



UN-SPIDER EvIDENz Workflow Data & Requirements

Meeting details: EvIDENz 2nd User Workshop



UNITED NATIONS
Office for Outer Space Affairs



Resources required for our exercise

1

Agricultural drought impact map

2

Administrative border shape file of the municipality Sakhisizwe

3

Statistical data from Statistics South Africa

4

Land cover / land use maps

5

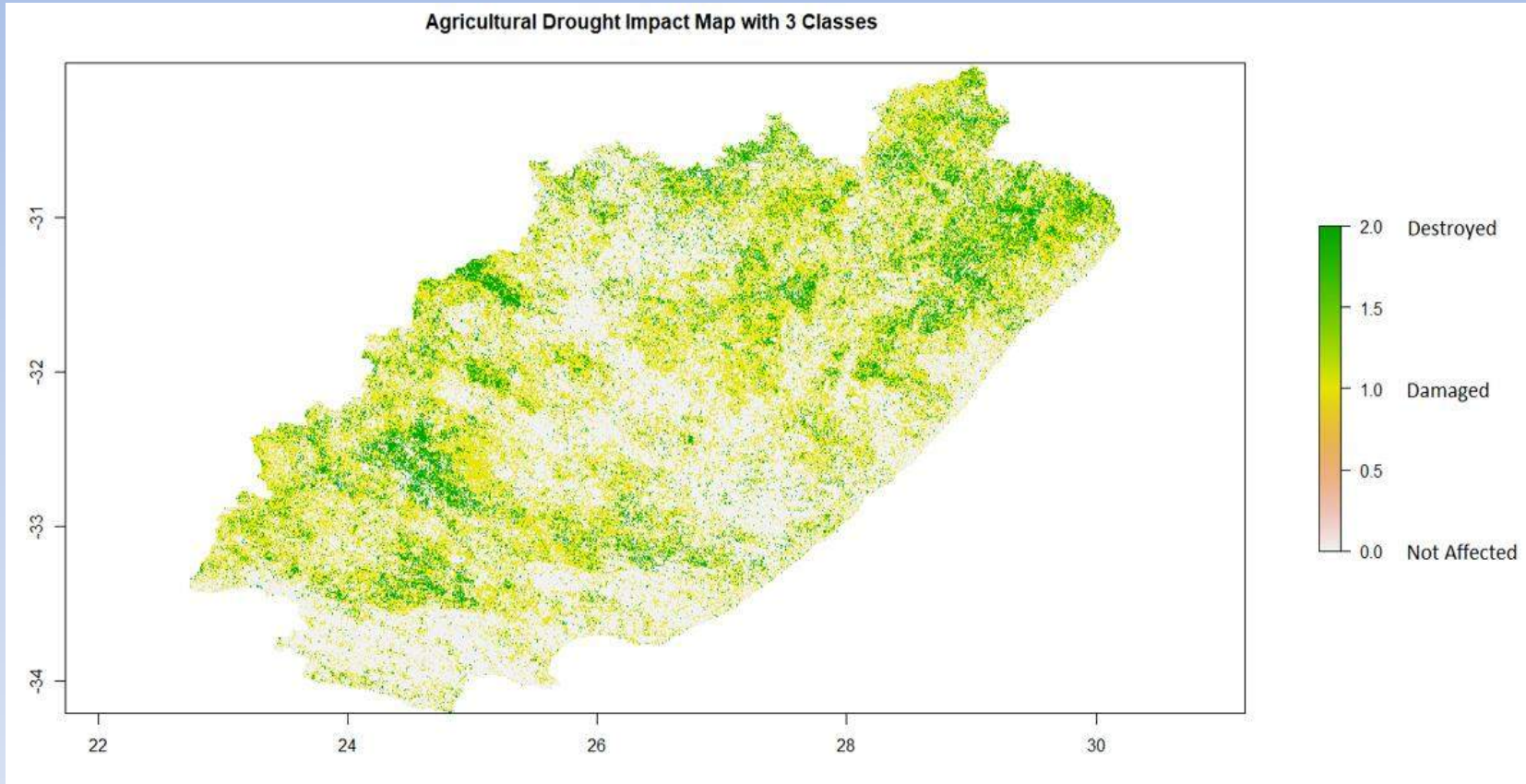
R and R-Studio software





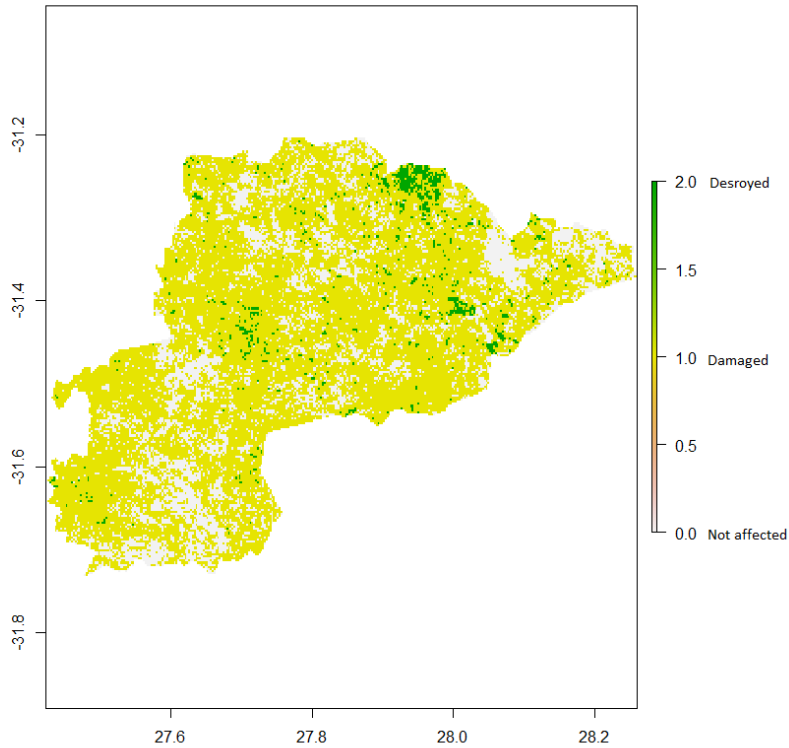
1

Agricultural drought impact map(Input from 1st segment)

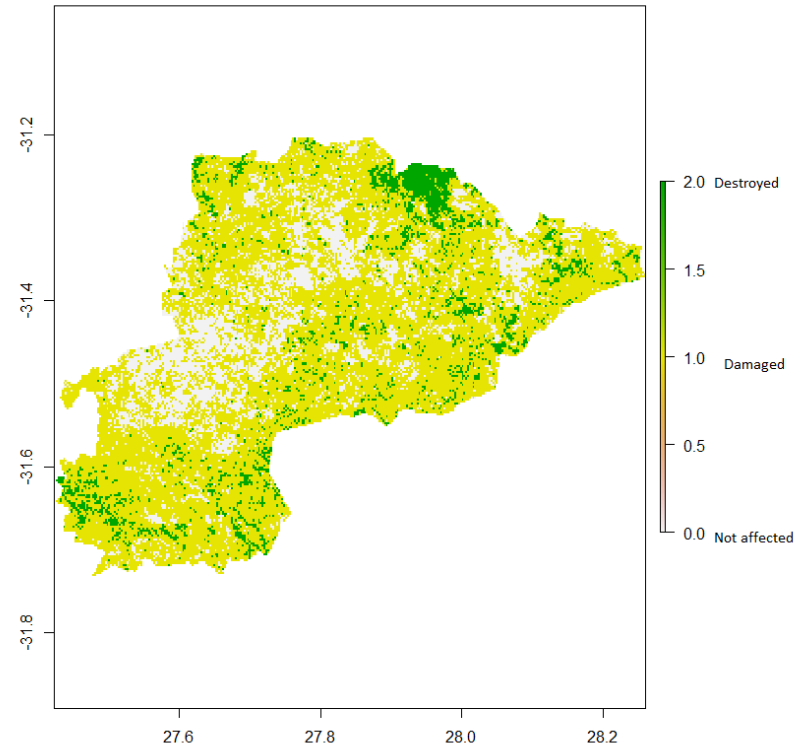




Crop Drought Impact of Sakhisizwe



Grass Drought Impact of Sakhisizwe





- Median over the period November to May (cropland)
- Median over the period July to June (grassland)





2

Administrative border shape file of the municipality Sakhisizwe

Municipal Demarcation Board (MDB)

[United Nations Office for the Coordination of Humanitarian Affairs \(OCHA\)](#)



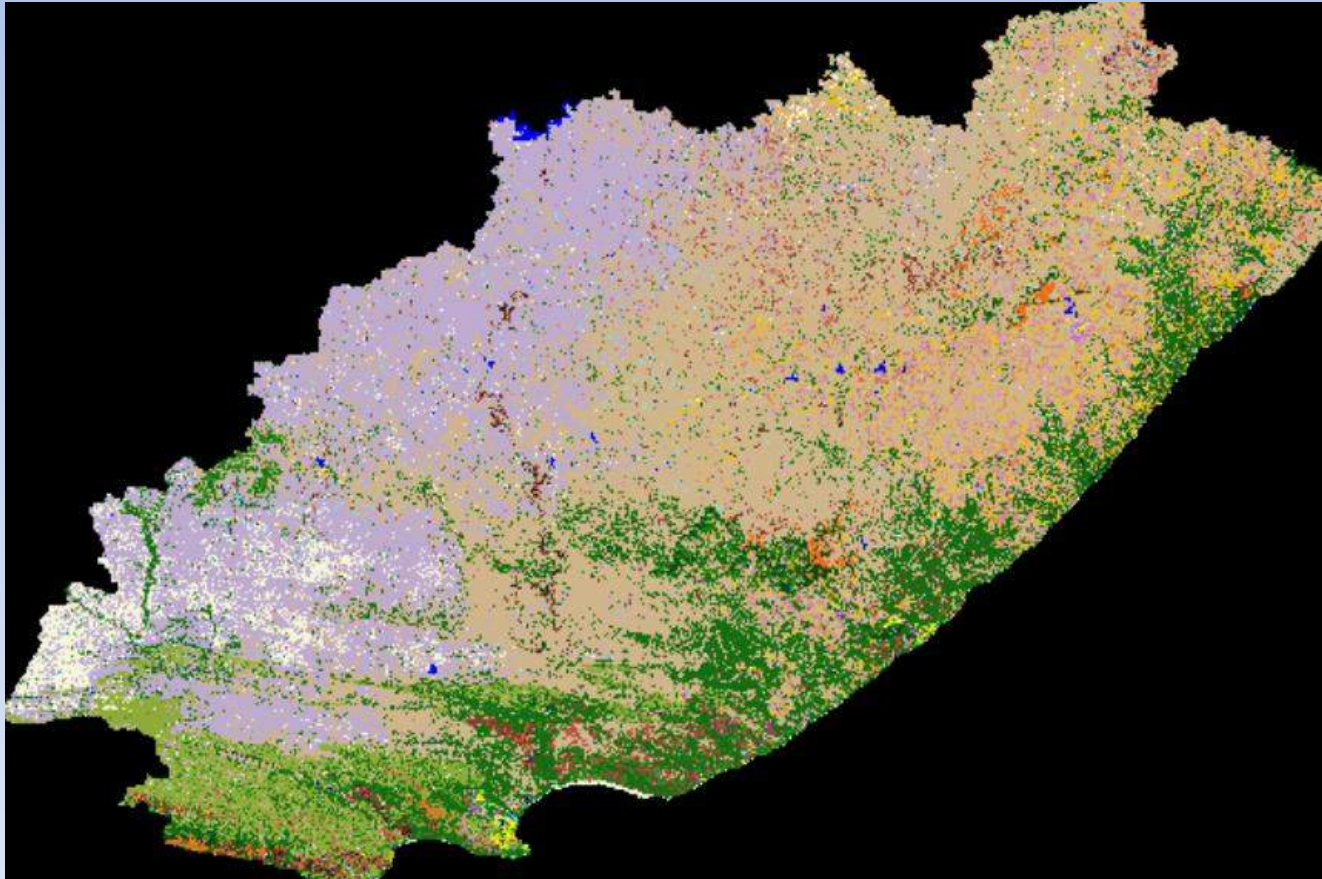


4

Land cover / land use maps

- Land-cover maps were generated from Landsat 8
- Resolution 30 X 30m
- Environmental Geographical Information Systems (E-GIS)
- The release date was 7th of June 2016
- The data can be downloaded from: <https://egis.environment.gov.za>





lcov22_final_gti_utm35n_sa_2014_snap.img

Row	Color	Class_Names
0		
1		Water seasonal
2		Water permanent
3		Indigenous Forest
4		Indigenous Forest
5		Thicket / Dense bush
6		Woodland / Open bush
7		Grassland
8		Shrubland / sbrbos
9		Low shrubland
10		Cultivated corn fields (high)
11		Cultivated corn fields (med)
12		Cultivated corn fields (low)
13		Cultivated corn pivots (high)
14		Cultivated corn pivots (med)
15		Cultivated corn pivots (low)
16		Cultivated orchards (high)
17		Cultivated orchards (med)
18		Cultivated orchards (low)
19		Cultivated vines (high)
20		Cultivated vines (med)
21		Cultivated vines (low)
22		Cultivated permanent pineapple
23		Cultivated subsistence (high)
24		Cultivated subsistence (med)
25		Cultivated subsistence (low)
26		Cultivated cane pivot - crop
27		Cultivated cane pivot - fallow
28		Cultivated cane commercial - crop
29		Cultivated cane commercial - fallow
30		Cultivated cane emerging - crop
31		Cultivated cane emerging - fallow
32		Plantations / Woodlots mature
33		Plantation / Woodlots young
34		Plantation / Woodlots cleared
35		Mines 1 bare
36		Mines 2 semi-bare
37		Mines water seasonal
38		Mines water permanent
39		Mine buildings
40		Erosion (donga)
41		Bare none vegetated
42		Urban commercial
43		Urban industrial
44		Urban informal (dense trees / bush)
45		Urban informal (open trees / bush)
46		Urban informal (low veg / grass)
47		Urban informal (bare)
48		Urban residential (dense trees / bush)
49		Urban residential (open trees / bush)
50		Urban residential (low veg / grass)
51		Urban residential (bare)
52		Urban school and sports ground
53		Urban smallholding (dense trees / bush)
54		Urban smallholding (open trees / bush)
55		Urban smallholding (low veg / grass)
56		Urban smallholding (bare)
57		Urban sports and golf (dense tree / bush)
58		Urban sports and golf (open tree / bush)
59		Urban sports and golf (low veg / grass)
60		Urban sports and golf (bare)
61		Urban township (dense trees / bush)
62		Urban township (open trees / bush)
63		Urban township (low veg / grass)
64		Urban township (bare)
65		Urban village (dense trees / bush)
66		Urban village (open trees / bush)
67		Urban village (low veg / grass)
68		Urban village (bare)
69		Urban built-up (dense trees / bush)
70		Urban built-up (open trees / bush)
71		Urban built-up (low veg / grass)
72		Urban built-up (bare)





3

Statistical data from Statistics South Africa

- South Africa census data
 - The release date was 2011
- Household data information

<http://cs2016.statssa.gov.za/wp-content/uploads/2016/06/CS-2016-Provinces-at-a-glance.pdf>

- The release day was 2016





Table 1.2: Number of agricultural households involved in specific activity and local municipality

Local municipality	Livestock production	Poultry production	Vegetable production	Production of other crops	Fodder grazing	Other
Amahlathi	9,871	7,839	5,669	1,524	502	549
Baviaans	321	303	335	320	65	41
Blue Crane Route	665	686	570	347	178	170
Buffalo City	13,800	16,342	25,964	4,368	2,458	4,310
Camdeboo	611	802	546	403	277	242
Elundini	13,066	10,226	7,416	4,077	689	885
Emalahleni-EC	12,163	7,791	3,172	1,847	534	666
Engcobo	16,421	14,809	6,998	3,495	1,012	1,009
Gariep	775	621	1,300	440	103	76
Great Kei	1,793	2,278	969	160	50	108
Ikwezi	231	214	160	74	32	60

	A	B	C
1	Table 1.1: Number of households by Local municipality		
2			
3	Local municipality	Household involved in agricultural activities	Household not involved in agricultural activities
4	Amahlathi	15,581	18,578
5	Baviaans	949	3,662
6	Blue Crane Route	1,733	8,027
7	Buffalo City	43,624	179,944
8	Camdeboo	1,733	10,667
9	Elundini	19,436	18,418
10	Emalahleni-EC	16,335	15,347
11	Engcobo	22,187	15,027
12	Gariep	2,599	7,171
13	Great Kei	3,559	6,751
14	Ikwezi	564	2,351
15	Inkwanca	1,899	4,329
16	Intsika Yethu	23,639	16,809
17	Inxuba Yethemba	3,342	15,122
18	King Sabata Dalindyebo	48,405	56,835
19	Kou-Kamma	1,983	9,049
20	Kouga	2,002	27,445
21	Lukanji	15,132	36,041
22	Makana	3,098	18,290
23	Maletswai	2,533	9,571
24	Matatiele	26,641	22,885



Poverty headcount	The poverty measures used in the table are based on the South African Multidimensional Poverty Index constructed using eleven indicators across four dimensions, namely health, education, living standards and consumption. The poverty headcount is defined as the proportion of households that are considered to be "multidimensional poor" in the defined area.	23,748 17,914 17,823 21,422
Intensity of poverty	The intensity of poverty is the average proportion of indicators in which multidimensional poverty is experienced.	
Total households	Total number of households in a geographic area as per municipal borders (2011 Demarcation)	
Household size	The average number of persons in the household	



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	ID	MUNICNAME	agriHH2011	LivestockPrd	PoultryPrd	VegProd	OtherProd	FodderGraz	OtherPrdAc	SumProdHH	RatioProd&agriHH	CropDepHH	LSDepHH	HHSize201f	CropDepPop	LSDepPop
2	EC1	Amahlathi	15581.06347	9870.99595	7839.44246	5668.94064	1523.50488	501.92324	549.24945	25954.05662	0.600332491	4317.858738	6227.200419	4.1	17703.22082	25531.5217
3	EC2	Blue Crane Rc	1733.46404	664.55548	686.22712	569.67284	347.16808	177.51679	169.6288	2614.76911	0.662951093	607.8206902	558.252732	3.7	2248.936554	2065.53511
4	EC3	Buffalo City	43623.86365	13799.65741	16341.77062	25964.46502	4368.10043	2457.93891	4310.02892	67241.96131	0.648759536	19678.5411	10547.27065	3.3	64939.18563	34805.9932
5	EC4	Dr Beyers Nau	3245.69139	1163.25806	1318.3977	1042.16311	796.55547	374.27397	342.45256	5037.10087	0.644357037	1184.791255	990.7195826	3.9	4581.192855	3830.78239
6	EC5	Elundini	19436.29519	13065.64743	10226.02004	7415.93077	4077.29403	689.29904	884.78631	36358.97762	0.534566604	6143.89415	7352.935022	4	24575.5766	29411.7401
7	EC6	Emalahleni	16334.52011	12162.57709	7791.32028	3171.74487	1846.86528	534.33476	666.1269	26172.96918	0.624098855	3132.108851	7924.128154	4.6	14407.70071	36450.9895
8	EC7	Engcobo	22186.55911	16420.901	14808.86951	6997.77871	3494.79059	1011.97161	1008.90402	43743.21544	0.507200005	5321.831206	8841.953083	4.9	26076.97291	43325.5701
9	EC8	Enoch Mgjijim	20328.26318	10115.20908	6159.93189	8673.71686	3710.23388	780.06627	904.88152	30344.0395	0.669926072	8296.331471	7299.029015	4	33461.87027	29439.417
10	EC9	Great Kei	3558.79061	1793.21683	2278.05227	968.54143	159.92614	49.92042	108.25773	5357.91482	0.664211868	749.5415524	1224.233635	3.7	2773.303744	4529.66445
11	EC10	Intsika Yethu	23638.58934	18400.27411	14209.78858	6289.41799	3040.0741	1100.3185	639.50404	43679.37732	0.541184211	5048.973813	10553.41282	4.3	21710.5874	45379.6751
12	EC11	Inxuba Yethe	3341.50691	759.70919	1262.53116	1086.50495	972.34546	398.25521	574.88302	5054.22899	0.66113089	1361.169604	765.5660343	3.9	5308.561455	2985.70753
13	EC12	King Sabata D	48404.52246	27613.23894	28813.82329	22396.31987	7331.04219	1909.11037	2259.97041	90323.50507	0.535901728	15930.9447	15821.07801	4.2	66909.96775	66448.5277
14	EC13	Kouga	2001.98439	781.67136	867.59287	661.1288	318.30206	245.95295	408.29651	3282.94455	0.609813647	597.270305	626.6593286	3.2	1911.264976	2005.30985
15	EC14	Kou-Kamma	1983.1326	603.01521	688.97118	907.02478	209.60183	101.97749	229.47191	2740.0624	0.723754539	808.1635777	510.2416668	3.8	3071.021595	1938.91833
16	EC15	Makana	3097.98751	1092.77442	999.87549	1524.58333	338.29498	250.29022	410.40614	4616.22458	0.671108491	1250.193451	901.3420833	3.6	4500.696423	3244.8315
17	EC16	Matatiele	26640.87278	14171.11082	14337.36031	10613.6671	6937.08193	744.49095	1813.89339	48617.6045	0.547967615	9617.242086	8173.266727	3.9	37507.24413	31875.7402
18	FC17	Mhashe	36376.70793	23503.83708	24586.02704	15627.08821	6437.43462	1068.68819	1106.62962	72329.69976	0.50292906	11096.88973	12358.23704	4.7	52155.38174	58083.7141





5

R and R-Studio software

Developed

Ross Ihaka & Robert Gentleman
(1996)

Remarkable Features of R

- Effective data handling: Arrays, matrices, and complex operations (GIS, Remote sensing)
- Statistical tools analysis
- Flexible graphical facilities
- A simple, effective & free

R help pages

- Search > <http://rseek.org>
- Quick R > <http://statmethod.net>
- Spatial > <http://geodacenter.asu.edu/r-spatial-projects>
- Overview > <http://cran.r-project.org/web/views/>
- Manuals > <http://cran.r-project.org/other-docs.html>

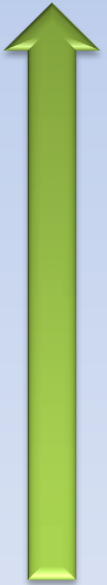
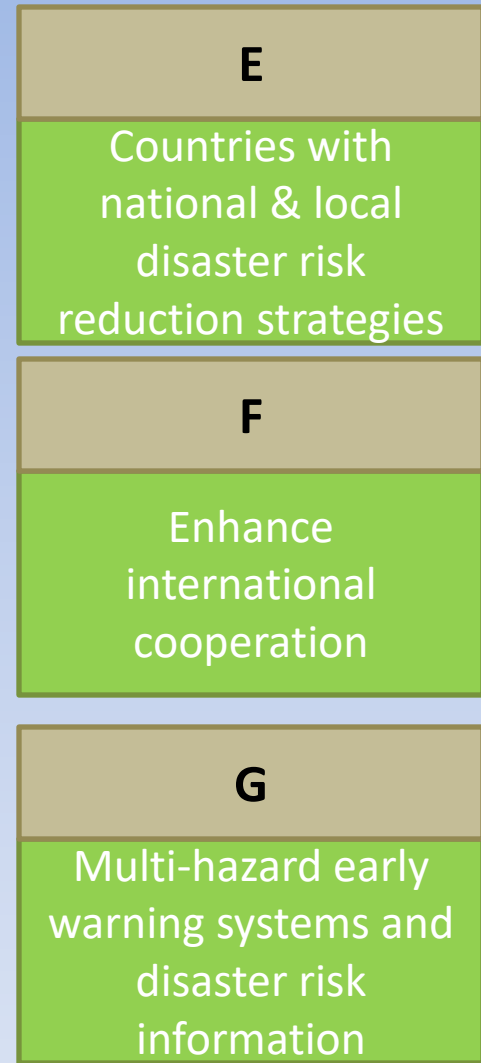
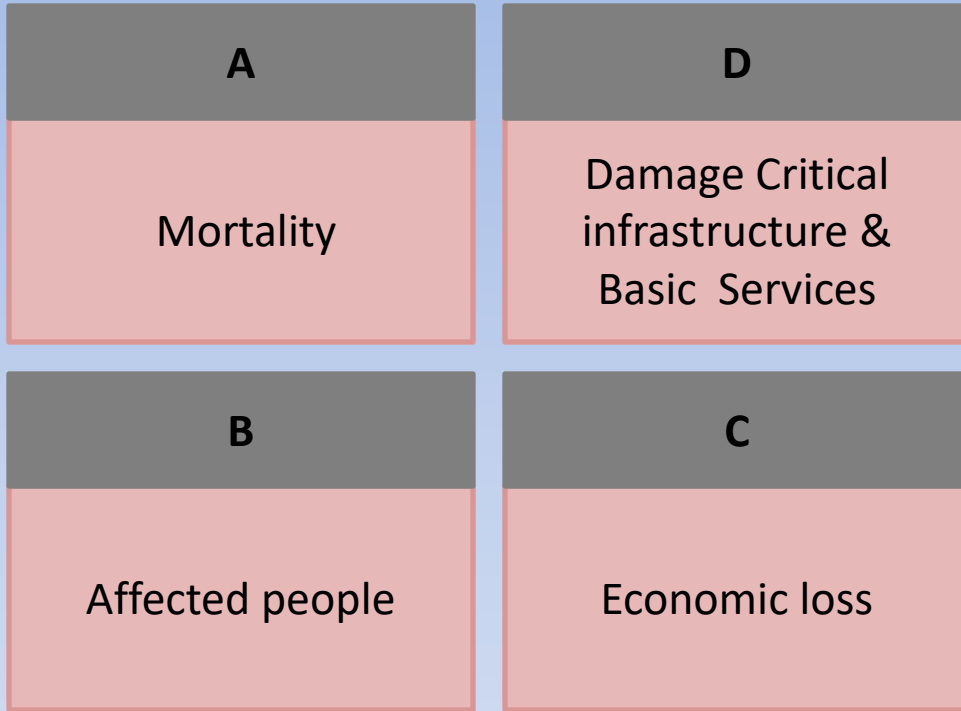
Things to note when using R

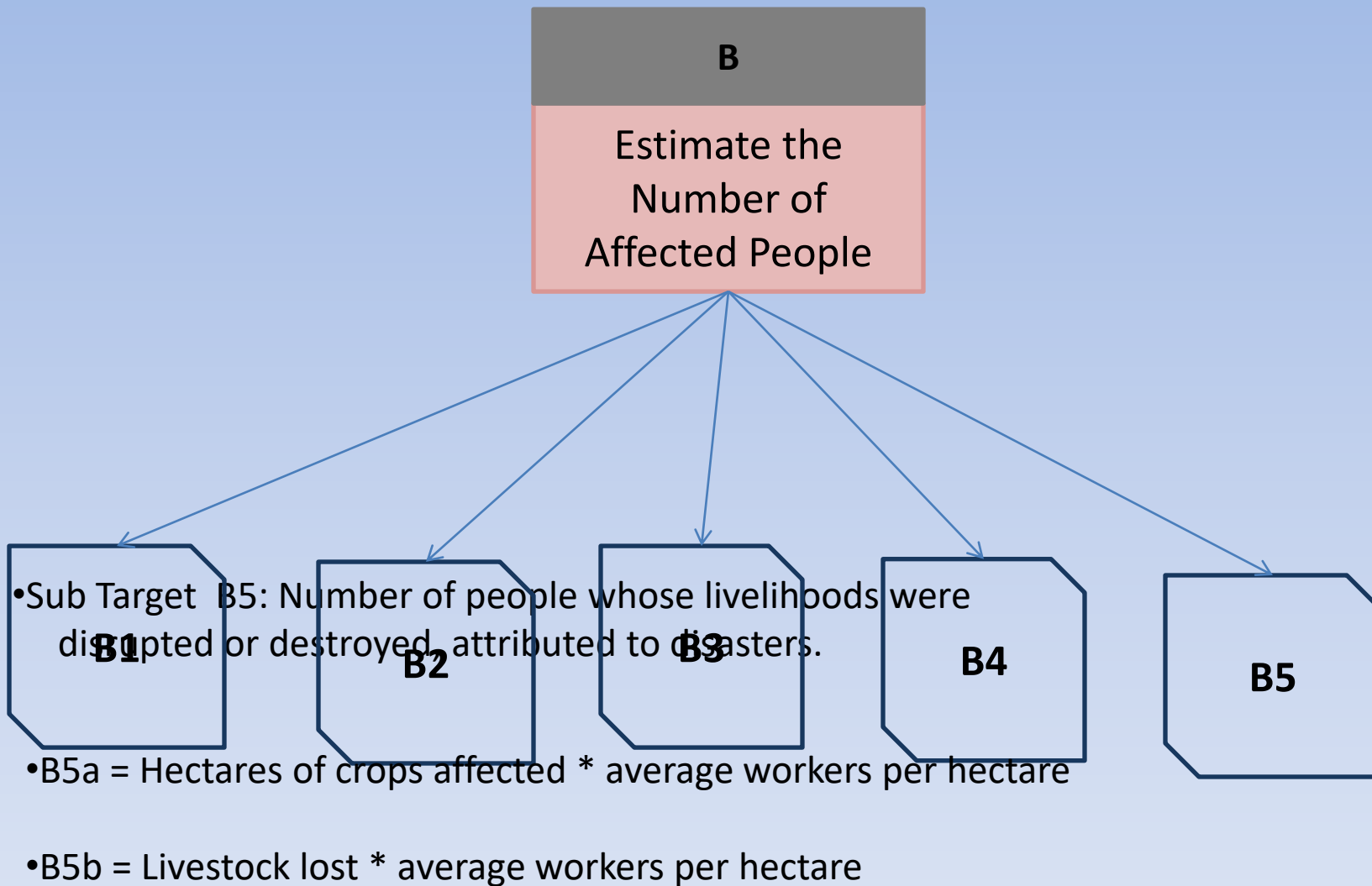
- R is case sensitive
- Require packages for analysis





Expected outcome and goals of SFDRR







South Africa

- WRC <http://www.droughtsa.org.za>
- Rainfall or precipitation trends decrease by 75% April 2015 to August 2015
- Water systems storage trends (Dams and Rivers) 74.5% to full capacity

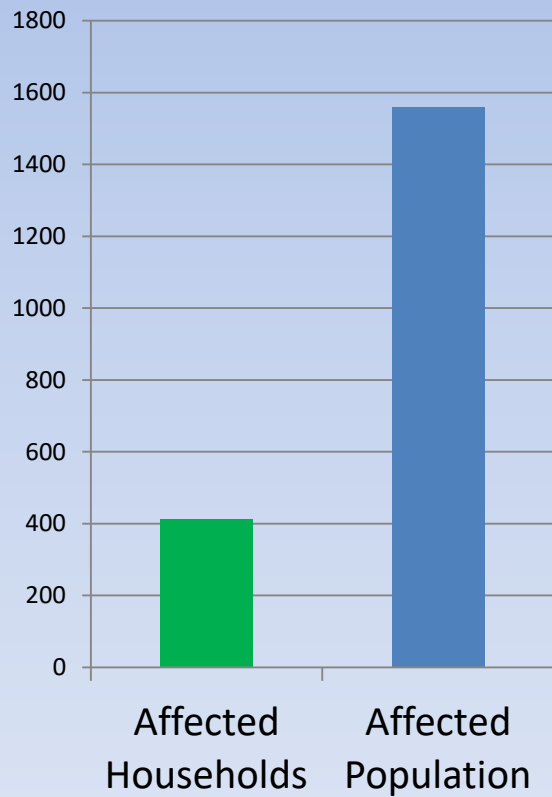
Province	12 month SPI	Description
Eastern Cape	-0.30	Dry Conditions
Free State	-0.6	Dry Conditions
Gauteng	-1.2	Moderate Drought Conditions
Kwazulu-Natal	-2.43	Exceptional Drought Conditions
Limpopo	-1.34	Severe Drought Conditions
Mpumalanga	-1.45	Severe Drought Conditions
Northern Cape	-0.60	Dry Conditions
North West	-1.4	Severe Drought Conditions
Western Cape	-1.4	Severe Drought Conditions



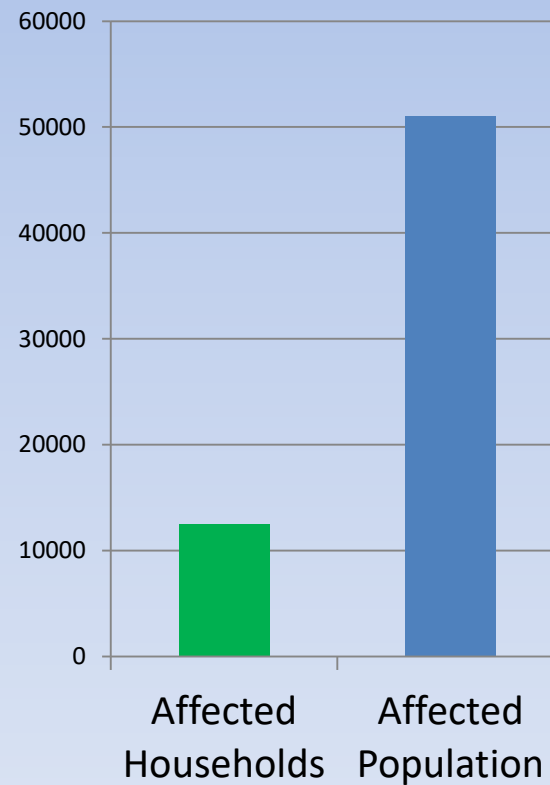


Impact of drought on people

Sakhisizwe 2015

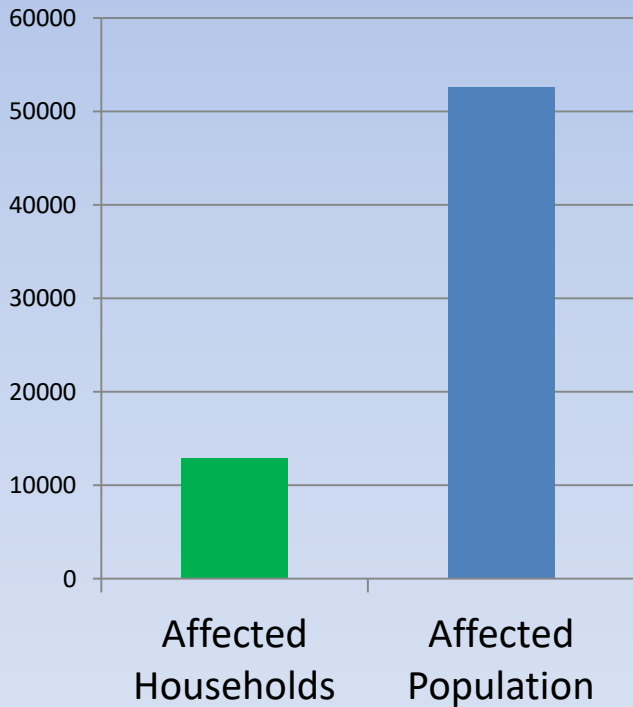


Engcobo 2015

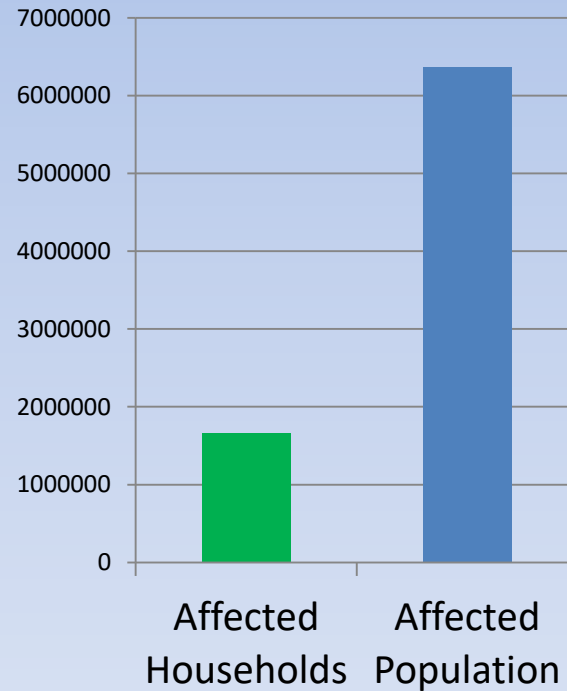


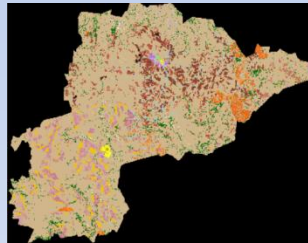
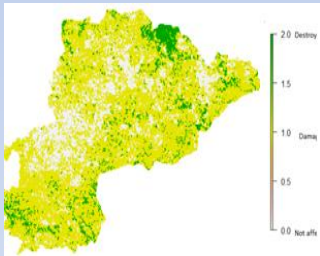
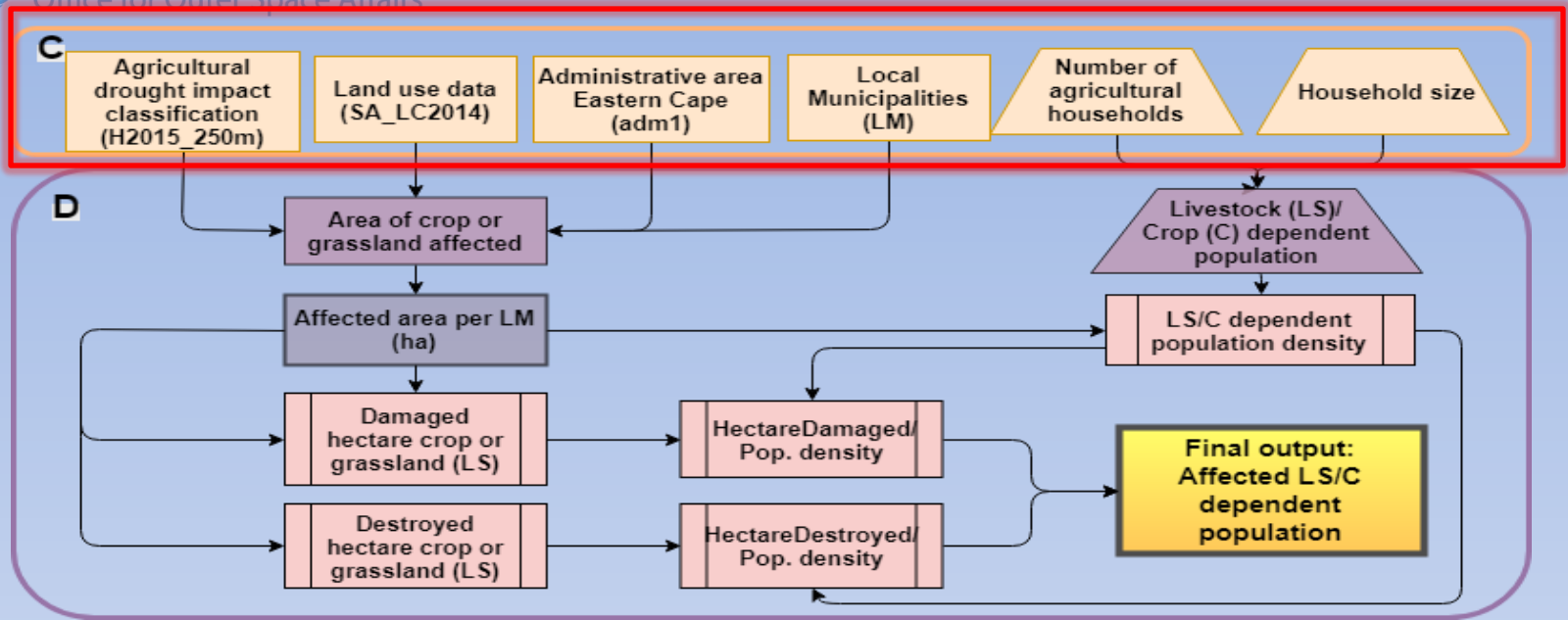


Eastern Cape drought Impact 2015



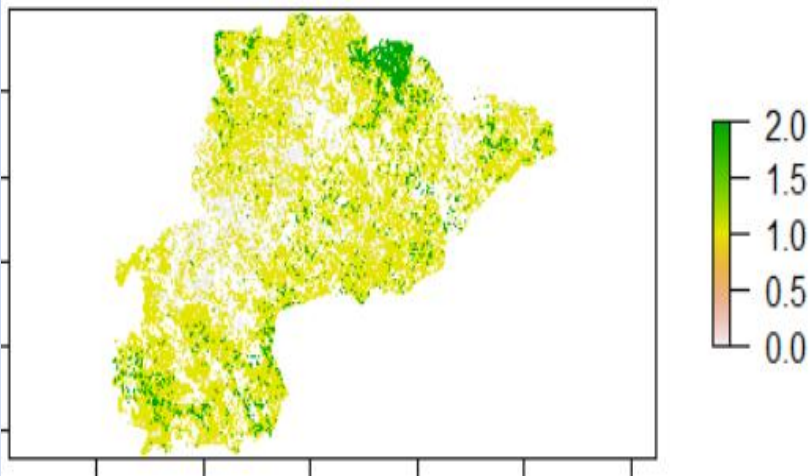
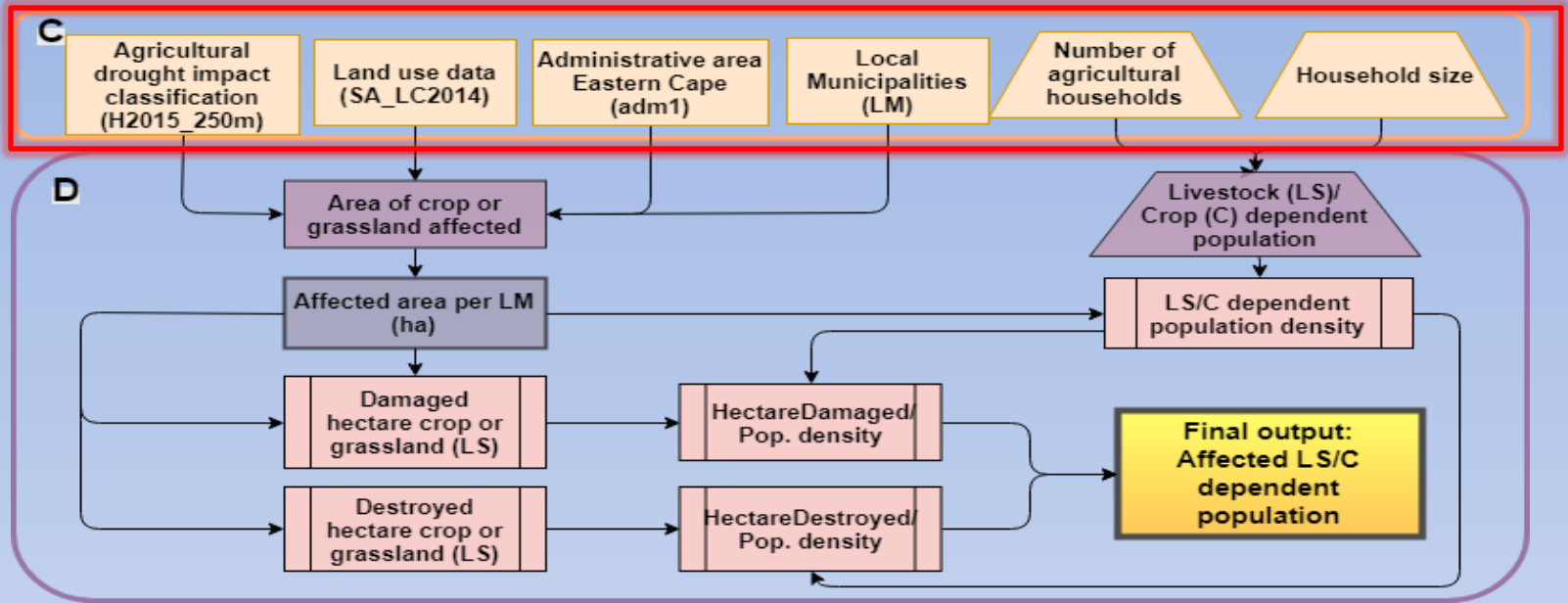
Drought impact South Africa:





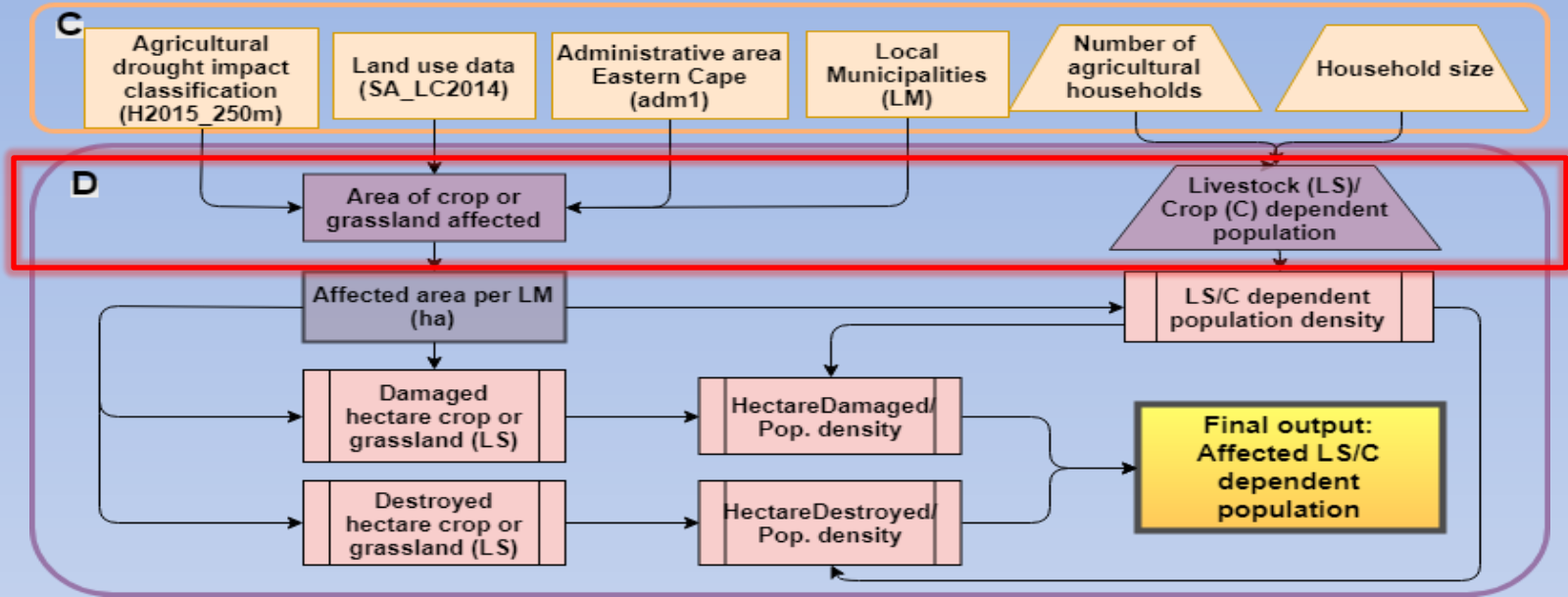
ID	MUNICNAME	LSDepPop	CropDepPop
EC29	Sakhisizwe	13392.666	9247.198
EC28	Raymond Mhlaba	25744.601	19216.130





- Livestock or crop dependant population from based house on household size

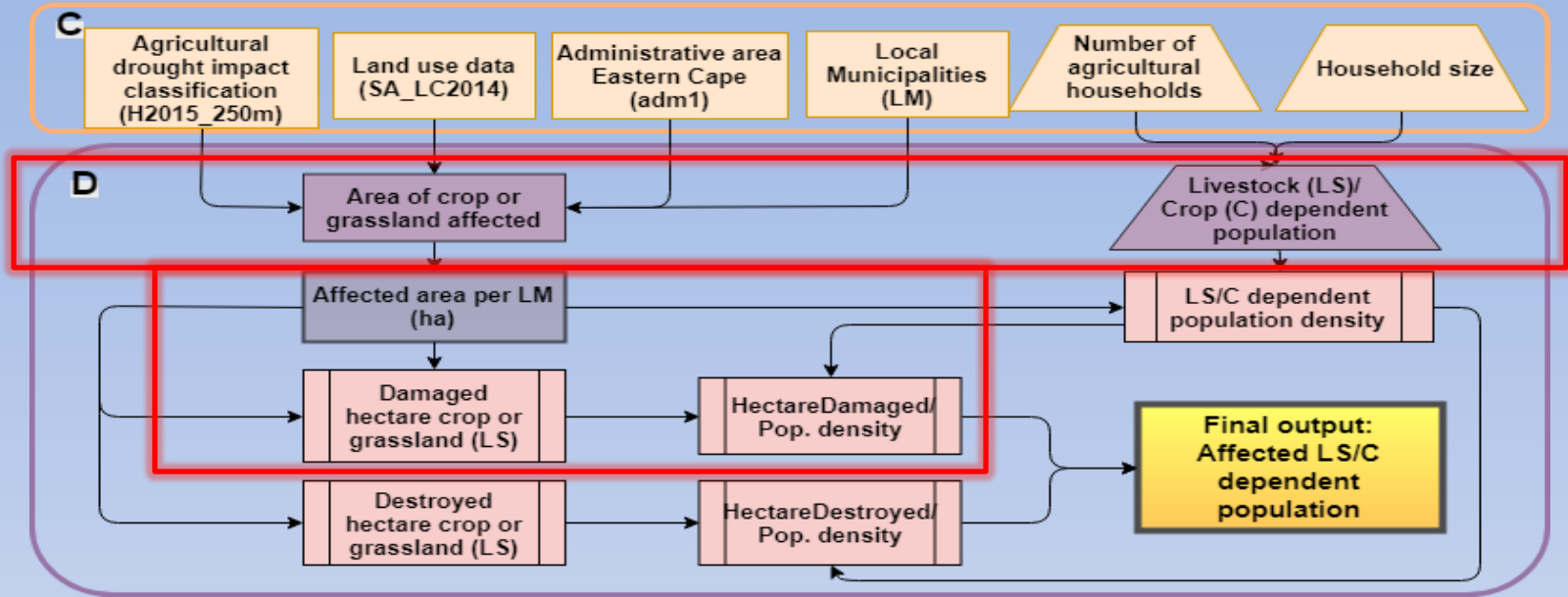




*Hectares Per municipality = Pixel count per class * 0.09*

$$\text{Crop population density} = \frac{\text{Crop dependant population}}{\text{Total crop land area}}$$





Crop dependant population within H2

$$= \text{Crop population density} * \text{Crop H2 hectares}$$

•H2 Destroyed

•H1 Damaged

•H0 Not affected

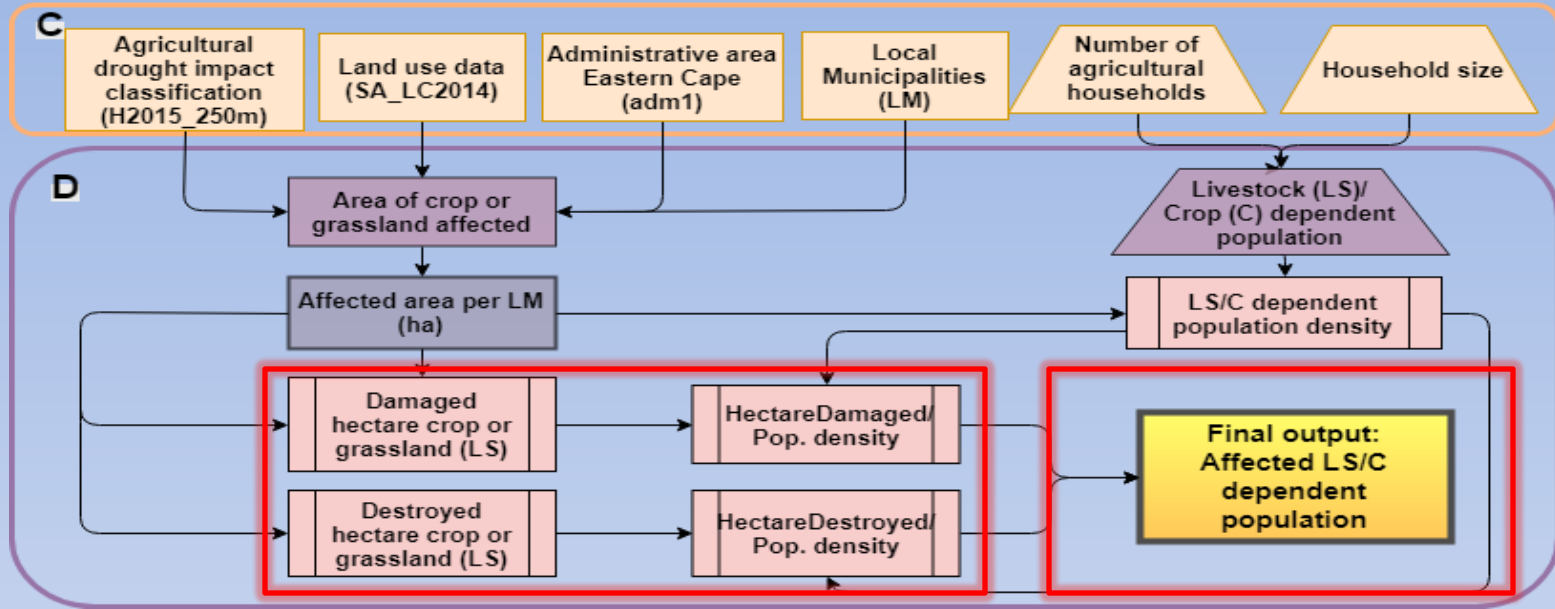
Crop dependant population within H1

$$= \text{Crop population density} * \text{Crop H1 hectares}$$

Crop dependant population within H0

$$= \text{Crop population density} * \text{Crop H0 hectares}$$





$$\text{Affected crop dependant poulation} = H1 + H2$$

$$\text{Affected livestock dependant poulation} = H1 + H2$$

Affected poulation

$$= \text{Affected livestock dependant poulation} \\ + \text{Affected crop dependant poulation}$$





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Thank you



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