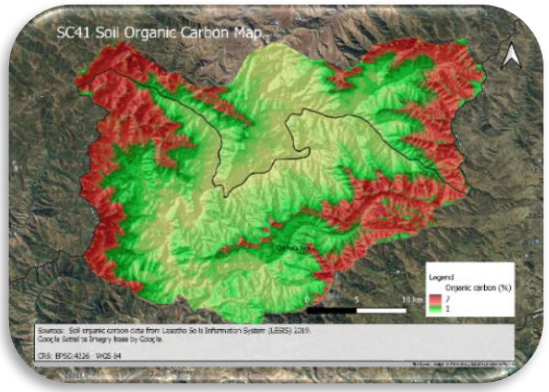


Figure 23:SC41 Soil Organic Carbon Map (LESIS, 2019)

Areas affected (hotspots map)

Degradation hotspots

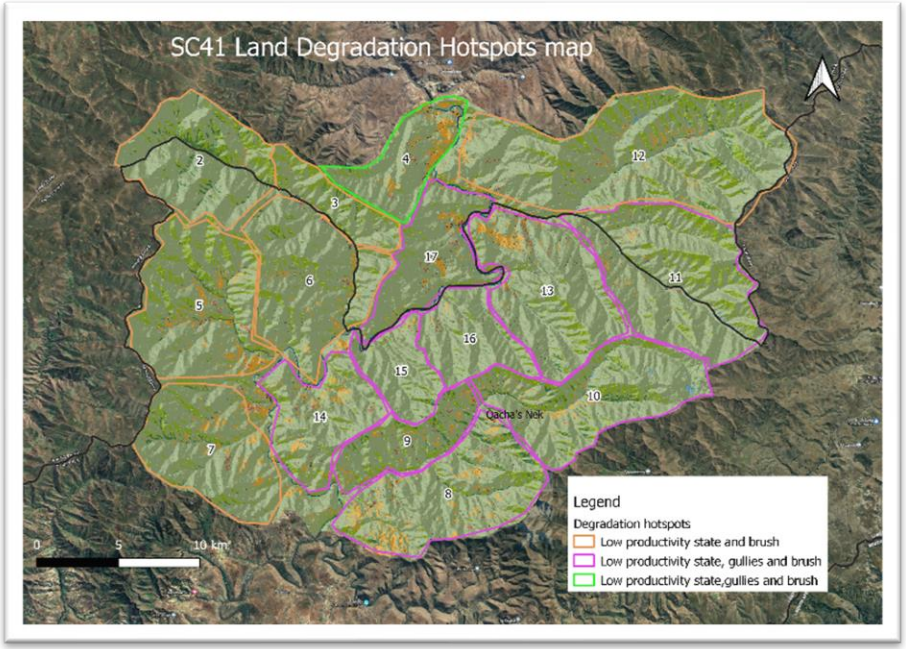


Figure 24: SC41 Land Degradation Hotspots

Prioritized hotspots

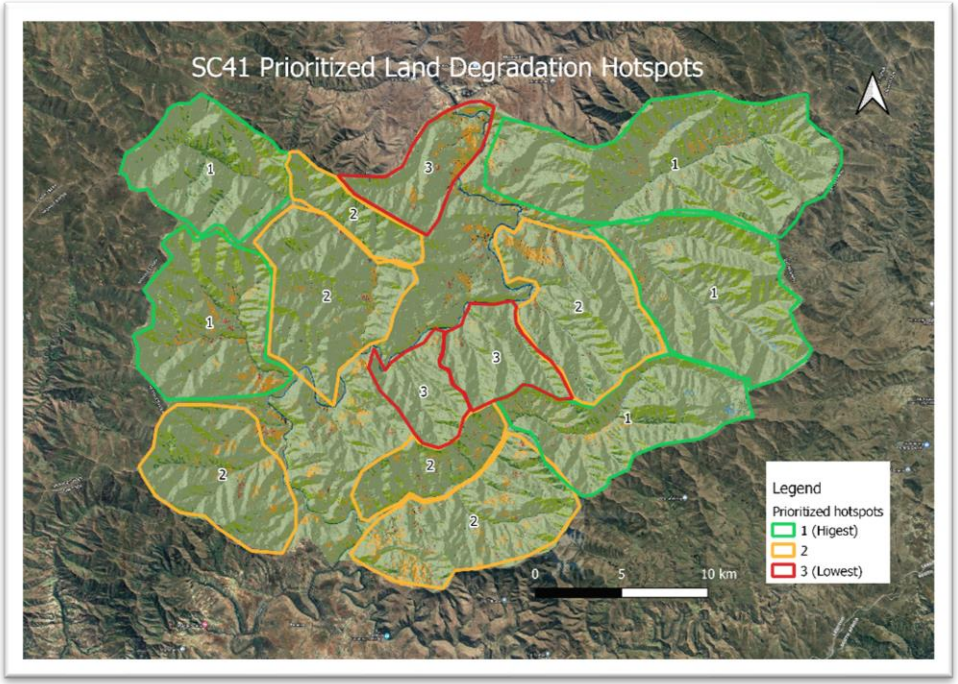


Figure 25:SC41 Prioritized Degradation Hotspots

Discussion:

The major form of degradation is the very low productivity state (figure 20). The other forms are loss in grassland to shrubland, gully gain, bare surface gain and low soil organic carbon (figure21, 22, and 23). Figure 24 and 25 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Bare surface gain, low organic carbon, Gully Gain, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 4 SC41 hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
2	SC41	Low productivity state and brush	1	5147.487
3	SC41	Low productivity state and brush	2	1886.067
4	SC41	Low productivity state, gullies, and brush	3	2834.393
5	SC41	Low productivity state and brush	1	6353.199
6	SC41	Low productivity state and brush	2	5904.813
7	SC41	Low productivity state and brush	2	5195.181
8	SC41	Low productivity state, gullies, and brush	2	6064.366
9	SC41	Low productivity state, gullies, and brush	2	2656.864
10	SC41	Low productivity state, gullies, and brush	1	6023.585

ID	SC_ID	Indicator	Priority	Area (Ha)
11	SC41	Low productivity state, gullies, and brush	1	7485.6
12	SC41	Low productivity state and brush	1	11476.38
13	SC41	Low productivity state, gullies, and brush	2	5909.627
14	SC41	Low productivity state, gullies, and brush	4	3656.446
15	SC41	Low productivity state, gullies, and brush	3	2130.083
16	SC41	Low productivity state, gullies, and brush	3	2740.266
17	SC41	Low productivity state, gullies, and brush	4	3554.406

Sub-catchment: SC40

Major forms of degradation (In order of severity)

1. Productivity: Low productivity state

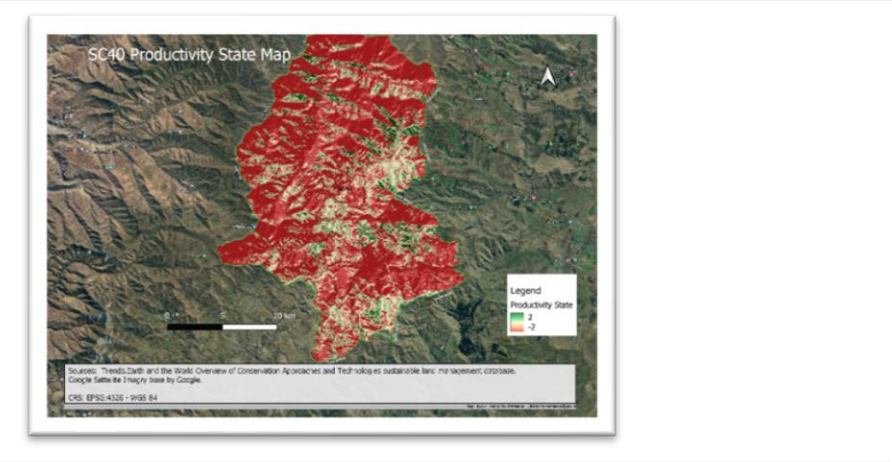


Figure 26: SC40 Productivity state

2. Land cover change: Gully and bare surface gain

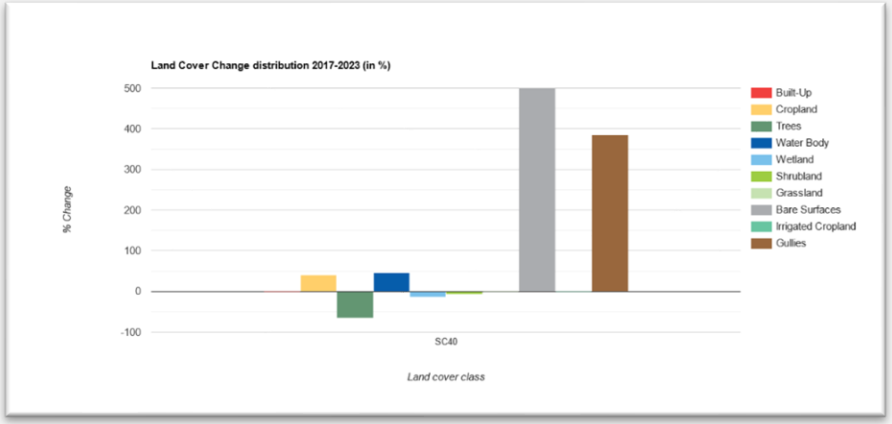


Figure 27: SC40 2027-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

3. Land cover change: Wetlands depletion

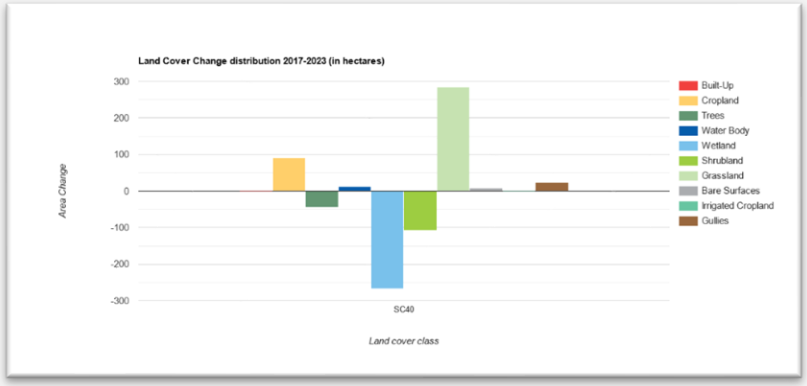


Figure 28: SC40 2017-2023 Land cover change (Ha) (ReNoka Data Reference Group DRG, 2023)

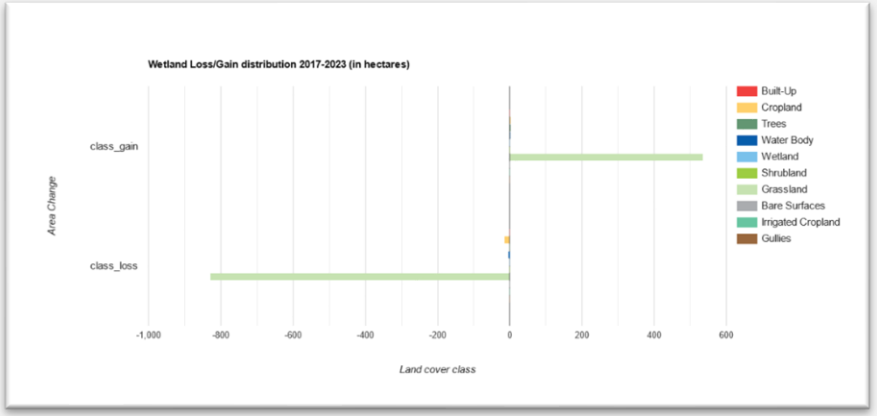


Figure 29: SC40 2017-2023 wetlands loss/gain (ReNoka Data Reference Group DRG, 2023)

Areas affected (hotspots map)

Degradation hotspots

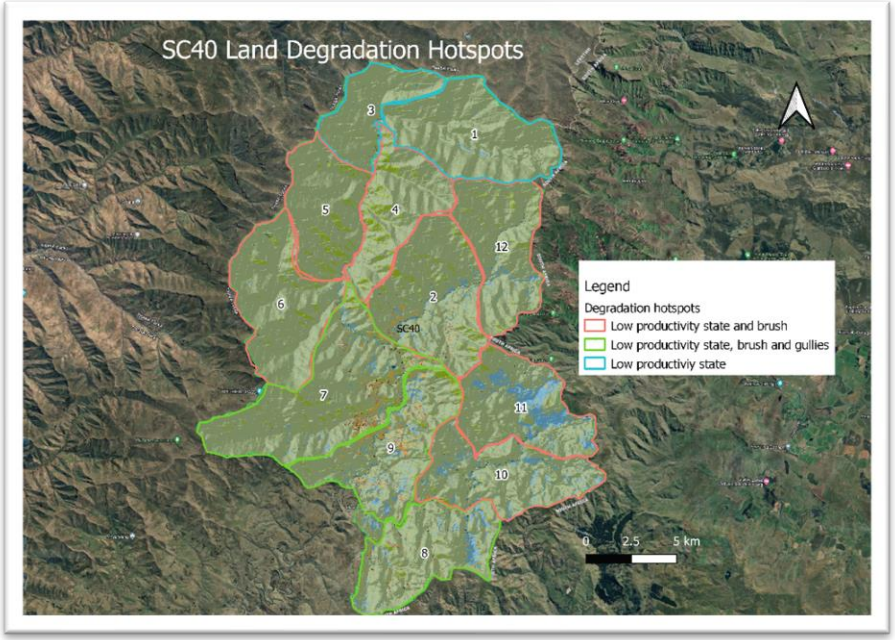


Figure 30: SC40 Land degradation hotspots.

Prioritized hotspots

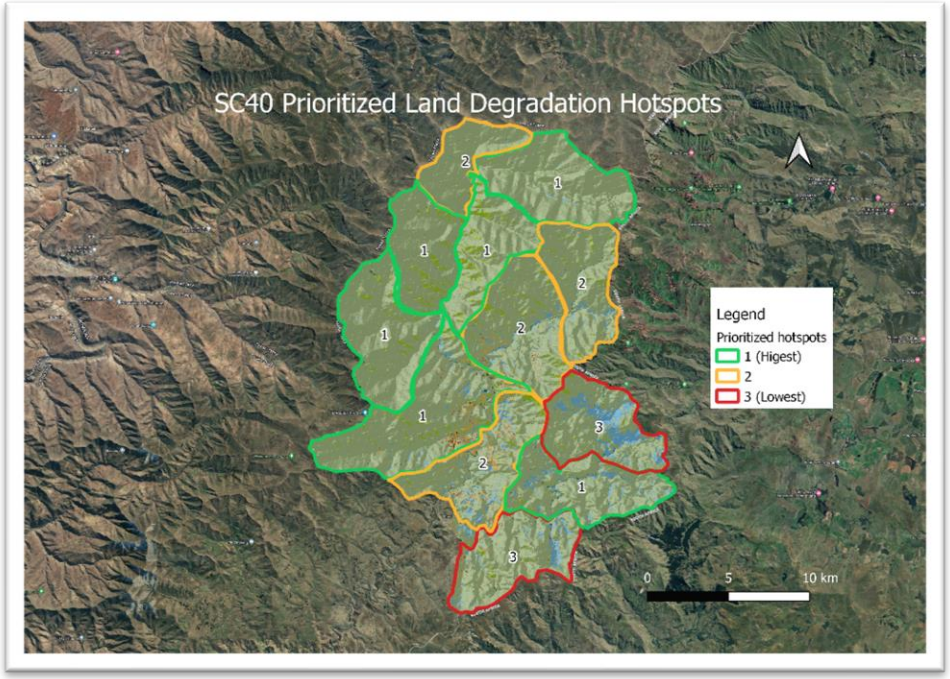


Figure 31: SC40 Prioritized degradation hotspots.

Discussion:

The productivity state of the rangelands is found to be the major form of degradation as can be seen from figure26. Other forms of degradation are gully and bare surface gain (figure 27) as well as wetland depletion (figure28 and 29). Figure 30 and 31 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Local Communities.

Table 5 SC40 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	SC40	Low productivity state	1	3637.857
2	SC40	Low productivity state and brush	2	3821.28
3	SC40	Low productivity state	2	1857.099
4	SC40	Low productivity state and brush	1	2561.095
5	SC40	Low productivity state and brush	1	2619.984
6	SC40	Low productivity state and brush	1	3550.178
7	SC40	Low productivity state, brush, and gullies	1	5205.596
8	SC40	Low productivity state, brush, and gullies	3	3129.978
9	SC40	Low productivity state, brush, and gullies	2	3299.024
10	SC40	Low productivity state and brush	1	3170.603
11	SC40	Low productivity state and brush	3	3094.39
12	SC40	Low productivity state and brush	2	2987.138

Sub-catchment: SC47

Major forms of degradation (In order of severity)

1. Productivity: Low productivity state

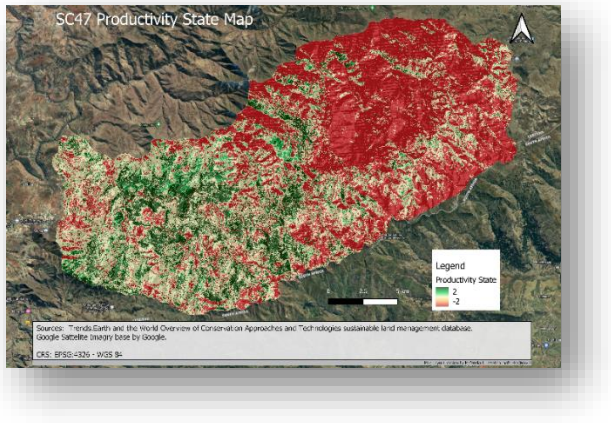


Figure 32: SC47 Productivity state map

2. Land cover change: Shrubland encroachment into grassland

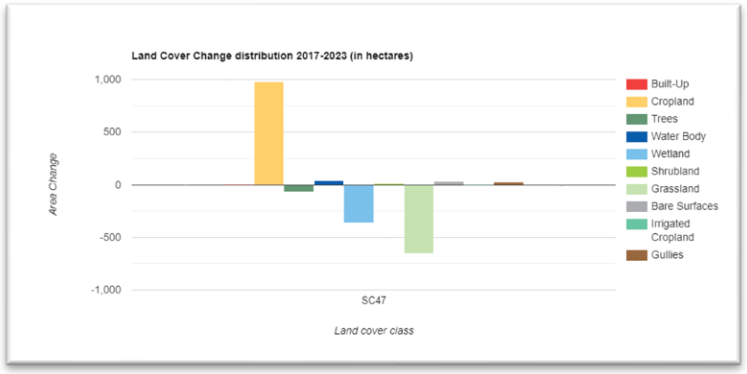


Figure 33: SC47 2017-2023 Land cover change distribution (ReNoka Data Reference Group DRG, 2023)

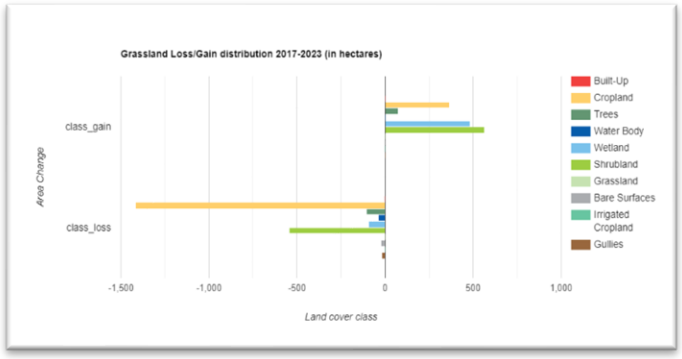


Figure 34:SC47 2017-2023 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Soil Organic Carbon: Low soil organic carbon

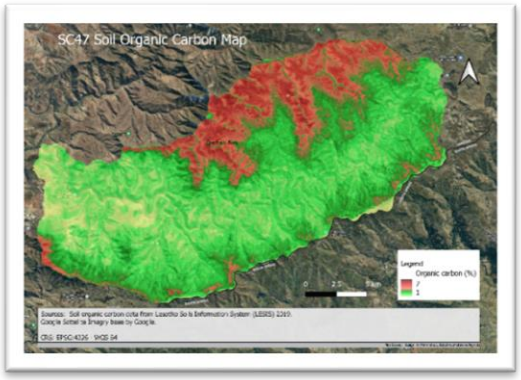


Figure 35:SC47 Soil Organic Carbon map (ReNoka Data Reference Group DRG, 2023)

Areas affected (hotspots map)

Degradation hotspots

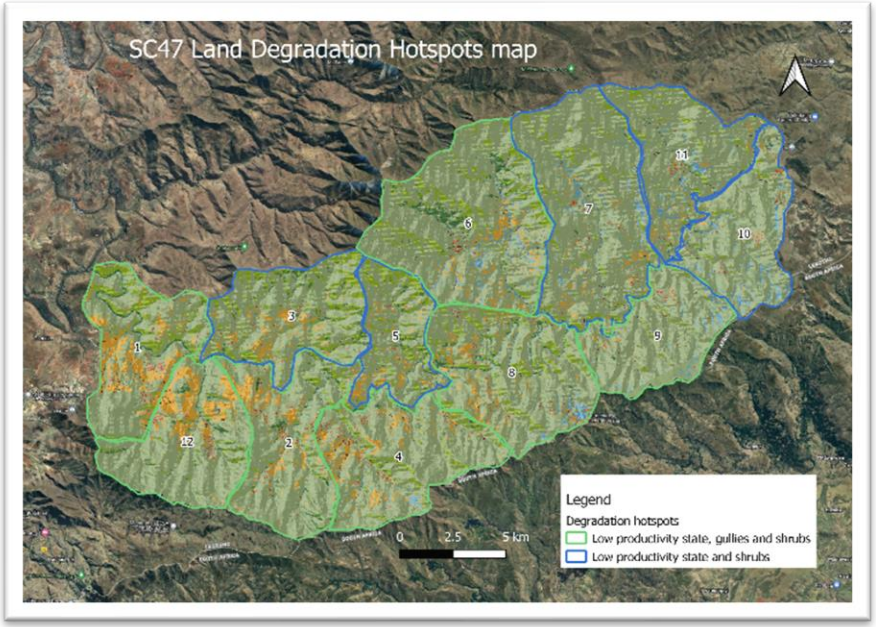


Figure 36: SC47 Land Degradation Hotspots

Prioritized hotspots

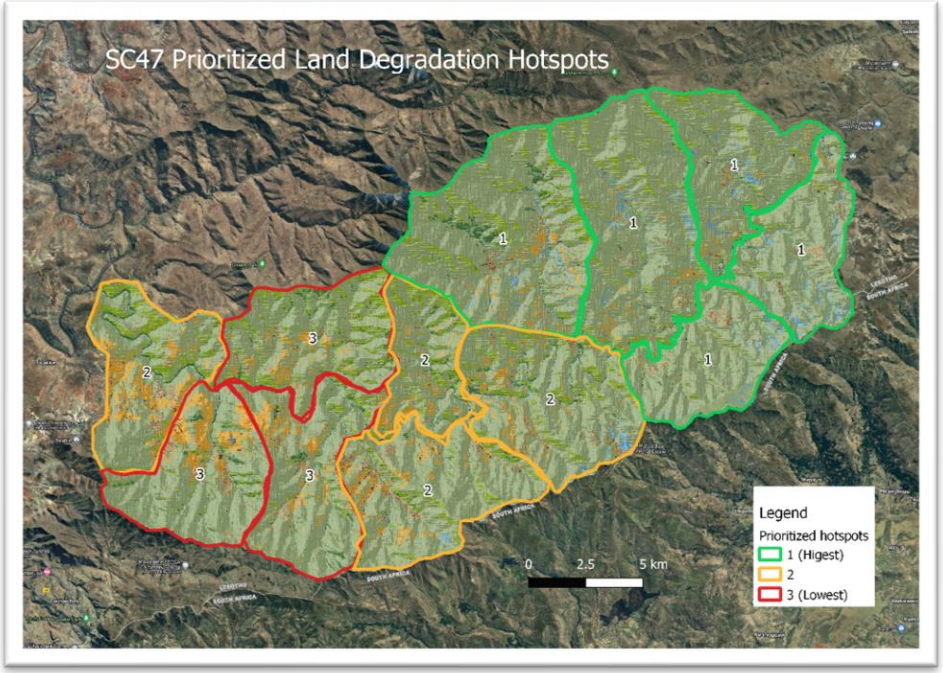


Figure 37:SC47 Prioritized hotspots.

Discussion:

The major form of degradation in SC47 is low productivity state of the rangelands (figure 32). We also see loss of grassland to shrubland and some gully and bare surface gain (figure 33 and 34). On the lower altitudes of the sub-catchment, its mainly croplands, the percentages of soil organic carbon are very low. Figure 36 and 37 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion, Gully Gain, Bare surface gain,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Local Communities.

Table 6 SC47 Hotsposts

ID	SC_Id	Indicators	Priority	Area (Ha)
1	SC47	Low productivity state, gullies, and shrubs	2	3107.179
2	SC47	Low productivity state, gullies, and shrubs	3	3387.572
3	SC47	Low productivity state and shrubs	3	3219.54
4	SC47	Low productivity state, gullies, and shrubs	2	3687.96
5	SC47	Low productivity state and shrubs	2	1963.187
6	SC47	Low productivity state, gullies, and shrubs	1	5403.866
7	SC47	Low productivity state and shrubs	1	5196.58
8	SC47	Low productivity state, gullies, and shrubs	2	3956.72

ID	SC_ID	Indicators	Priority	Area (Ha)
9	SC47	Low productivity state, gullies, and shrubs	1	2651.469
10	SC47	Low productivity state and shrubs	1	2834.93
11	SC47	Low productivity state and shrubs	1	3040.398
12	SC47	Low productivity state, gullies, and shrubs	3	3189.976

Sub-catchment: SC48

Major forms of degradation (In order of severity)

1. Productivity: Low productivity state

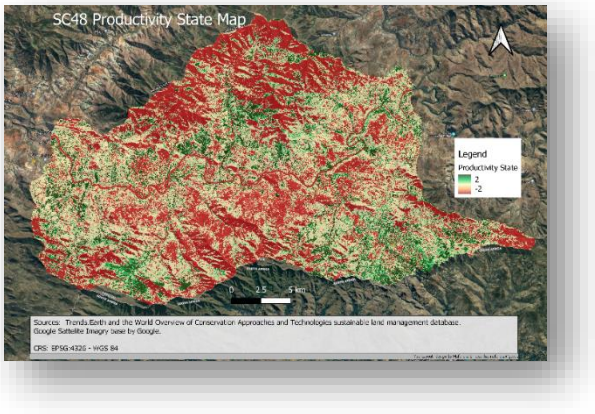


Figure 38:SC48 productivity state

2. Land cover change: Shrubland encroachment into grassland

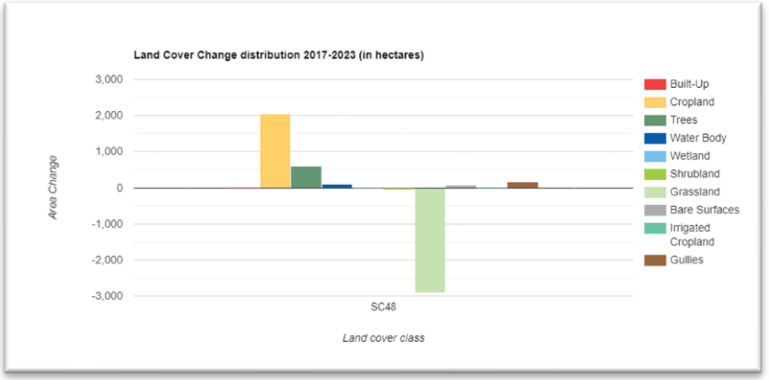


Figure 39:SC48 2017-2023 land cover change (ReNoka Data Reference Group DRG, 2023).

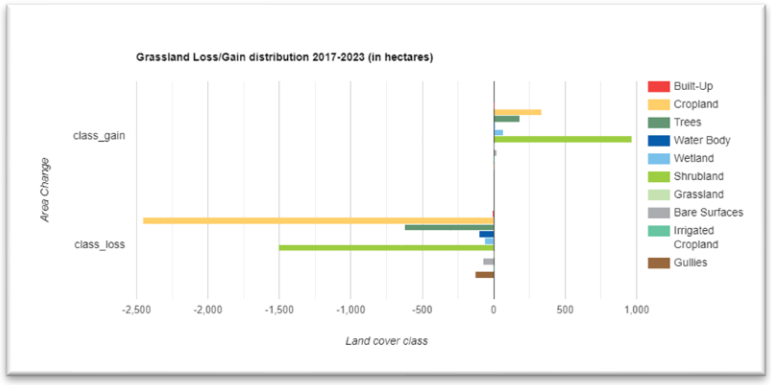


Figure 40:SC48 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Land cover change: Gully gain

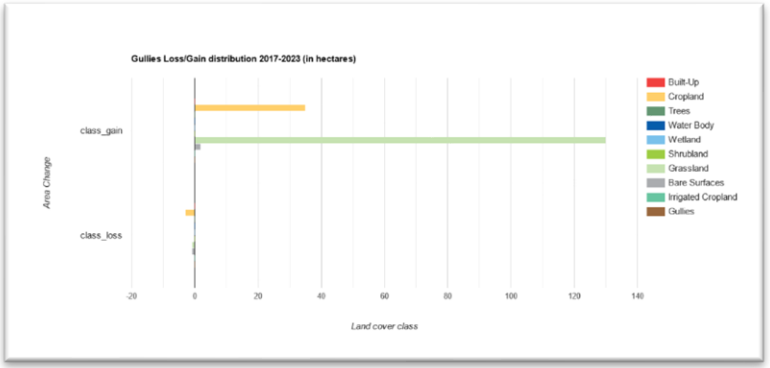


Figure 41: SC48 gullies loss/gain (ReNoka Data Reference Group DRG, 2023)

Areas affected (hotspots map)

Degradation hotspots

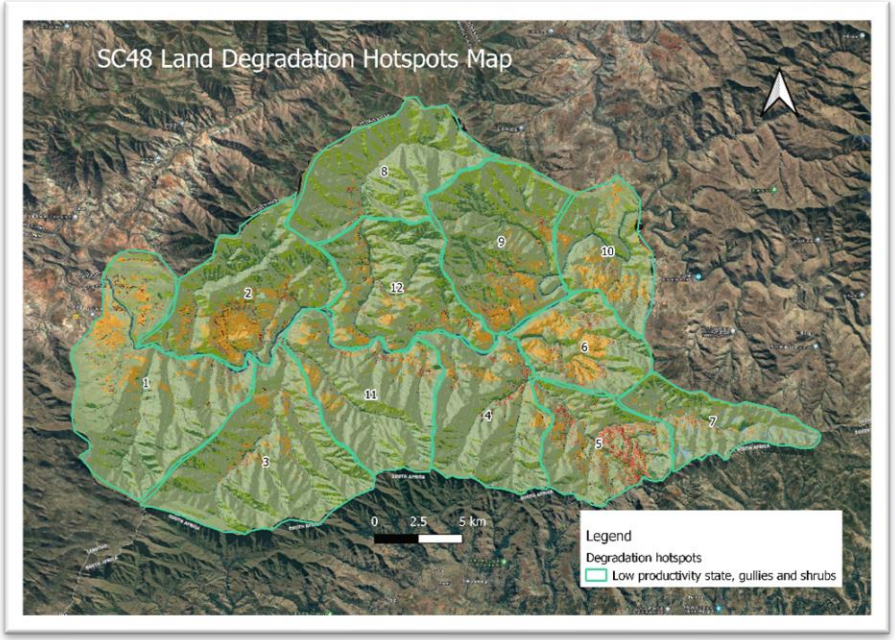


Figure 42:SC48 Land degradation hotspots.

Prioritized hotspots

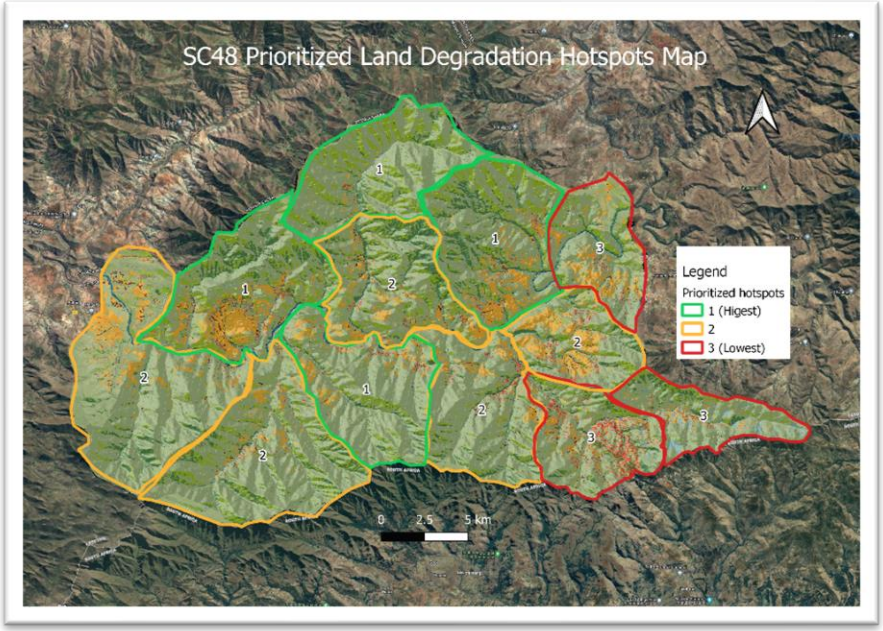


Figure 43:SC48 Prioritized degradation hotspots.

Discussion:

The major form of degradation in SC48 is low productivity state (figure 38). Almost the whole of the sub-catchment has productivity state values below 2, which is the sign of degradation (Trends.Earth, 2017-2023). We also see loss in grassland to shrubland as well as gully gain (figure 39 and 40). Figure 41 shows gully gain which is in the expense of mostly grassland and then croplands. Figure 42 and 43 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 7 SC48 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	SC48	Low productivity state, gullies, and shrubs	2	8049.565
2	SC48	Low productivity state, gullies, and shrubs	1	5757.031
3	SC48	Low productivity state, gullies, and shrubs	2	6878.508
4	SC48	Low productivity state, gullies, and shrubs	2	4796.937
5	SC48	Low productivity state, gullies, and shrubs	3	3805.808
6	SC48	Low productivity state, gullies, and shrubs	2	3134.564
7	SC48	Low productivity state, gullies, and shrubs	3	2725.246
8	SC48	Low productivity state, gullies, and shrubs	1	5043.166
9	SC48	Low productivity state, gullies, and shrubs	1	5521.511
10	SC48	Low productivity state, gullies, and shrubs	3	3308.99
11	SC48	Low productivity state, gullies, and shrubs	1	4966.8
12	SC48	Low productivity state, gullies, and shrubs	2	4757.671

District: Quthing

Sub-catchment: SC52

Major forms of degradation (In order of severity)

1. Productivity: Low productivity state

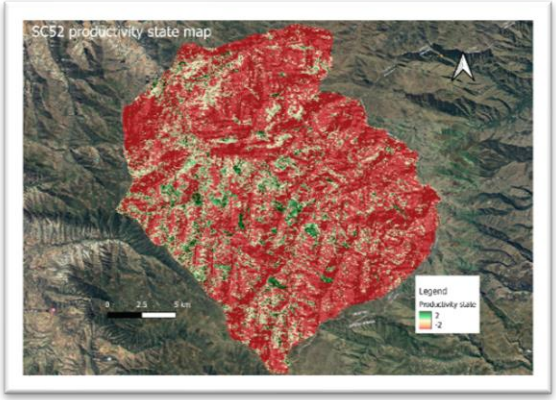


Figure 44:SC52 productivity state map

2. Land cover change: Shrubland encroachment into grassland

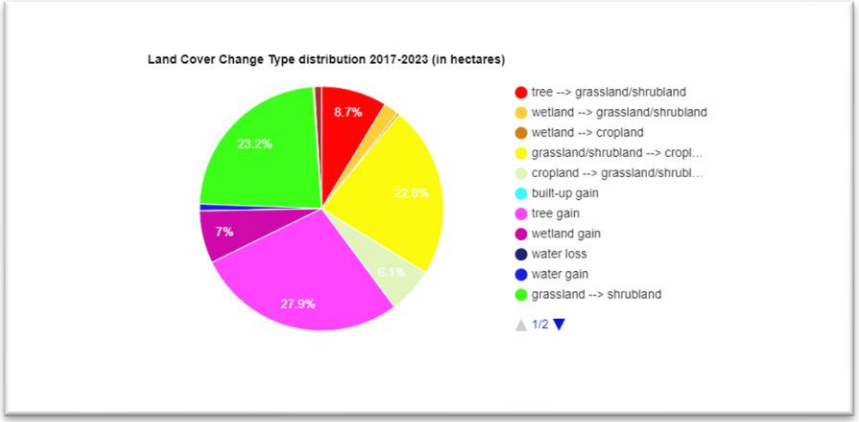


Figure 45:SC52 2017-2023 land cover change type (ReNoka Data Reference Group DRG, 2023)

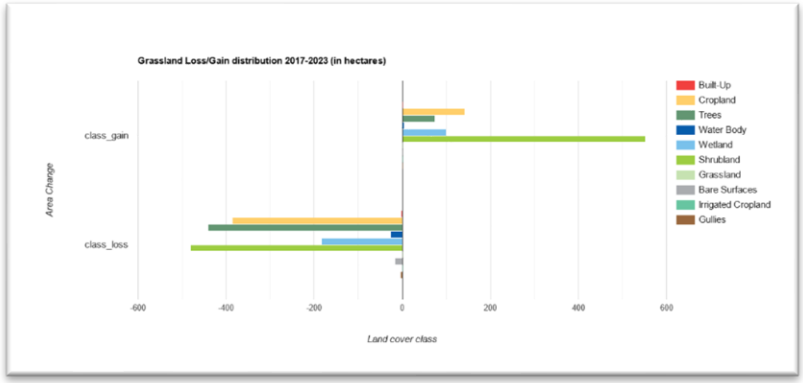


Figure 46:SC52 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Land cover change: Gullies and bare surface gain.

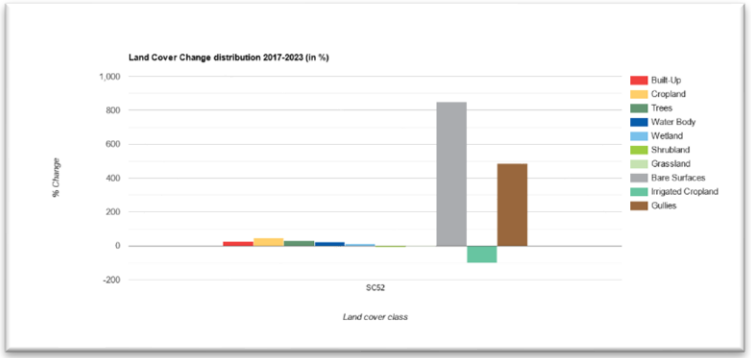


Figure 47: SC52 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

Areas affected (hotspots map)

Degradation hotspots

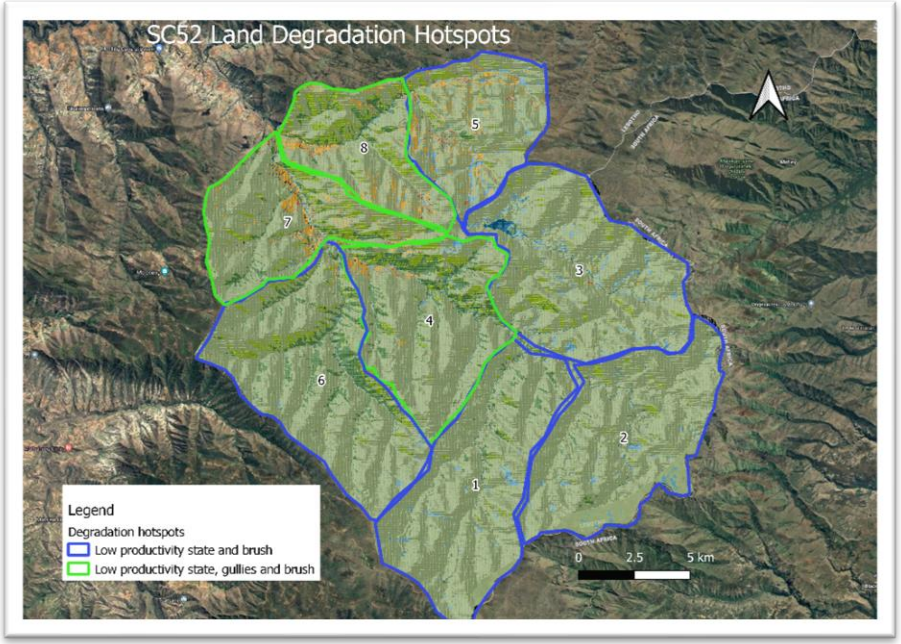


Figure 48:SC52 degradation hotspots.

Prioritized hotspots

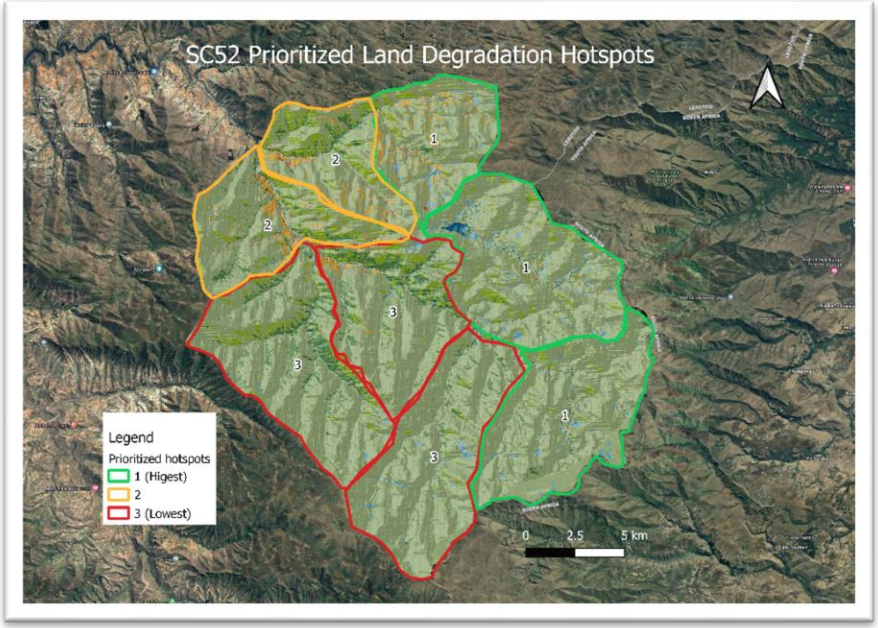


Figure 49:S52 prioritized degradation hotspots.

Discussion:

The SC52 sub-catchment is mostly the rangelands. As per the productivity state map on figure 44, very few patches of land show positive change. Therefore, low productivity is the major form of degradation. The other forms of degradation prevalent are loss of grassland to shrubland (figure 45 and 46). There is also gully and bare surface gain (figure 47). Figure 48 and 49 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
4,5,7,8	Gully Gain, Bare surface gain, low organic carbon, soil loss, Wetland depletion, low tree cover, invasive species encroachment, Reduced species composition (Fauna and Flora)	Local government, Farmers, Forestry, Soil and Water Conservation, Range, DMA, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, public health,
1,2,3,6	Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion.	Local government, Herders, Grazing Associations, Initiation schools, Farmers, Environment, Range, Local Communities, Conservation, Agriculture (Livestock), Water Affairs, Woolshed, MDTP (Maluti Drakensberg Transfontier Park)

Table 8 SC52 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	SC52	Low productivity state and brush	3	5562.3
2	SC52	Low productivity state and brush	1	5297.624
3	SC52	Low productivity state and brush	1	5832.199
4	SC52	Low productivity state, gullies, and brush	3	4452.395
6	SC52	Low productivity state and brush	3	5990.5
7	SC52	Low productivity state, gullies, and brush	2	3616.529
5	SC52	Low productivity state and brush	1	3374.885
8	SC52	Low productivity state, gullies, and brush	2	2906.886

District: Botha-Bothe

Sub-catchment: CC65

Major forms of degradation (In order of severity)

1. Land cover change: Gully and bare surface gain

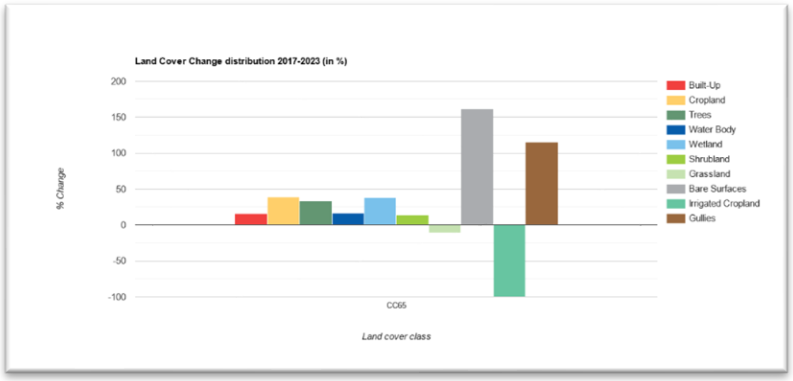


Figure 50:CC65 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

2. Land cover change: Shrubland encroachment into grassland

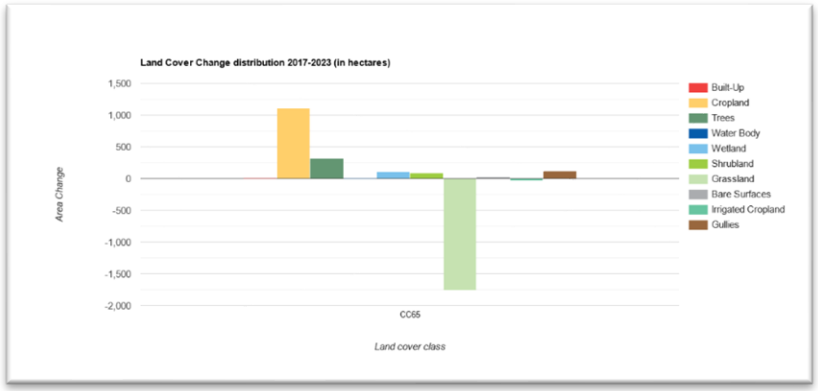


Figure 51:CC65 2017-2023 land cover change (Ha) (ReNoka Data Reference Group DRG, 2023)

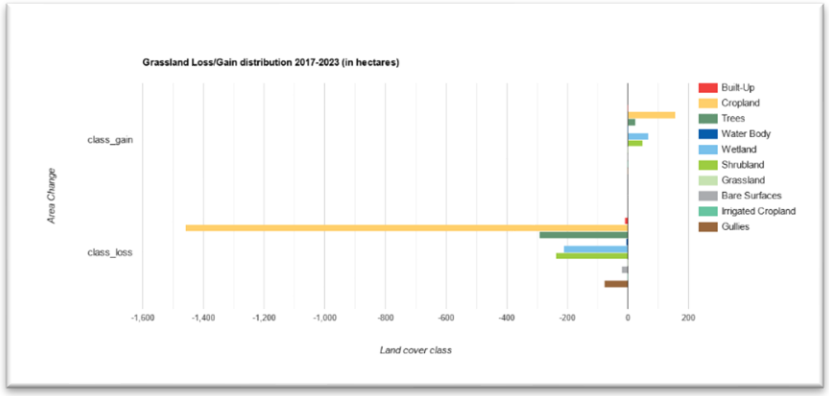


Figure 52:CC65 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Productivity: Low productivity state

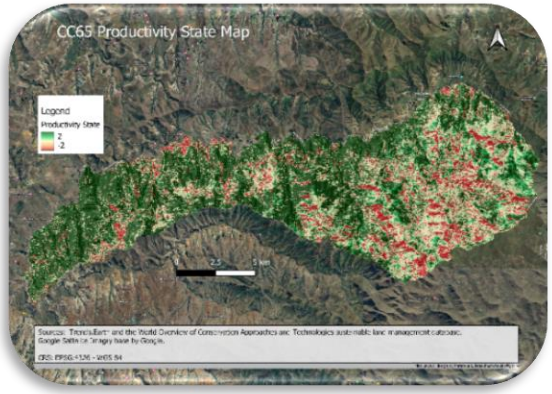


Figure 53:CC65 productivity state map

Areas affected (hotspots map)

Degradation hotspots

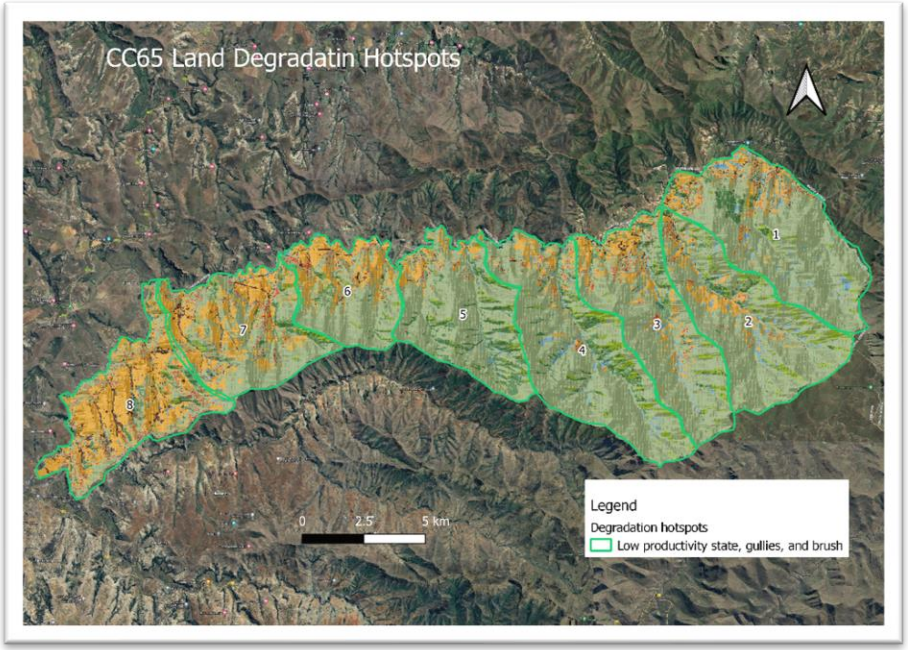


Figure 54: CC65 Land degradation hotspots

Prioritized hotspots

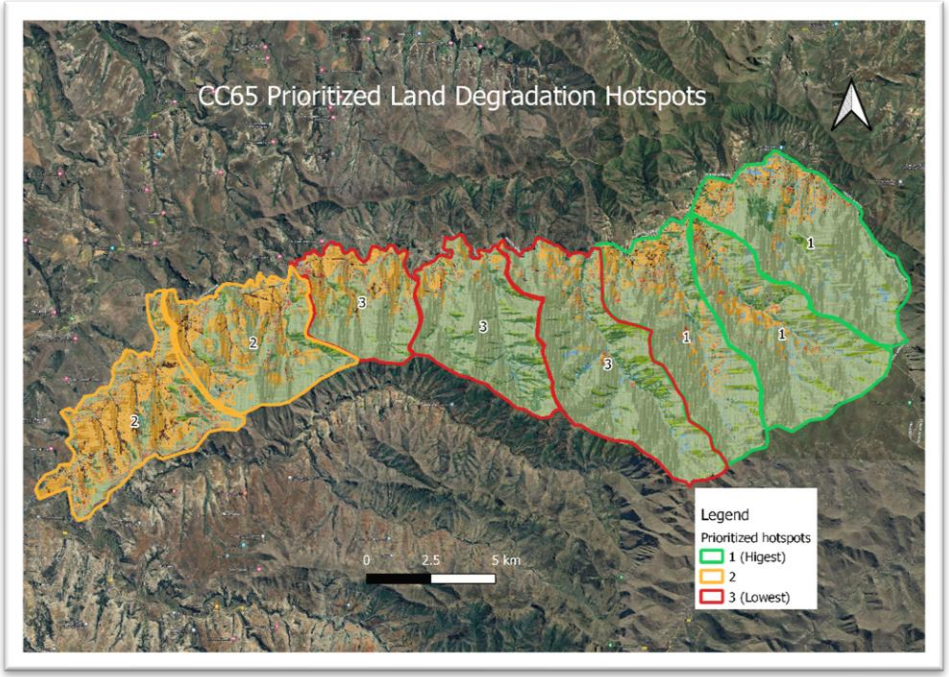


Figure 55:CC65 Prioritized degradation hotspots.

Discussion:

CC65 sub-catchment overwhelmed by gullies encroaching on croplands (figure 50), grassland loss to shrubland (figure 51 and 52) and low productivity state of the rangelands (figure 53). There are also other forms of degradation like low soil organic carbon on croplands and some bare surface gain. Figure 54 and 55 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 9 CC65 Hotspots

ID	SC_ID	Degradation indicator	priority	Area (Ha)
1	CC65	Low productivity state, gullies, and brush	1	3137.269
2	CC65	Low productivity state, gullies, and brush	1	2927.511
3	CC65	Low productivity state, gullies, and brush	1	2779.058
4	CC65	Low productivity state, gullies, and brush	3	3393.352
5	CC65	Low productivity state, gullies, and brush	3	2373.266
6	CC65	Low productivity state, gullies, and brush	3	1666.045
7	CC65	Low productivity state, gullies, and brush	2	2427.536
8	CC65	Low productivity state, gullies, and brush	2	2509.666

Sub-catchment: CC63

Major forms of degradation (In order of severity)

1. Land cover change: Gully and bare surface gain

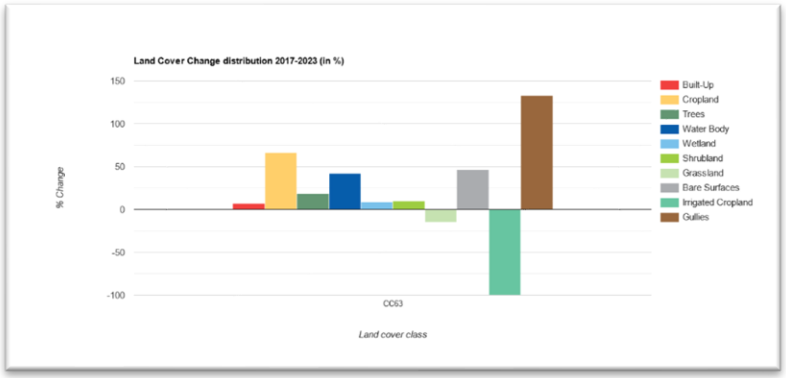


Figure 56:CC65 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

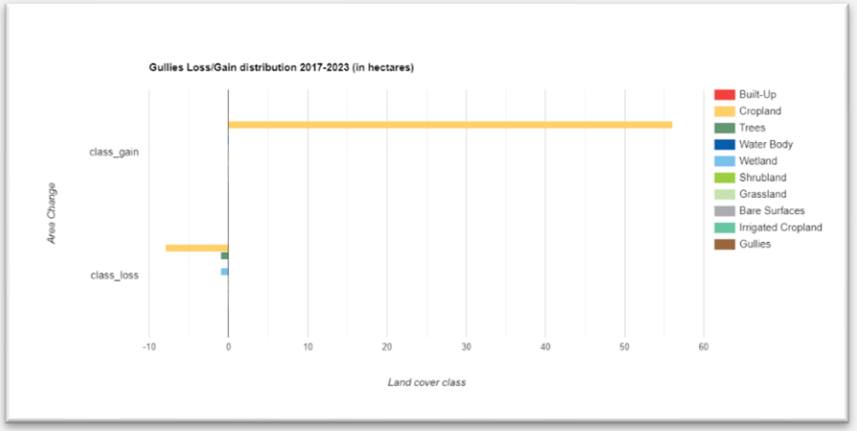


Figure 57:CC65 grassland loss/gain

2. Productivity: Low productivity state

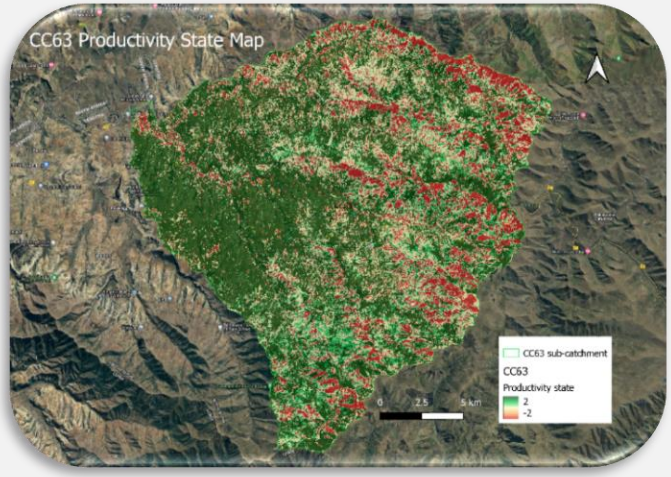


Figure 58:CC65 productivity stste map

3. Soil Organic Carbon: Low soil organic carbon

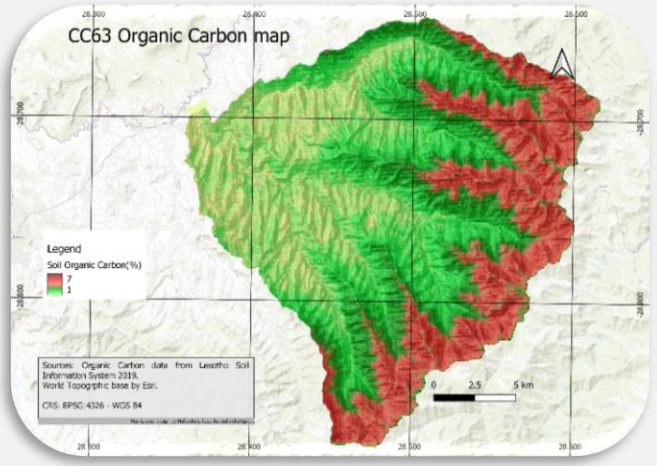


Figure 59:CC65 soil organic carbon map (LESIS, 2019)

Areas affected (hotspots map)

Degradation hotspots

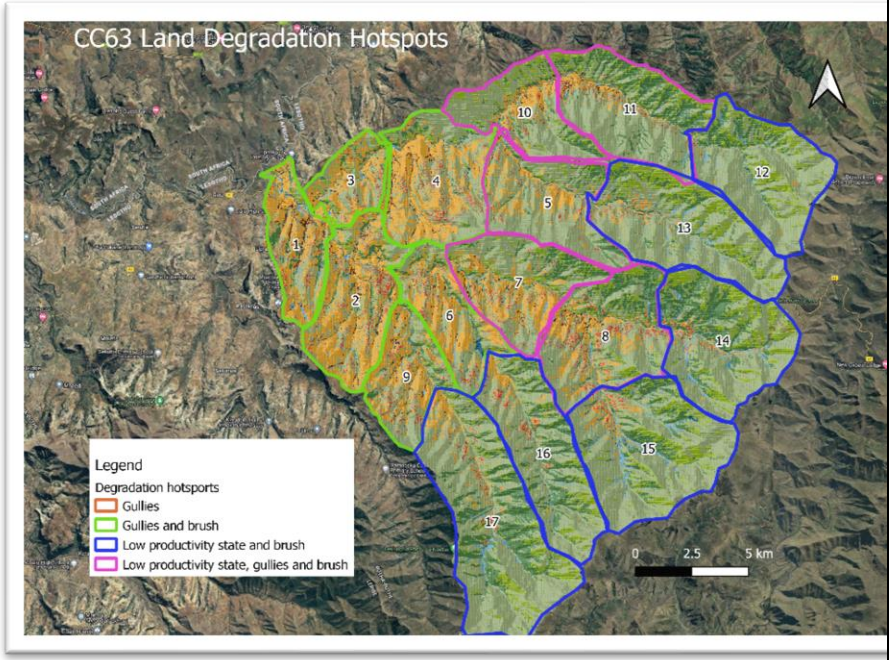


Figure 60:CC65 land degradation hotspots

Prioritized hotspots

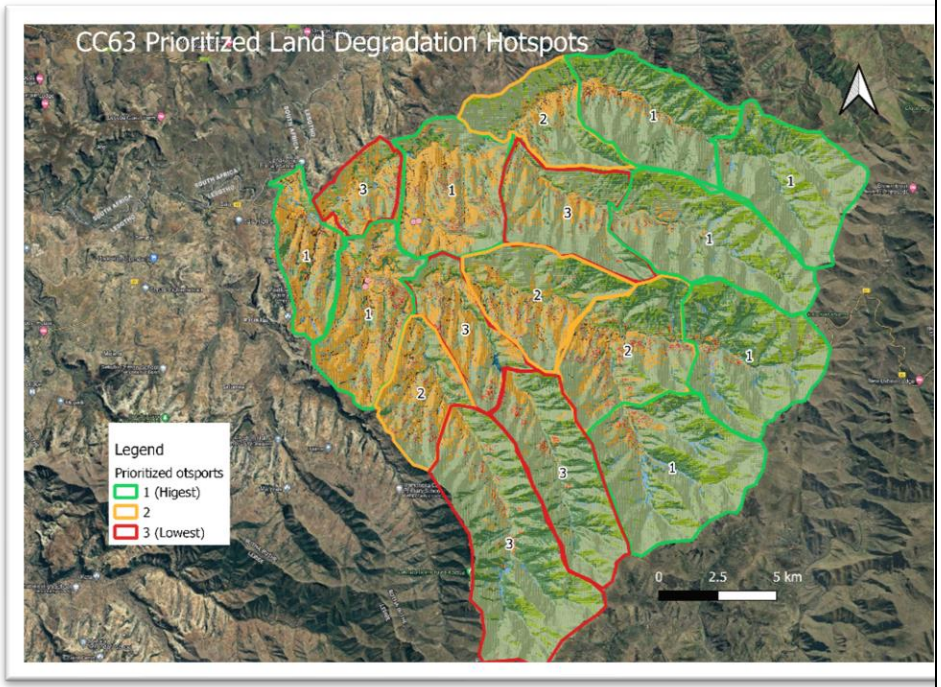


Figure 61:CC65 prioritized degradation hotspots

Discussion:

CC63 sub-catchment mostly overwhelmed by three major forms of degradation. The western part shows tremendous gully and bare surface gain which affect the croplands (figure 56). It also on these regions that we see low soil organic carbon levels (figure59). The eastern part, which is mainly rangelands, shows low productivity state (figure 58) and some loss in grassland to shrubland. Figure 60 and 61 shows degradation hotspots identified and prioritized in cognisant of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 10 CC63 hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	CC63	Gullies and brush	1	1334.213
2	CC63	Gullies and brush	1	2177.779
3	CC63	Gullies and brush	3	943.757
4	CC63	Gullies and brush	1	2323.612
5	CC63	Low productivity state, gullies, and brush	3	2053.786
6	CC63	Gullies and brush	3	1504.983
7	CC63	Low productivity state, gullies, and brush	2	2067.581
8	CC63	Low productivity state, gullies, and brush	2	2510.295
9	CC63	Gullies and brush	2	1460.754
10	CC63	Low productivity state, gullies, and brush	2	1632.194
11	CC63	Low productivity state, gullies, and brush	1	2518.142
12	CC63	Low productivity state and brush	1	2523.141
13	CC63	Low productivity state and brush	1	2931.992
14	CC63	Low productivity state and brush	1	2806.682
15	CC63	Low productivity state and brush	1	3350.237
16	CC63	Low productivity state and brush	3	2561.385
17	CC63	Low productivity state and brush	3	4136.339

Sub-catchment: SC3

Major forms of degradation (In order of severity)

1. Land cover change: grassland loss to shrubland

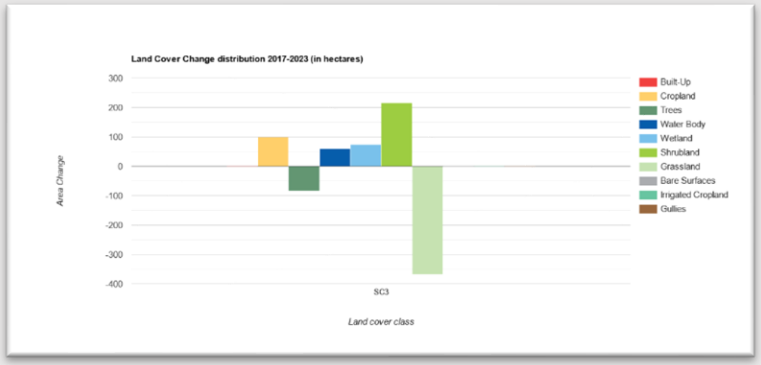


Figure 62:SC3 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

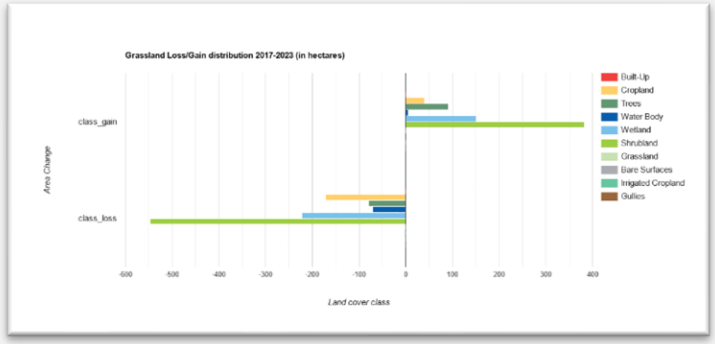


Figure 63:SC3 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Productivity: Low productivity state

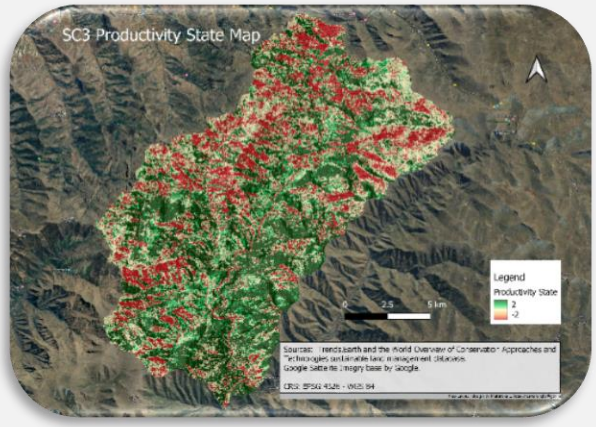


Figure 64:SC3 productivity state map

3. Land cover change: Trees loss

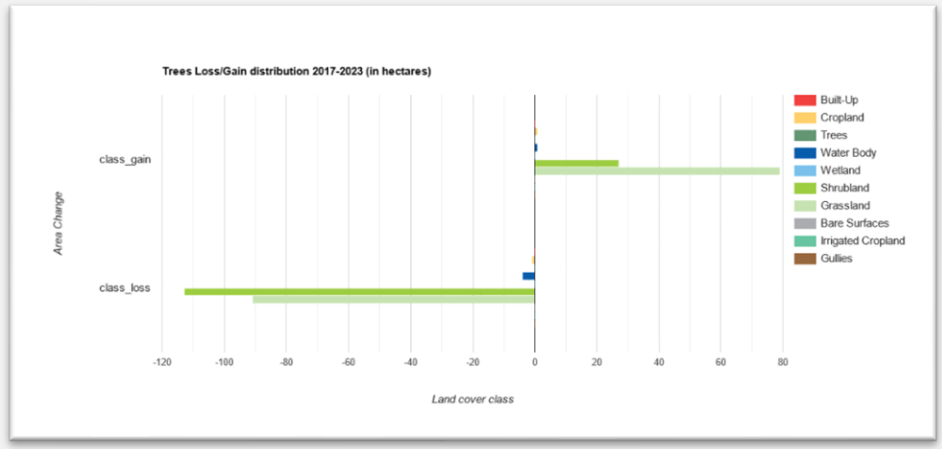


Figure 65:SC3 trees loss/gain (ReNoka Data Reference Group DRG, 2023)

Areas affected (hotspots map)

Degradation hotspots

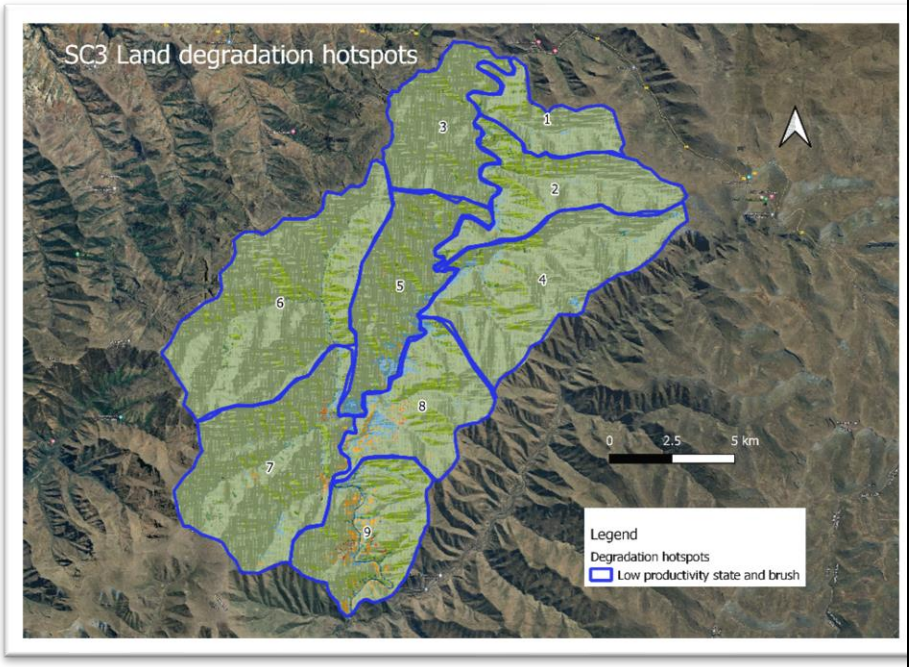


Figure 66:SC3 land degradation hotspots

Prioritized hotspots

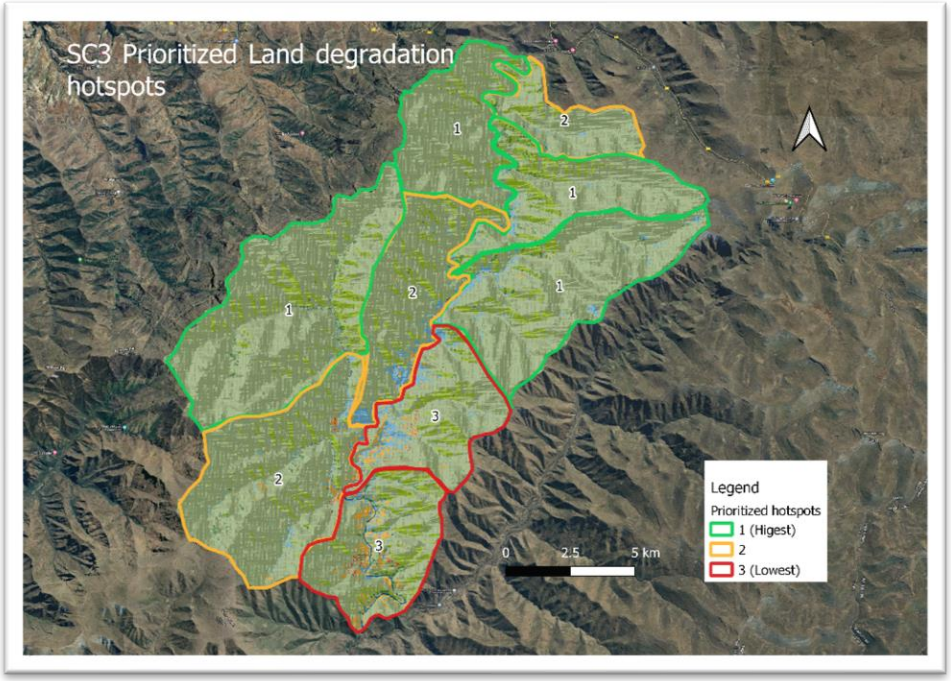


Figure 67:SC3 prioritized degradation hotspots.

Discussion:

SC3 is endangered by two major forms of degradation, which are encroachment of shrubs into grassland (figure 62 and 63) and low productivity state of the rangelands (figure 64). There is also loss in tree cover, which is mainly to shrubland and grassland (figure 65). Figure 66 and 67 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion, low organic carbon	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 11 SC3 Hotspots

ID	SC_ID	Indicators	priority	Area (Ha)
1	SC3	Low productivity state and brush	2	1115.836
2	SC3	Low productivity state and brush	1	2129.222
3	SC3	Low productivity state and brush	1	2063.048
4	SC3	Low productivity state and brush	1	3411.454
5	SC3	Low productivity state and brush	2	2249.324
6	SC3	Low productivity state and brush	1	4594.835
7	SC3	Low productivity state and brush	2	3746.204
8	SC3	Low productivity state and brush	3	2063.68
9	SC3	Low productivity state and brush	3	2257.794

District: Leribe

Sub-catchment: CC6

Major forms of degradation (In order of severity)

1. Land cover change: Gully gain

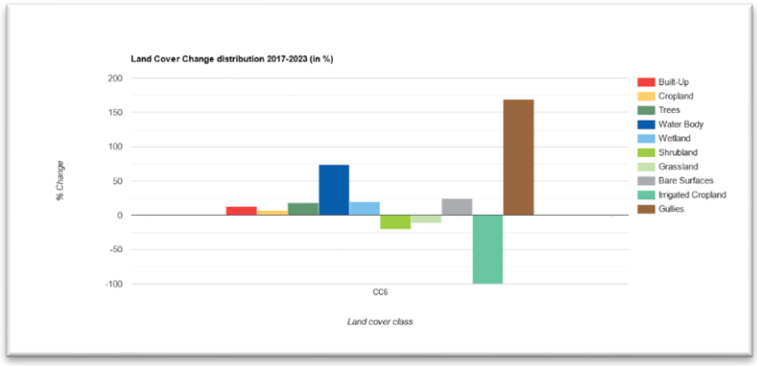


Figure 68:CC6 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

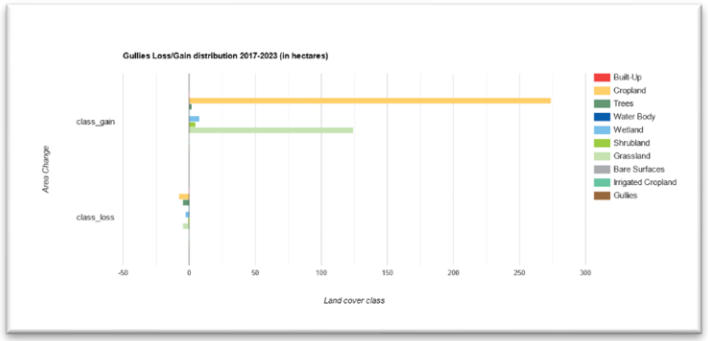


Figure 69:CC6 gullies loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Soil Organic Carbon: Low soil organic carbon

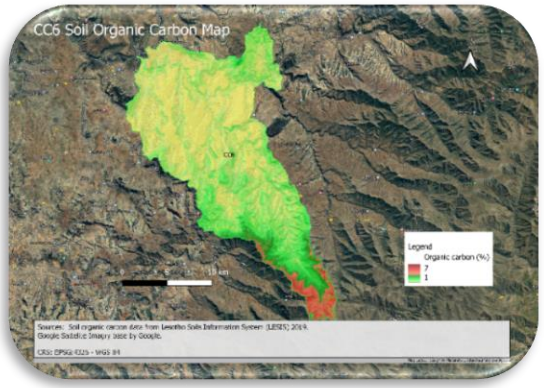


Figure 70:CC6 soil organic carbon map (LESIS, 2019)

3. Productivity: Low productivity state

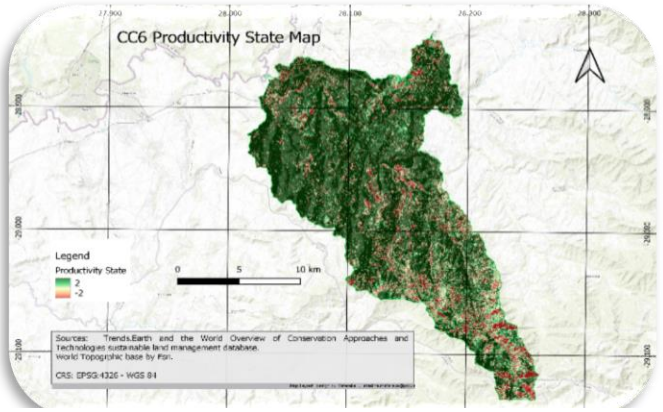


Figure 71:CC6 productivity state map

Areas affected (hotspots map)

Degradation hotspots

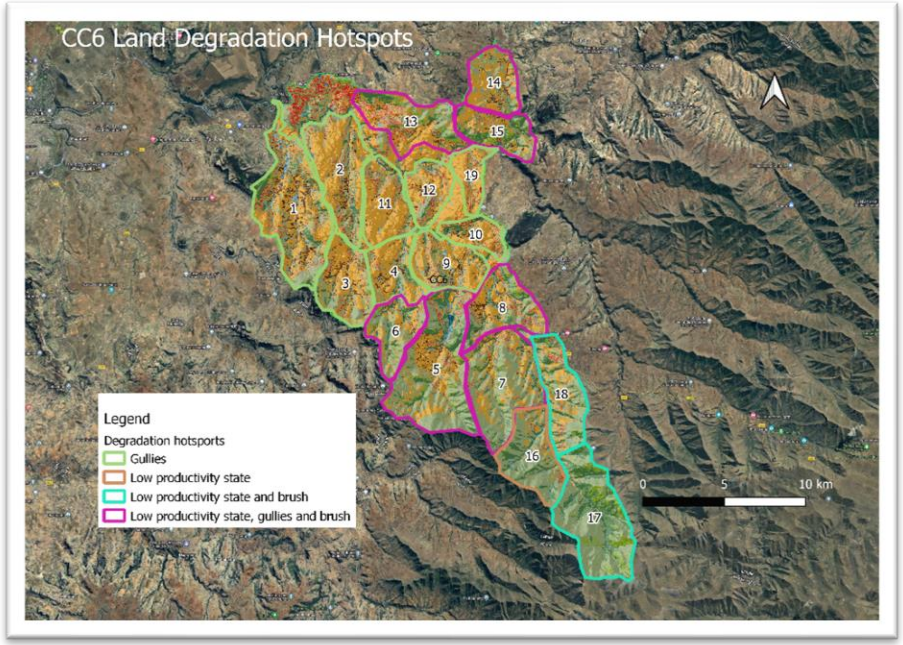


Figure 72:CC6 land degradation hotspots

Prioritized hotspots

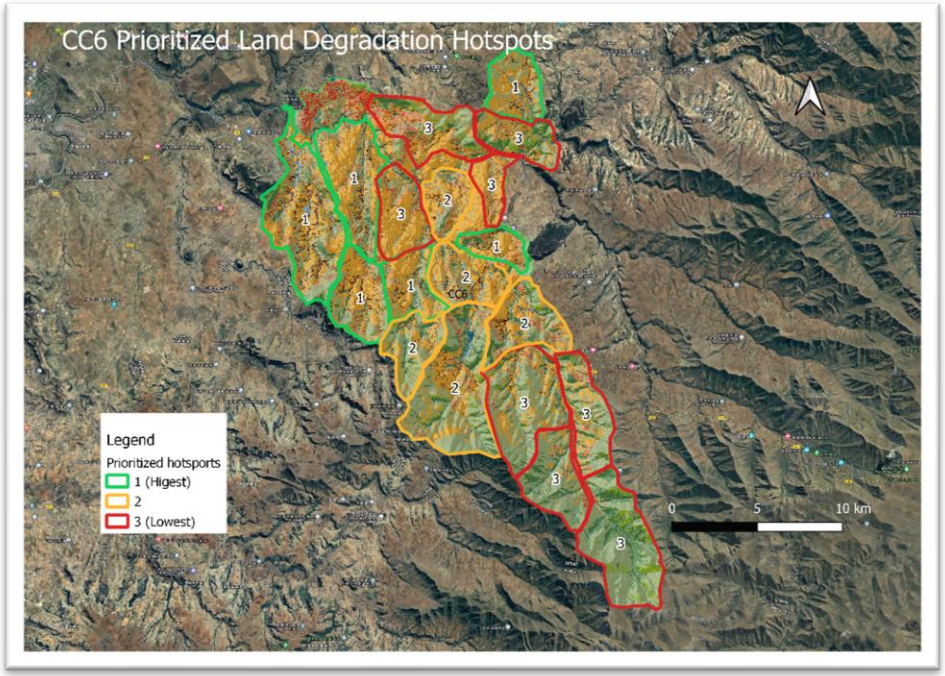


Figure 73: CC6 prioritized degradation hotspots.

Discussion:

The major forms of degradation in CC6 are Gullies and bare surface gain which mostly affect the croplands (figure 68 and 69) and low levels of soil organic carbon (figure 70). There is also low productivity state on the rangeland part of the catchment (figure 71). Figure 72 and 73 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 12 CC6 Hotspots

ID	SC_ID	Indicators	Priority	Area (Ha)
1	CC6	Gullies	1	2985.176
2	CC6	Gullies	1	2002.232
3	CC6	Gullies	1	1396.672
4	CC6	Gullies	3	1060.626
5	CC6	Low productivity state, gullies, and brush	3	3210.239
6	CC6	Low productivity state, gullies, and brush	3	1105.096
7	CC6	Low productivity state, gullies, and brush	3	2452.205
8	CC6	Low productivity state, gullies, and brush	2	1459.152
9	CC6	Gullies	2	1255.509
10	CC6	Gullies	1	633.722
11	CC6	Gullies	3	1300.435
12	CC6	Gullies	2	869.526
13	CC6	Low productivity state, gullies, and brush	4	1682.899
14	CC6	Low productivity state, gullies, and brush	2	1083.054
15	CC6	Low productivity state, gullies, and brush	4	1057.619
16	CC6	Low productivity state	3	1505.033
17	CC6	Low productivity state and brush	3	2598.24
18	CC6	Low productivity state and brush	3	1442.612
19	CC6	Gullies	4	622.6

Sub-catchment: CC9

Major forms of degradation (In order of severity)

1. Land cover change: Shrubland encroachment into grassland

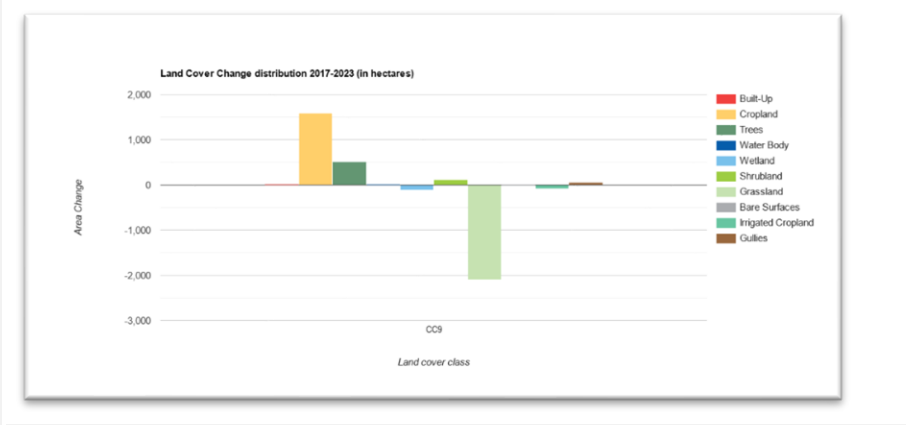


Figure 74:CC9 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

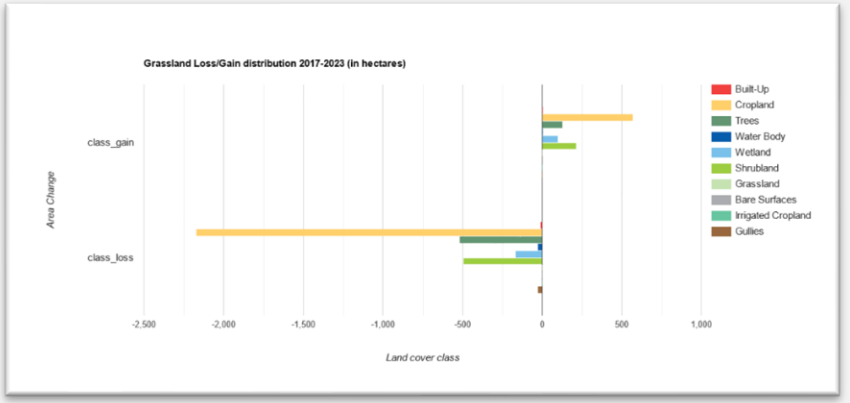


Figure 75:CC9 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Soil organic carbon: low soil organic carbon

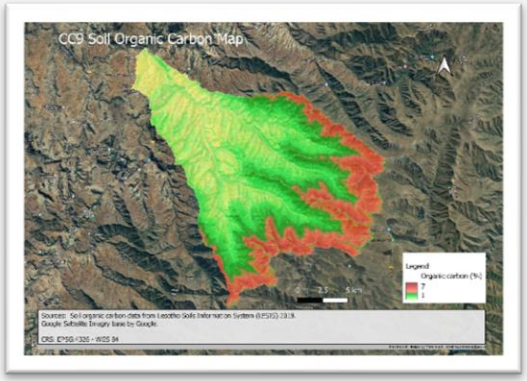


Figure 76:CC9 soil organic carbon (LESIS, 2019)

3. Land cover change: Gully gain

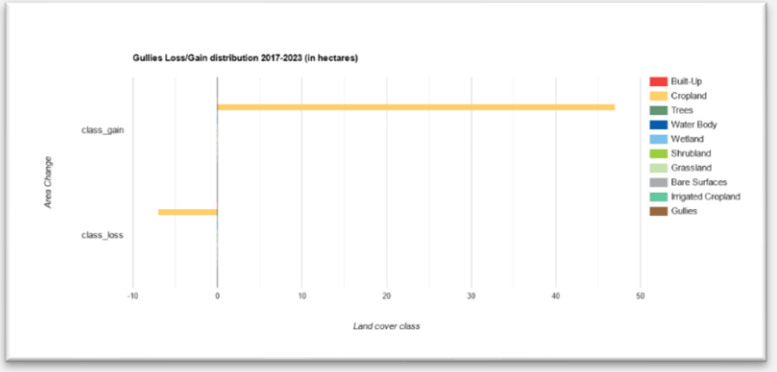


Figure 77:CC9 gullies loss/gain (ReNoka Data Reference Group DRG, 2023)

Areas affected (hotspots map)

Degradation hotspots

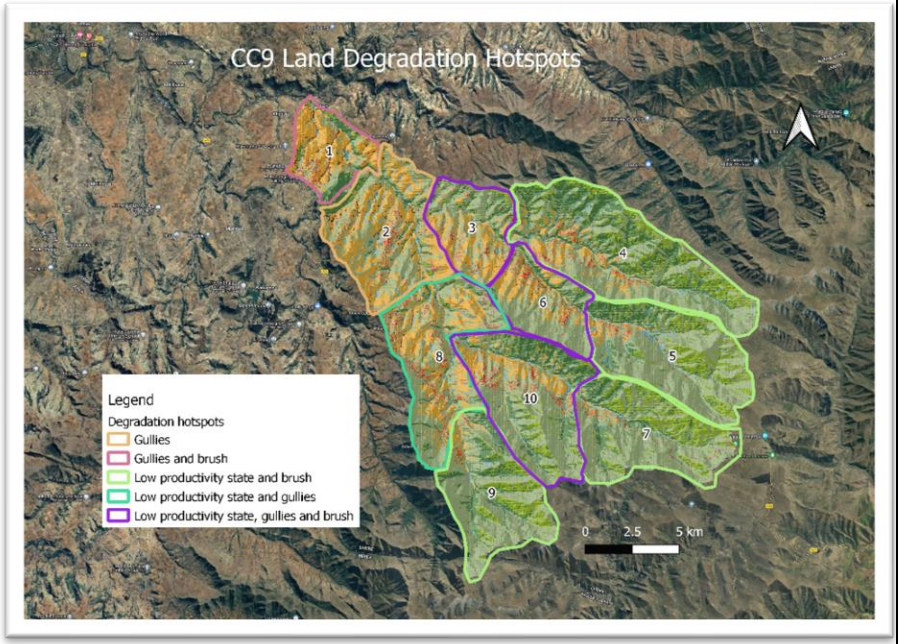


Figure 78:CC9 land degradation hotspots

Prioritized hotspots

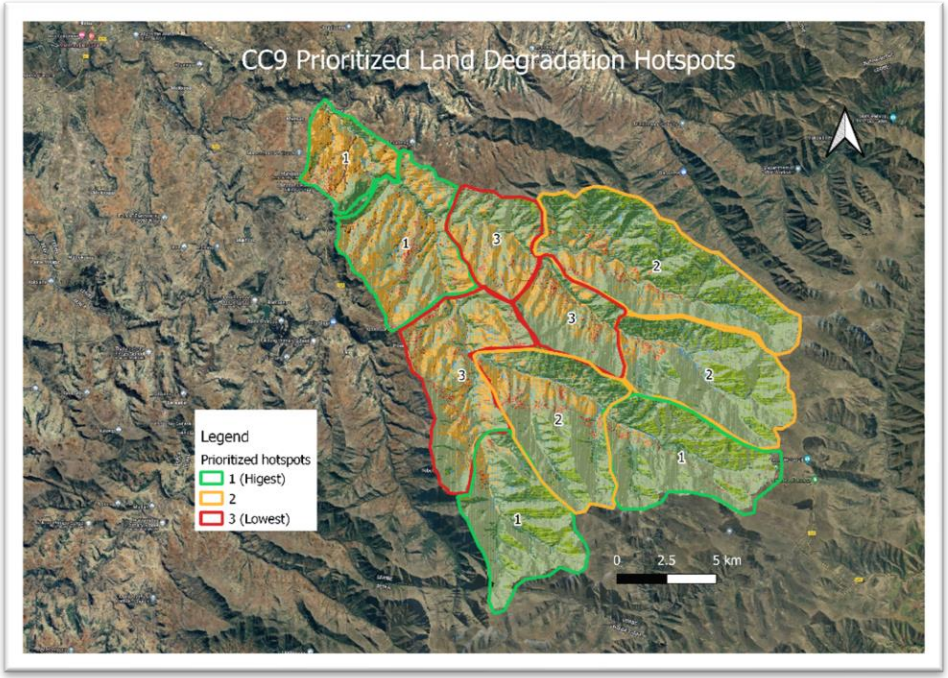


Figure 79:CC9 prioritized degradation hotspots.

Discussion:

The major forms of degradation in CC9 are shrubland encroachment into grassland (figure 74 and 75), Low soil organic carbon levels especially on the croplands (figure 76) and the gully gain at the expense of croplands (figure 77). There is also low productivity state on the rangelands. Figure 78 and 79 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 13 CC9 Hotspots

ID	SC_*ID*	Indicators	Priority	Area (Ha)
1	CC9	Gullies and brush	1	1596.837
2	CC9	Gullies	1	3474.483
3	CC9	Low productivity state, gullies, and brush	3	1927.916
4	CC9	Low productivity state and brush	2	5192.488
5	CC9	Low productivity state and brush	2	3783.678
6	CC9	Low productivity state, gullies, and brush	3	1907.013
7	CC9	Low productivity state and brush	1	3483.955
8	CC9	Low productivity state and gullies	3	3479.858
9	CC9	Low productivity state and brush	1	3198.626
10	CC9	Low productivity state, gullies, and brush	2	3752.174

Sub-catchment: SC11

Major forms of degradation (In order of severity)

1. Land cover change: Shrubland encroachment into grassland

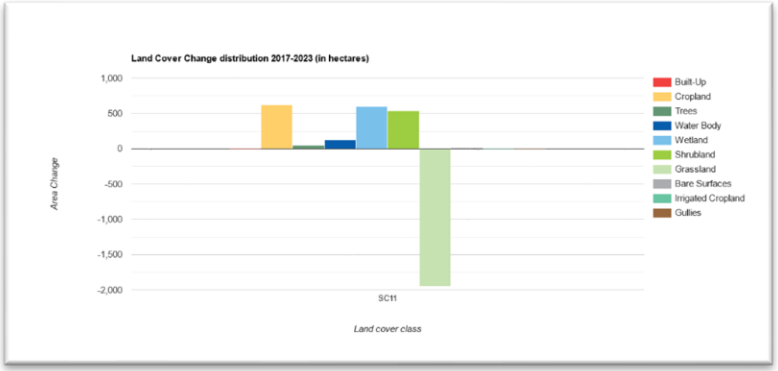


Figure 80:SC11 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

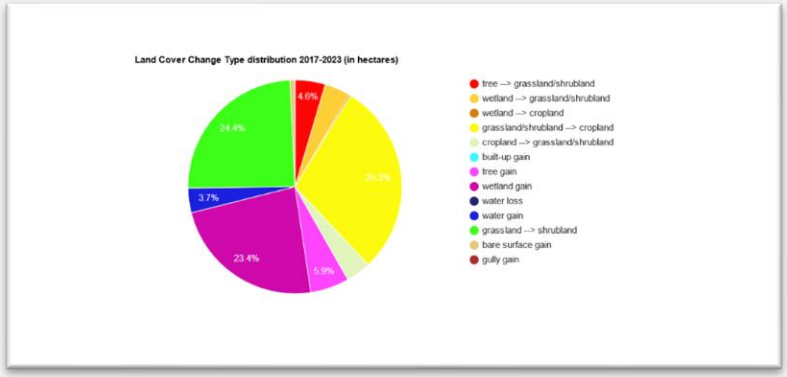


Figure 81:SC11 land cover change distribution type (ReNoka Data Reference Group DRG, 2023)

2. Productivity: Low productivity state

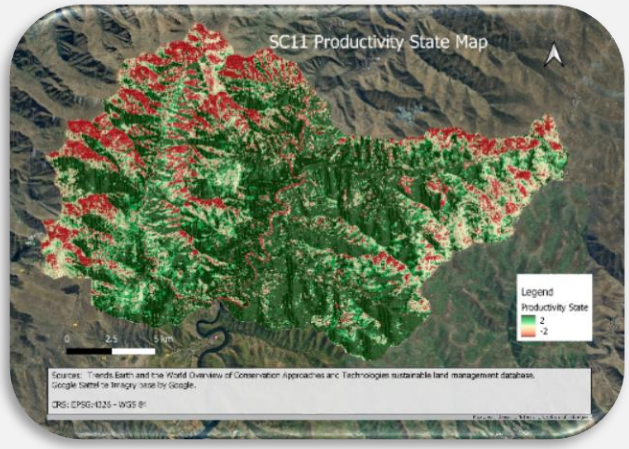


Figure 82:SC11 productivity state map

Areas affected (hotspots map)

Degradation hotspots

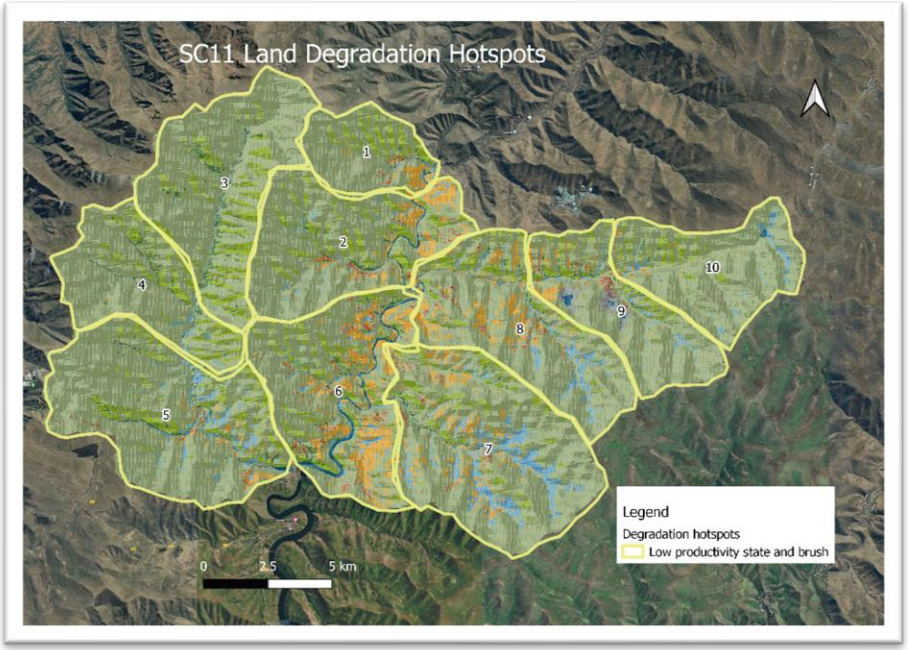


Figure 83:SC11 land degradation hotspots

Prioritized hotspots

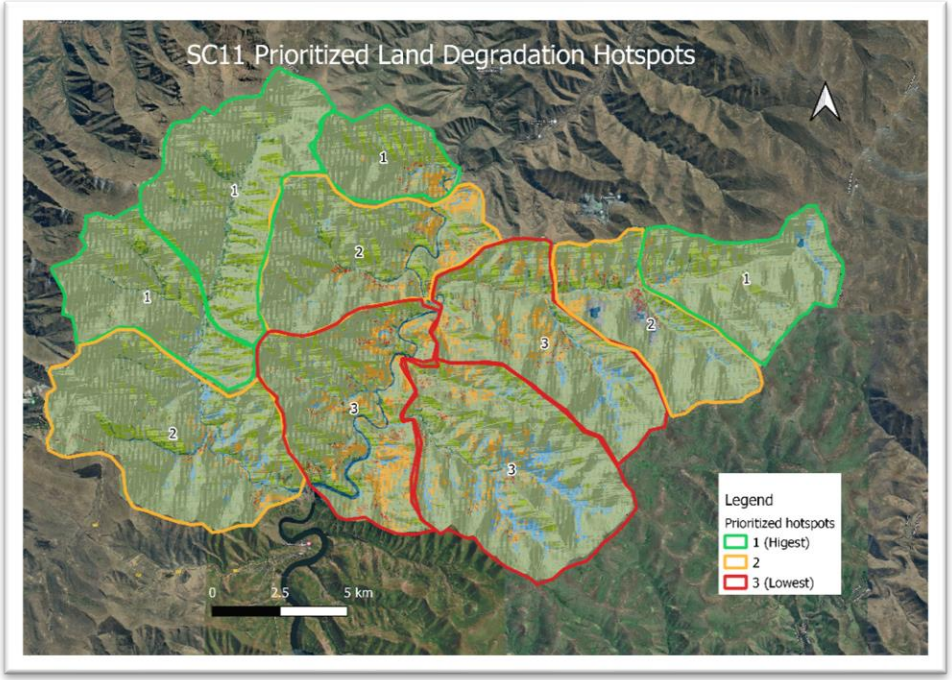


Figure 84:SC11 prioritized degradation hotspots.

Discussion:

This sub-catchment has two major forms of degradation. The loss of grassland into shrubland is the first form in terms of severity (figure 80 and 81). We see about 2000 Ha loss of grassland. The other form of degradation is the low productivity state of the rangelands (figure 82). Figure 83 and 84 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion, low organic carbon,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 14 SC11 Hotspots

ID	SC_*ID*	Indicators	Priority	Area (Ha)
1	SC11	Low productivity state and brush	1	1379.593
2	SC11	Low productivity state and brush	2	3351.537
3	SC11	Low productivity state and brush	1	3661.59
4	SC11	Low productivity state and brush	1	2404.522
5	SC11	Low productivity state and brush	2	4432.771
6	SC11	Low productivity state and brush	3	3733.022
7	SC11	Low productivity state and brush	3	4644.204
8	SC11	Low productivity state and brush	3	3350.973
9	SC11	Low productivity state and brush	2	2319.62
10	SC11	Low productivity state and brush	1	2442.059

Sub-catchment: SC17

Major forms of degradation (In order of severity)

1. Land cover change: Shrubland encroachment into grassland

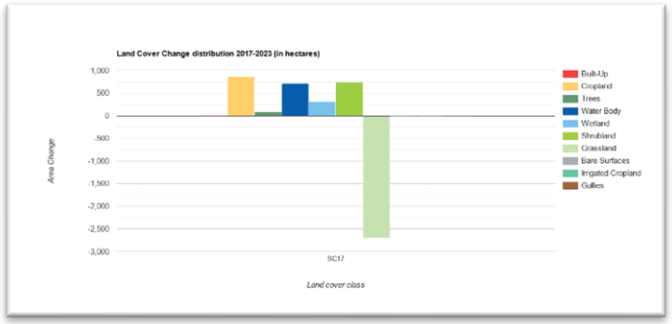


Figure 85:SC17 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

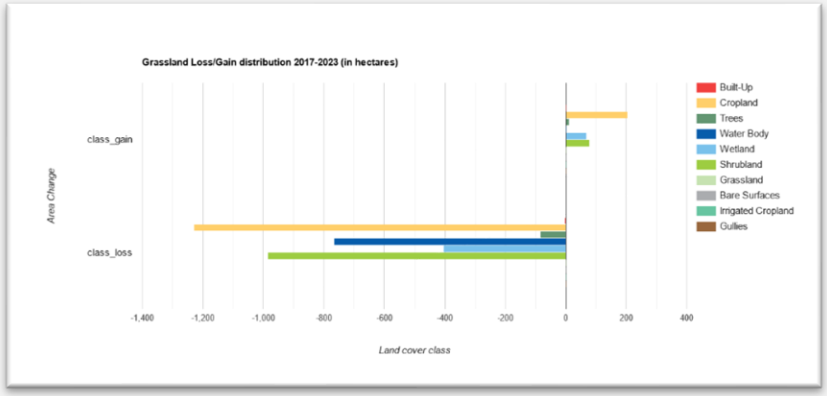


Figure 86:SC17 grassland los/gain (ReNoka Data Reference Group DRG, 2023)

2. Productivity: Low productivity state

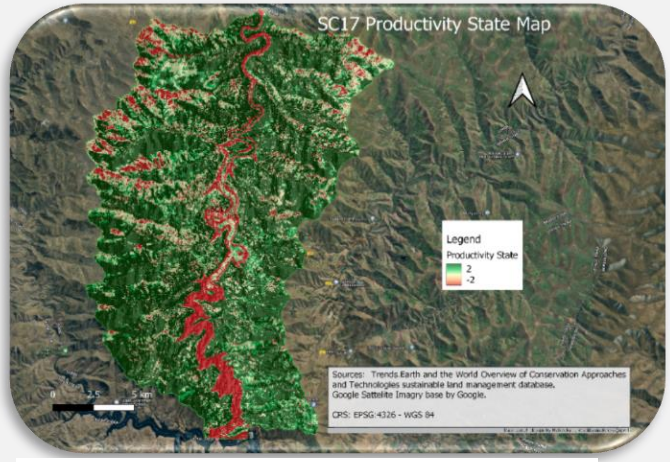


Figure 87:SC17 productivity state map

Areas affected (hotspots map)

Degradation hotspots

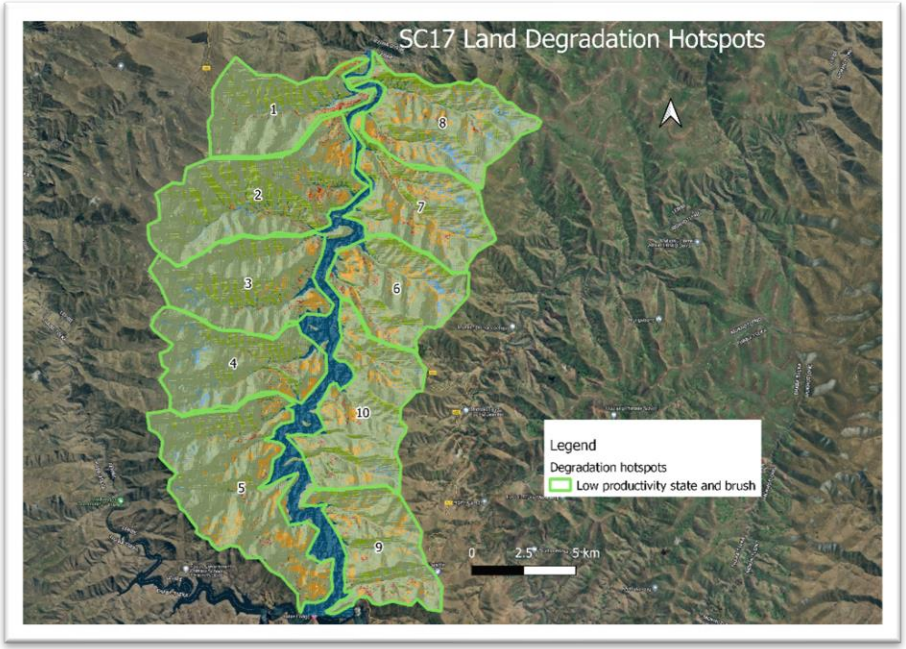


Figure 88:SC17 land degradation hotspots

Prioritized hotspots

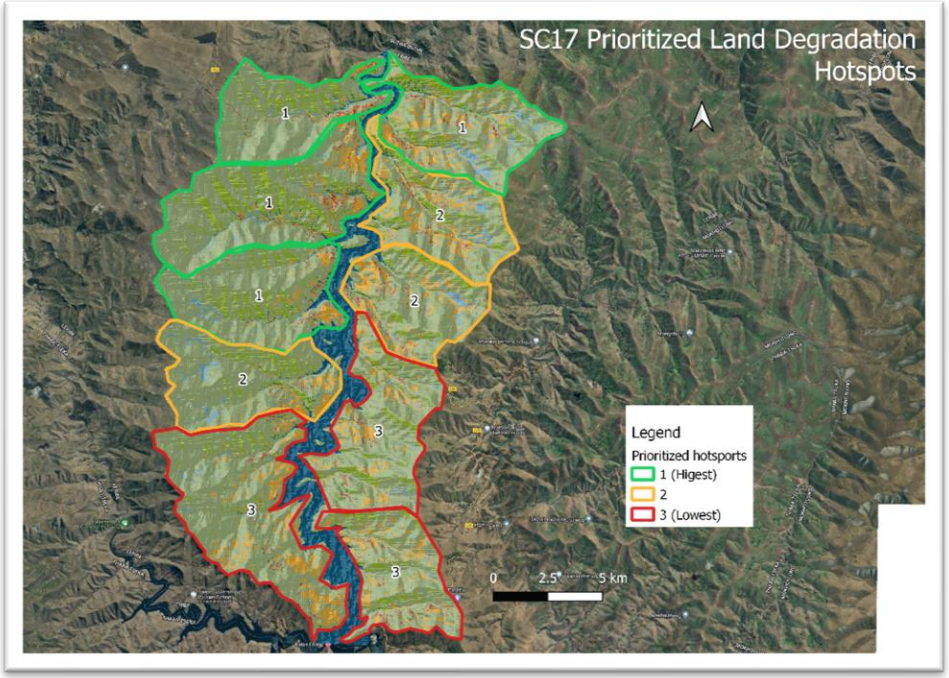


Figure 89: SC17 prioritized degradation hotspots.

Discussion:

This sub-catchment has two major forms of degradation. The loss of grassland into shrubland is the first form in terms of severity (figure 85 and 86). We see about 2000 Ha loss of grassland. The other form of degradation is the low productivity state of the rangelands (figure 87). Figure 88 and 89 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (livestock), Water Affairs, Environment, Local government, Herders, Grazing Associations, Initiation schools, Local Communities.

Table 15 SC17 Hotspots

ID	SC_*ID*	Indicators	Priority	Area (Ha)
1	SC17	Low productivity state and brush	1	2272.368
2	SC17	Low productivity state and brush	1	3922.185
3	SC17	Low productivity state and brush	1	2968.711
4	SC17	Low productivity state and brush	2	2754.621
5	SC17	Low productivity state and brush	3	4359.017
6	SC17	Low productivity state and brush	2	2338.265
7	SC17	Low productivity state and brush	2	2495.415
8	SC17	Low productivity state and brush	1	2891.403
9	SC17	Low productivity state and brush	3	2363.52
10	SC17	Low productivity state and brush	3	3070.828

District: Berea

Sub-catchment: CC13

Major forms of degradation (In order of severity)

1. Land cover change: Gully gain

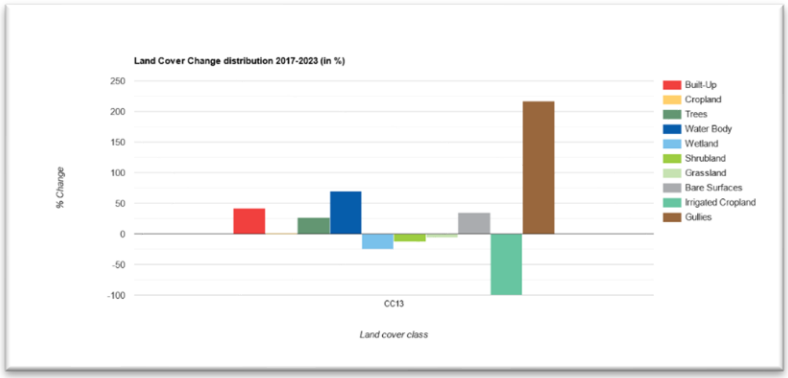


Figure 90: CC13 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

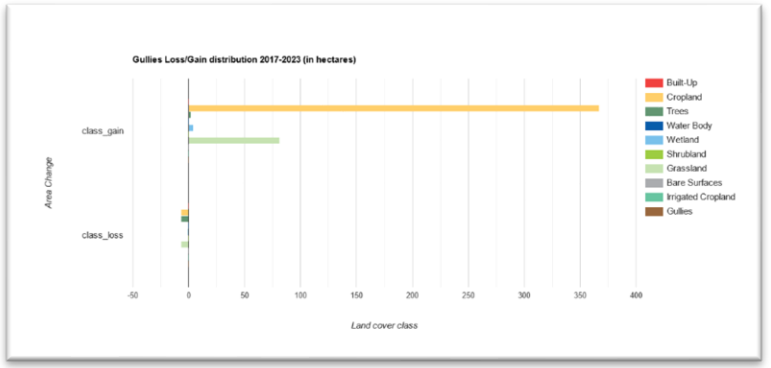


Figure 91:CC13 gullies loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Land cover change: Shrubland encroachment into grassland

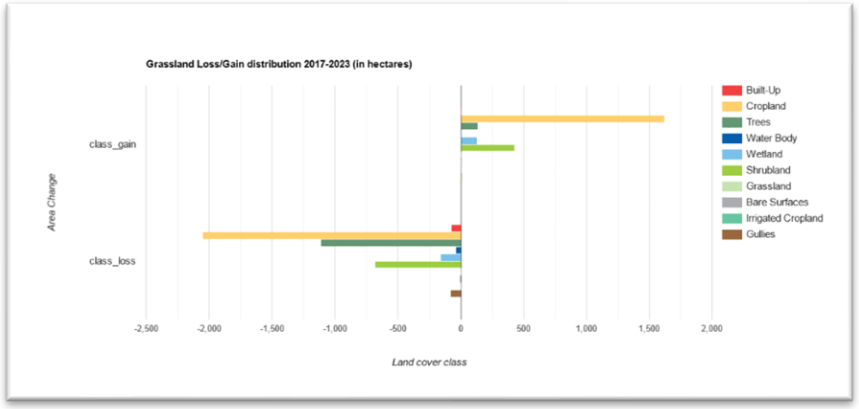


Figure 92:CC13 grassland loss/gain (ReNoka Data Reference Group DRG, 2023)

3. Soil Organic Carbon: Low soil organic carbon

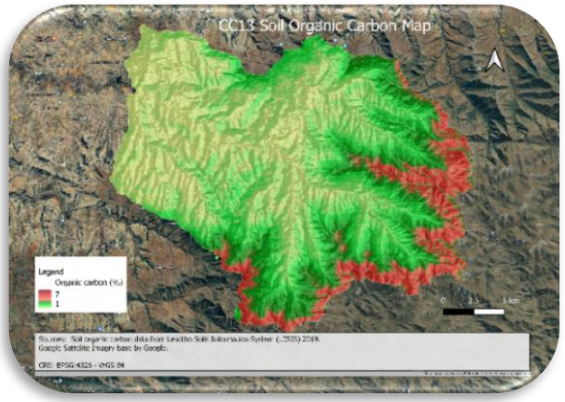


Figure 93:CC13 soil organic carbon map (LESIS, 2019)

Areas affected (hotspots map)	
Degradation hotspots	Prioritized hotspots

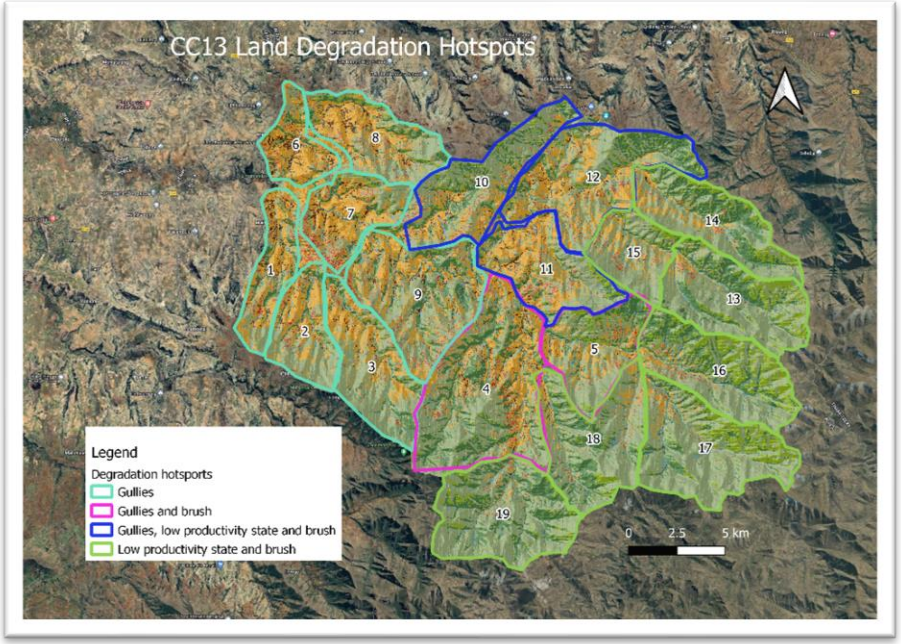


Figure 94:CC13 land degradation hotspots

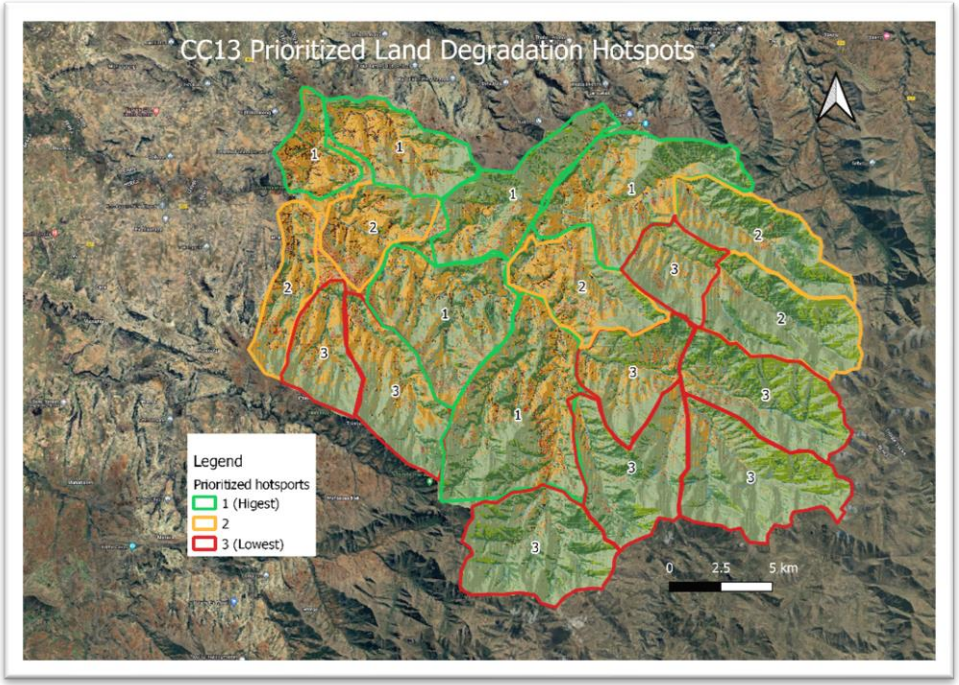


Figure 95:CC13 prioritized degradation hotspots.

Discussion:

CC13 has three major forms of degradation; gully and bare surface gain over the croplands and some grasslands (figure 90 and 91), loss of grassland to shrubland (figure 92) and Low levels of soil organic carbon which mostly affects the croplands (figure 93). The other form of degradation which affects the rangelands is the low productivity state. Figure 94 and 95 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.

Table 16 CC13 Hotspots

ID	SC_*ID*	Indicators	Priority	Area (Ha)
1	CC13	Gullies	2	1447.698
2	CC13	Gullies	3	1556.658
3	CC13	Gullies	3	2422.575
4	CC13	Gullies and brush	1	4803.816
5	CC13	Gullies and brush	3	2086.825
6	CC13	Gullies	1	1144.373
7	CC13	Gullies	2	1731.61
8	CC13	Gullies	1	2128.768
9	CC13	Gullies	1	3378.053
10	CC13	Gullies, low productivity state and brush	1	2562.875
11	CC13	Gullies, low productivity state and brush	2	2267.863
12	CC13	Gullies, low productivity state and brush	1	3457.704
13	CC13	Low productivity state and brush	2	2830.672
14	CC13	Low productivity state and brush	2	2427.027
15	CC13	Low productivity state and brush	3	1473.018
16	CC13	Low productivity state and brush	3	2888.916
17	CC13	Low productivity state and brush	3	3378.555
18	CC13	Low productivity state and brush	3	2929.981
19	CC13	Low productivity state and brush	3	3203.53

Sub-catchment: CC23

Major forms of degradation (In order of severity)

1. Land cover change: Gully gain

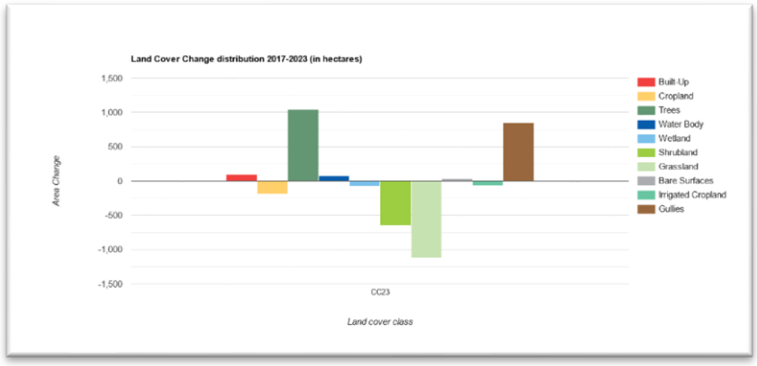


Figure 96:CC23 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

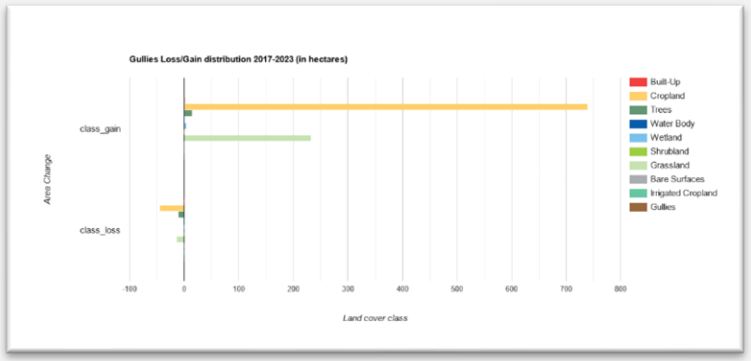


Figure 97:CC23 gullies loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Soil Organic Carbon: Low soil organic carbon

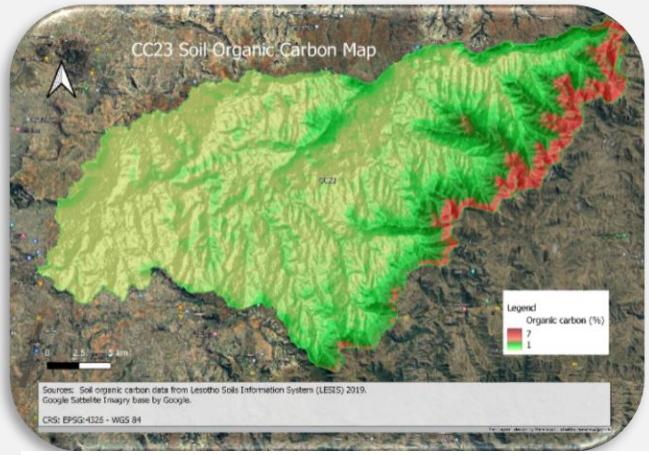


Figure 98:CC23 soil organic carbon map

3. Productivity: Low productivity state

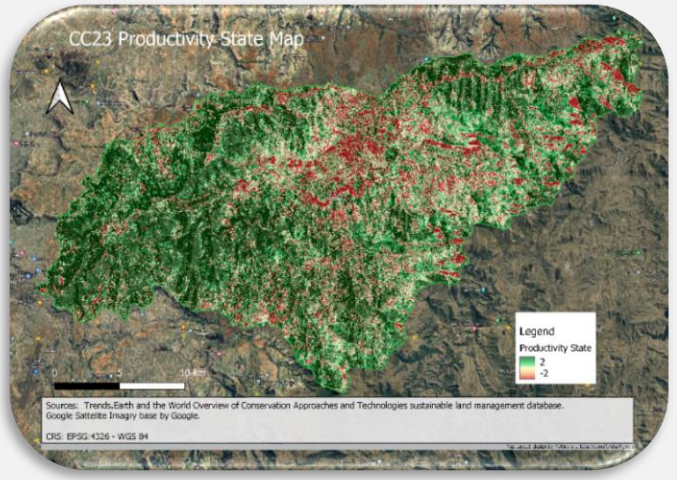


Figure 99:CC23 productivity state map

Areas affected (hotspots map)

Degradation hotspots

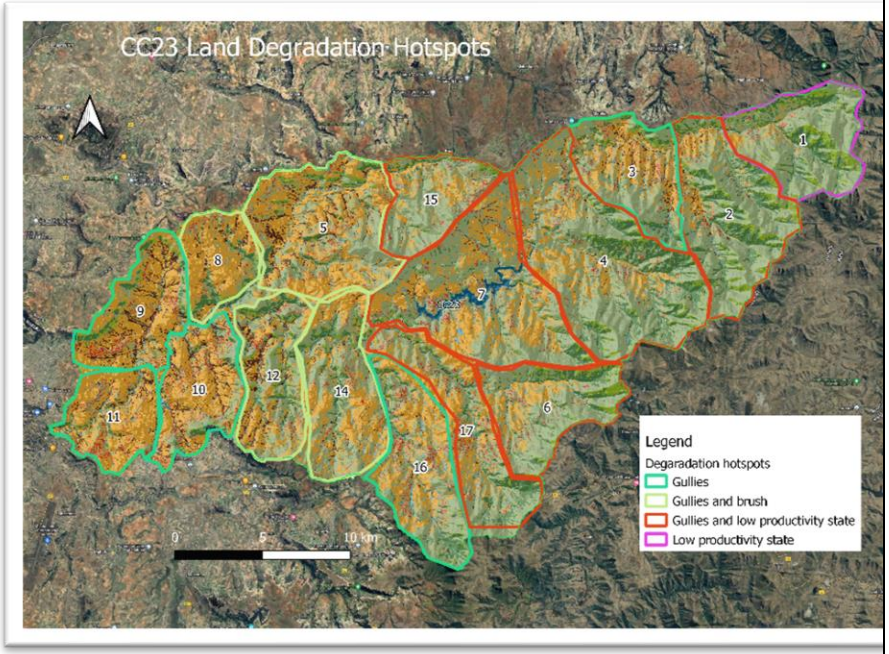


Figure 100:CC23 land degradation hotspots

Prioritized hotspots

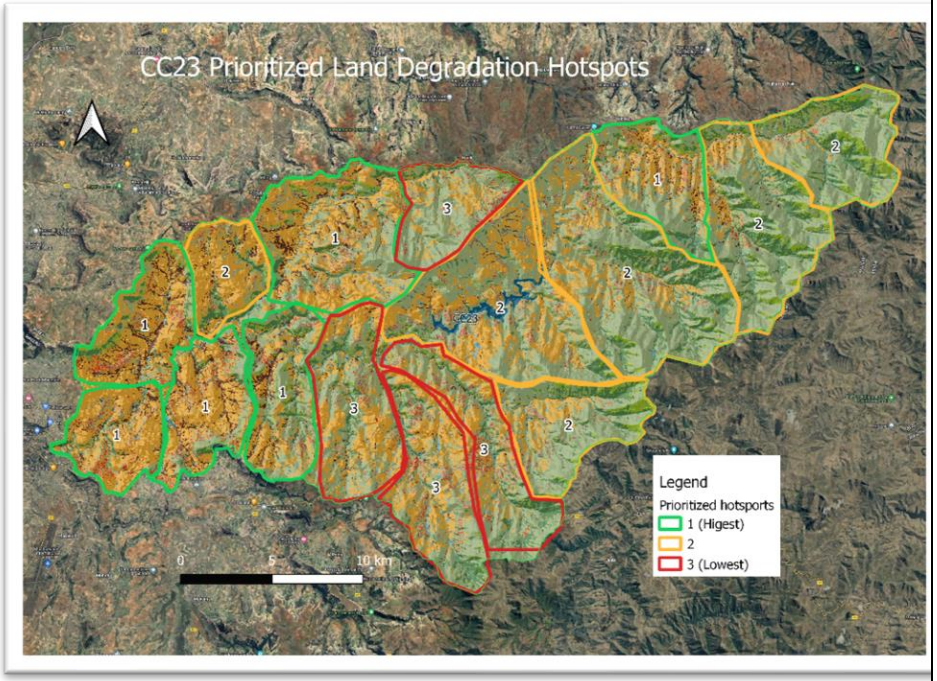


Figure 101:CC23 prioritized degradation hotspots.

Discussion:

The major forms of degradation in CC23 are gully gain at the expense of cropland and some grassland (figure 96 and 97), low levels of soil organic carbon (figure 98) and low productivity state (figure 99). Figure 100 and 101 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.			
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments	
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Initiation schools, Mining, Local Communities.	

Table 17 CC23 Hotspots

ID	SC_*ID*	Indicators	Priority	Area (Ha)
1	CC23	Low productivity state	2	3704.661
2	CC23	Gullies and low productivity state	2	5042.485
3	CC23	Gullies	1	3210.223
4	CC23	Gullies and low productivity state	2	7943.629
6	CC23	Gullies and low productivity state	2	3396.547
7	CC23	Gullies and low productivity state	2	6832.015
5	CC23	Gullies and brush	1	5450.981
8	CC23	Gullies and brush	2	2043.319
9	CC23	Gullies	1	3240.114
11	CC23	Gullies	1	2553.276
10	CC23	Gullies	1	3067.457
12	CC23	Gullies and brush	1	3233.603
14	CC23	Gullies and brush	3	3944.979
15	CC23	Gullies and low productivity state	3	2566.112
16	SC23	Gullies	3	3984.21
17	SC23	Gullies and low productivity state	3	3570.633

Sub-catchment: CC60

Major forms of degradation (In order of severity)

1. Land cover change: Gullies and bare surface gain

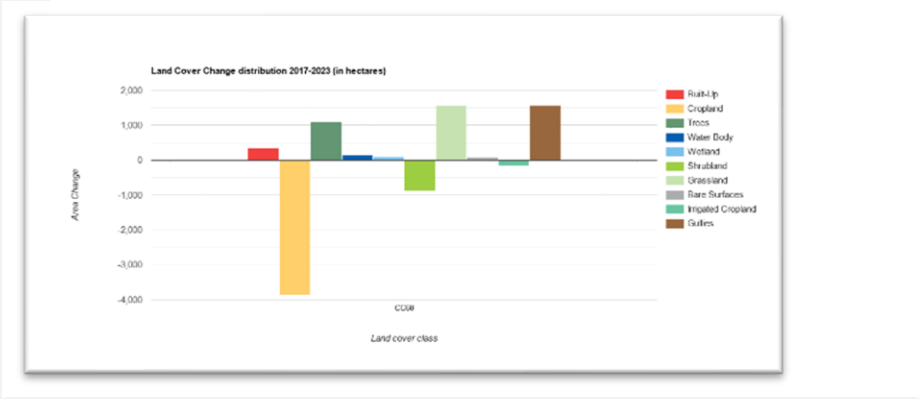


Figure 102:CC60 2017-2023 land cover change distribution (ReNoka Data Reference Group DRG, 2023)

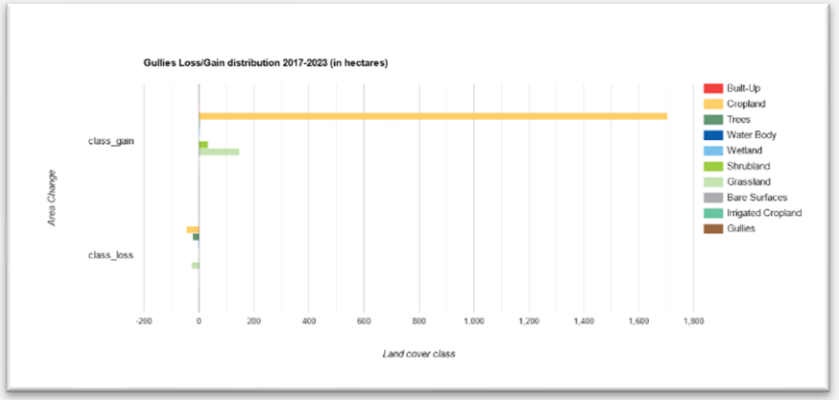


Figure 103:CC60 gullies loss/gain (ReNoka Data Reference Group DRG, 2023)

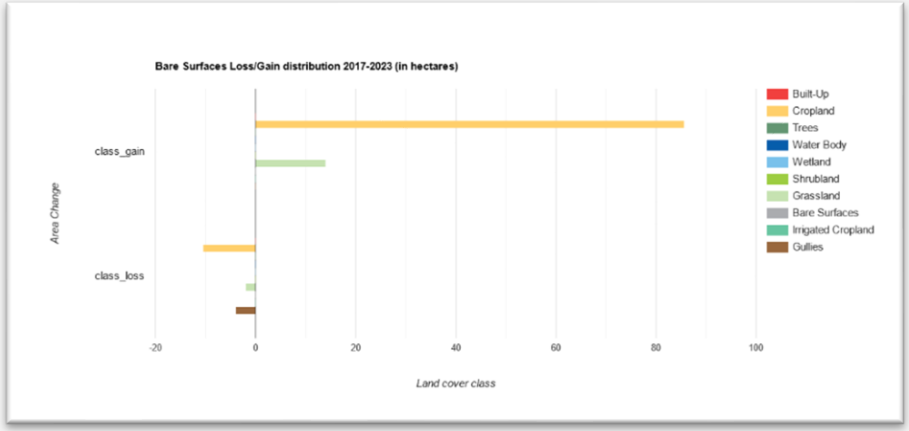


Figure 104:CC60 bare surface loss/gain (ReNoka Data Reference Group DRG, 2023)

2. Soil Organic Carbon: Low soil organic carbon

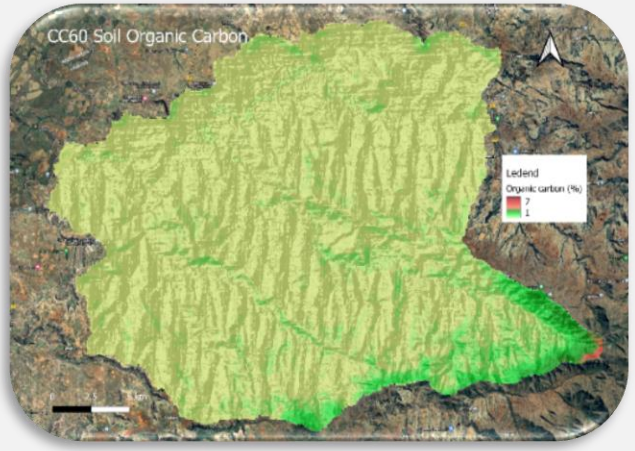


Figure 105: CC60 soil organic carbon map (LESIS, 2019)

Areas affected (hotspots map)

Degradation hotspots

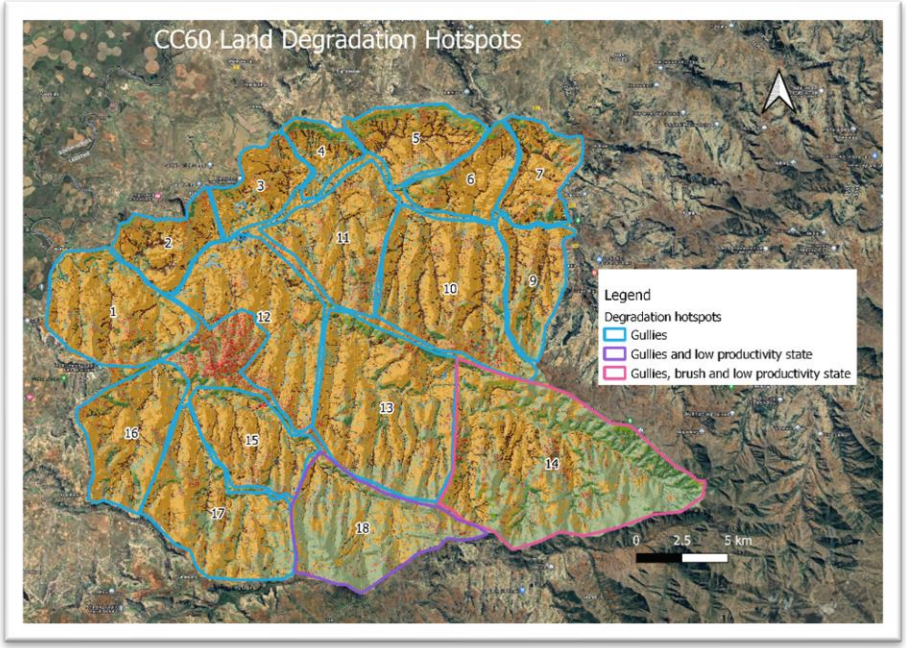


Figure 106:CC60 land degradation hotspots

Prioritized hotspots

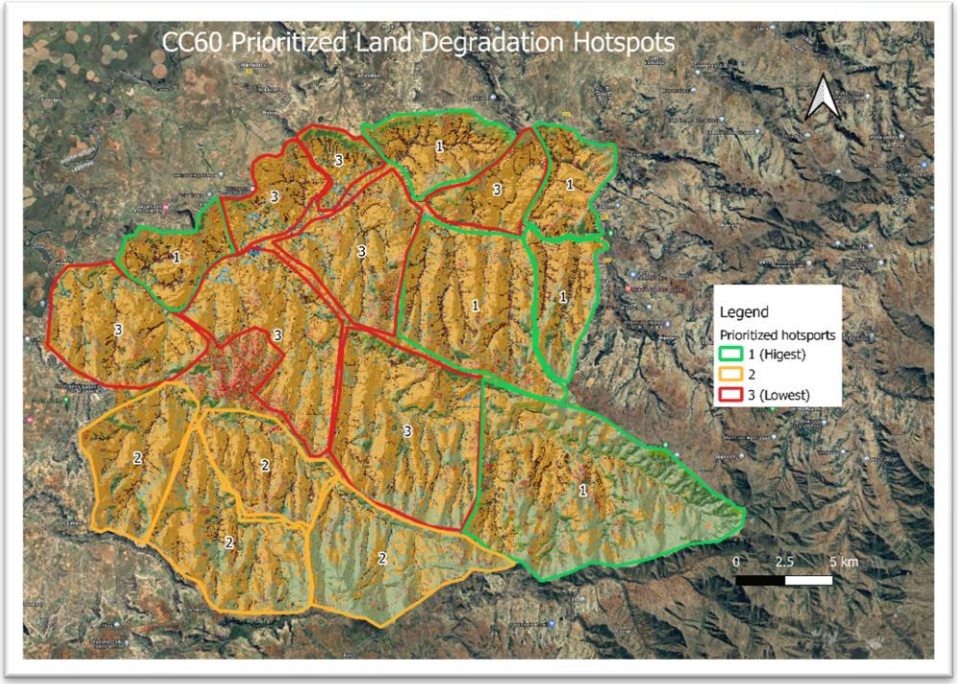


Figure 107:CC60 prioritized degradation hotspots.

Discussion:

CC60 sub-catchment is overwhelmed by two major forms of degradation; Gullies and bare surface gain which result in a very large loss of cropland (figure 102,103 and 104) and the very low levels of soil organic carbon (figure 105). Figure 106 and 107 shows degradation hotspots identified and prioritized in consideration of stated degradation indicators.

Land degradation indicators for each hotspot and stakeholders.		
Area	Degradation Indicators (plus any other indicators)	Stakeholders/departments
all	Gully Gain, Bare surface gain, low organic carbon, soil loss, Low productivity, invasive species encroachment, Reduced species composition (Fauna and Flora), Wetland depletion,	Local Authorities, Farmers, Forestry, Soil and Water Conservation, Range, Agriculture (Crops, livestock), Water Affairs, Environment, Rural Roads, Local government, Herders, Grazing Associations, Local Communities.

Table 18 CC60 Hotspots

ID	SC_*ID*	Indicators	Priority	Area (Ha)
1	CC60	Gullies	3	3660.095
2	CC60	Gullies	1	1760.061
3	CC60	Gullies	3	1657.558
4	CC60	Gullies	3	985.487
5	CC60	Gullies	1	2127.654
6	CC60	Gullies	3	1720.262
7	CC60	Gullies	1	1791.954
9	CC60	Gullies	1	1971.64
10	CC60	Gullies	1	4967.867
11	CC60	Gullies	3	3291.114
12	CC60	Gullies	3	4339.583
13	CC60	Gullies	3	6004.67
14	CC60	Gullies, brush, and low productivity state	1	8788.044
15	CC60	Gullies	2	2547.411
16	CC60	Gullies	2	3031.972
17	CC60	Gullies	2	4255.36
18	CC60	Gullies and low productivity state	2	4148.093

Recommendations and way forward.

The identified land degradation hotspots comprise of different indicators which call for different departments or stakeholders for integrated interrogation, planning as well as monitoring of interventions to be implemented. This is the last stage of the guiding tool on identification and prioritization of land degradation hotspots on ICM sub-catchments. The report states degradation indicators against each hotspot, and it is by considering those indicators that relevant stakeholders shall be engaged. The stakeholders will then come together to develop concept notes for further assessment of the degradation indicators. Amongst the outputs of the assessment, shall be the status of the areas in question (hotspots) before implementation of interventions, recommendations on interventions for rehabilitation and interventions monitoring tools.

One of the observations made during this exercise was lack of GIS capacity on the officers at the districts. The officers need capacity on the following topics.

1. GIS basics as a tool for Integrated Catchment Management.
2. Interpretation of Spatial Data,
3. Introduction to QGIS as Open-Source GIS software,
4. Navigation and Data Collection using various mapping tools.
5. How to use Land cover statistics tool.

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