July 2020

MINISTRY OF FORESTY AND RESEARCH

FOREST MANAGEMENT UNIT SPECIFICATION AND MANAGEMENT MANUAL

version: 1.1

July 2020

FMU Attribute Table Specification

1. Components

No	Field Name	Type	Length	Precision	Source
1	fid	Integer	10	0	Original
2	Province Code	String	10	0	Census
3	Province Name	String	10	0	Census
4	Ward Code	String	10	0	Census
5	Ward Name	String	30	0	Census
6	Basin Code 1	String	10	0	Original
7	Basin Code 2	String	10	0	Original
8	Watershed Code	String	10	0	Original
9	Catchment Code	String	10	0	Original
10	FMU Code	String	10	0	#3+#4+#5
11	Area (ha)	Real (double)	10	2	Original
12	FTYPE	String	10	0	FTM
13	F_TYPE2	String	10	0	ForestType Level1
14	F_TYPE3	String	10	0	ForestType Level2
15	F_TYPE4	String	10	0	ForestType Level3
16	Treecover(ha)	Real (double)	10	2	Hansen Treecover
17	Loss area (ha)	Real (double)	10	2	Hansen Lossyear
18	Loss rate (ha)	Real (double)	10	2	Hansen Lossyear
19	Gain area (ha)	Real (double)	10	2	Hansen Gain
20	Water area (ha)	Real (double)	10	2	Hansen Datamask

21	Elevation	Real (double)	10	2	SRTM30
22	Elevation≥400 ratio	Real (double)	10	3	SRTM30
23	Slope	Real (double)	10	2	SRTM30
24	Aspect (8 directions)	Integer	10	0	SRTM30
25	Distance(Major road)	Real (double)	10	2	Base Map
26	Distance(River)	Real (double)	10	2	Base Map

Province Code	Ward Code	Ward name
01	Choisuel	
	101	Wagina
	102	Katupika
	103	Vasipuki
	104	Viviru
	105	Babatana
	106	Tepazaka
	107	Batava
	108	Tavua
	109	Polo
	110	Bangera
	111	Susuka
	112	Senga
	113	Kerepangara
	114	Kirugela
02	West	
	201	Outer Shortlands
	202	Inner Shortlands
	203	Simbo
	204	North Ranongga
	205	Central Ranongga
	206	South Ranongga
	207	Vonunu
	208	Mbilua
	209	Ndovele
	210	Irringgilla
	211	Gizo
	212	South Kolombangara
	213	Vonavona
	214	Kusaghe
	215	Munda

	216	Nusa Roviana
	217	Roviana Lagoon
	218	South Rendova
	219	North Rendova
	220	Kolombaghea
	221	Mbuini Tusu
	222	Nono
	223	Nggatokae
	224	North Vangunu
	225	Noro
	226	North Kolombangara
03	Isabel	
	301	Kia
	302	Baolo
	303	Kokota
	304	Hovikoilo
	305	Buala
	306	Tirotongana
	307	Koviloko
	308	Kmaga
	309	Kaloka
	310	Tatamba
	311	Sigana
	312	Japuana
	313	Kolomola
	314	Kolotubi
	315	Susubona
	316	Samasodu
04	Central	
	401	Sandfly/Buenavista
	402	West Gela
	403	East Gela

	404	Tulagi
	405	South West Gela
	406	South East Gela
	407	North East Gela
	408	North West Gela
	409	Banika
	410	Pavuvu
	411	Lovukol
	412	North Savo
	413	South Savo
05	Rennell-Bellona	
	501	East Tenggano
	502	West Tenggano
	503	Lughu
	504	Kanava
	505	Te Tau Gangoto
	506	Mugi Henua
	507	Matangi
	508	East Gaongau
	509	West Gaongau
	510	Sa'aiho
06	Guadalcanal	
	601	Tandai
	602	Saghalu
	603	Savulei
	604	Tangarare
	605	Wanderer Bay
	606	Duidui
	607	Vatukulau
	608	Talise
	609	Avuavu
	610	Moli

	611	Tetekanji
	612	Birao
	613	Valasi
	614	Kolokarako
	615	Longu
	616	Aola
	617	Paripao
	618	East Tasimboko
	619	Vulolo
	620	Malango
	621	West Ghaobata
	622	East Ghaobata
07	Malaita	
	701	Auki
	702	Aimela
	703	Buma
	704	Fauabu
	705	West Baegu/Fataleka
	706	Mandalua/Folotana
	707	Fo'ondo/Gwaiau
	708	Malu'u
	709	Matakwalao
	710	Takwa
	711	East Baegu
	712	Fouenda
	713	Sulufou/Kwarande
	714	Sububenu/Burianiasi
	715	Nafinua
	716	Faumamanu/Kwai
	717	Gulalofou
	718	Waneagu/Taelanasina
	719	Aiaisi
	720	Areare

	721	Raroisu'u
	722	Aba/Asimeuri
	723	Asimae
	724	Mareho
	725	Tai
	726	Kwarekwareo
	727	Siesie
	728	Waneagu/Silana Sina
	729	Keaimela/Radefasu
	730	Langalanga
	731	Luaniua
	732	Pelau
	733	Sikaiana
08	Makira/Ulawa	
	801	North Ulawa
	802	South Ulawa
	803	West Ulawa
	804	Ugi and Pio
	805	Arosi South
	806	Arosi West
	807	Arosi North
	808	Arosi East
	809	Bauro West
	810	Bauro Central
	811	Bauro East
	812	Wainoni West
	813	Wainoni East
	814	Star Harbour North
	815	Santa Ana
	816	Santa Catalina
	817	Star Harbour South
	818	Rawo
	819	Weather Coast

	820	Haununu
09	Temotu	
	901	Fenualoa
	902	Polynesia Outer Islands
	903	Nipua/Nopoli
	904	Lipe/Temua
	905	Manuopo
	906	Nenumpo
	907	Nevenema
	908	Luva Station
	909	Graciosa Bay
	910	Nea/Noole
	911	North East Santa Cruz
	912	Nanggu/Lord Howe
	913	Duff Islands
	914	Utupua
	915	Vanikoro
	916	Tikopia
	917	Neo
10	Honiara	
	1001	Nggossi
	1002	Mbumburu
	1003	Rove/Lenggakiki
	1004	Cruz
	1005	Vavaea
	1006	Vuhokesa
	1007	Mataniko
	1008	Kola'a
	1009	Kukum
	1010	Naha
	1011	Vura
	1012	Panatina

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FOREST TYPE CLASSIFICATION

Forest typing from API(air photo interpretation) will result in forest types which are composites of stratification levels one, two and three , as shown in the following example

Level1	ECOLOGICAL CLASS eg: HM

Level2	CANOPY CONDITION CLASS eg: 3

Level3	CROWN SIZE CLASS eg:S

*first two characters designating...ecological class
*second character designating...canopy condition class
*third character designating…crown size class
=coding for the above example is shown thus:
"HM3S"

Level 1Ecological Classes

UPLAND FOREST ON HILLS		
	UM	upland forest on hills,mixed spp composition
OTHER AREAS		
	NH	Herbaceous swamps, mixed spp composition
	NR	River courses: braided streams
	NW	Open water(inland)
	NP	Plantation areas for timber production
	NC	Cloud obscured areas
SALINE SWAMP FOREST		
	SM	Saline swamp forest, mixed spp (magroves)
	SN	Degraded forest (anthropogenic, gardens etc)
FRESHWATER SWAMP FOREST		
	FM	Fresh water swamp forest, mixed spp composition
	FC	Casuarina swamp forest
	FP	Pandan swamp forest
	FS	Sago swamp forest
	FT	Terminalia swamp forest
	FL	Logged forest
	FN	Degraded forest (anthropogenic, gardens etc)
LOWLAND RAINFOREST ON NEAR LEVEL LANDS		

	LM	Lowland rainforest, mixed spp composition
	LC	Casuarina dominated lowland rainforest
	LL	logged forest
	LN	Degraded forest (anthropogenic, gardens etc)
HILL FOREST		
	HM	Rainforest on hills, mixed spp composition
	HC	Casuarina dominated hill forest
	HN	Degraded rainforest on hills
	HL	Logged forest

Level2 Canopy Density Classes

Class	Density	Description
1	10-20%	Degraded forest areas Cleared to sparse remnant forest Primary canopy: very open to isolated trees
2	10-50%	Severe to moderately disturbed forest areasSparse to mid-dense forestPrimary canopy: clearly separated
3	40-100%	Moderate to relatively undisturbed forest areas Mid dense to dense forest Primary canopy: separated to overlapping

Level3 Crown Size Classes

Class	Crown size
S	small-medium
M	medium-large
V	various

Direction code

3	2	1
4		8
5	6	7

Direction number *0 = no data

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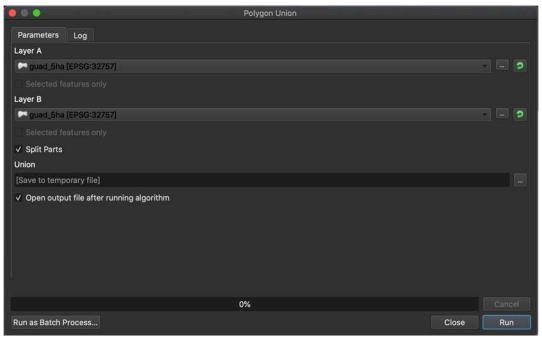
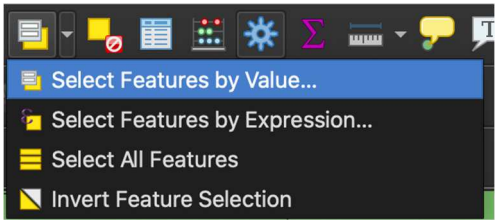
0. Preparation: Catchment

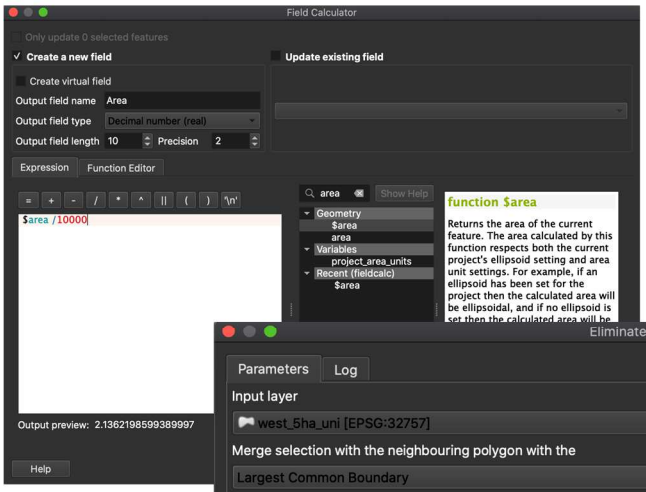
Make up FMU boundary with 5ha level watershed

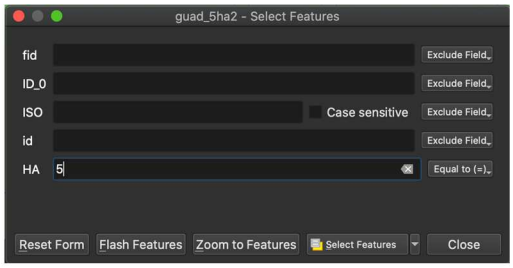
1. **Union watershed_5ha and administrative boundary with"SAGA Polygon Union" *this process can take time, check geometry correctness using "fix geometry"**

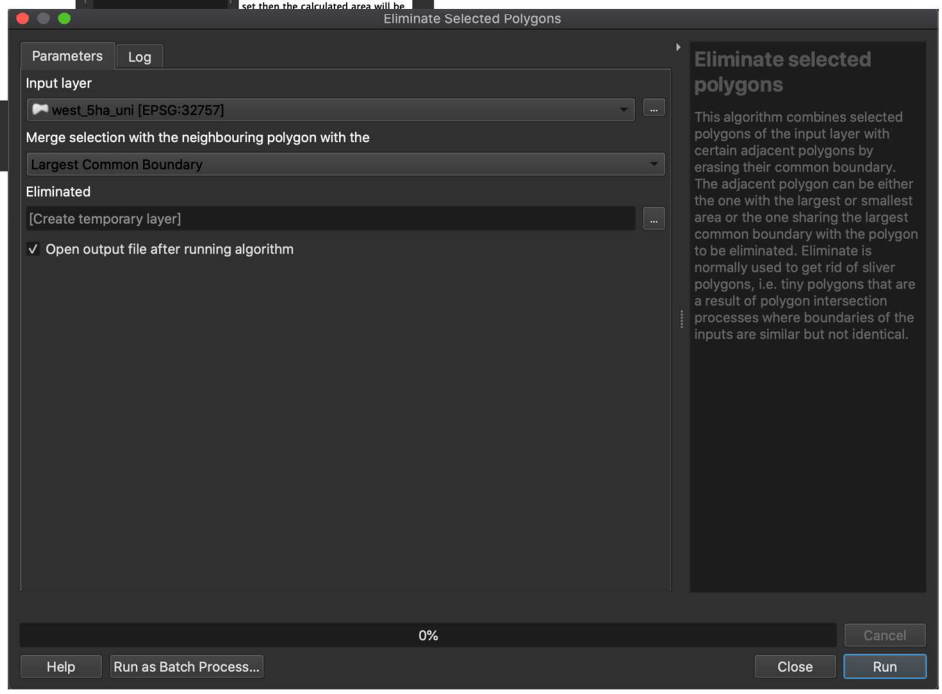


1. **Area**
1. **Put field "Area" with "Field Calculator". *it is better to fix geometry before executing this**
2. **Set "real"and field length as 10 and 2, and calculate as "ha"**
3. **Select small polygons < 5ha with "Select Features by Value"**
4. **Eliminate small polygons with "Eliminate selected polygons" using "Largest Common Boundary"**
5. **See attribute table to confirm elimination, but note that some of small island cannot be eliminated.**
6. **Recalculate the AREA**









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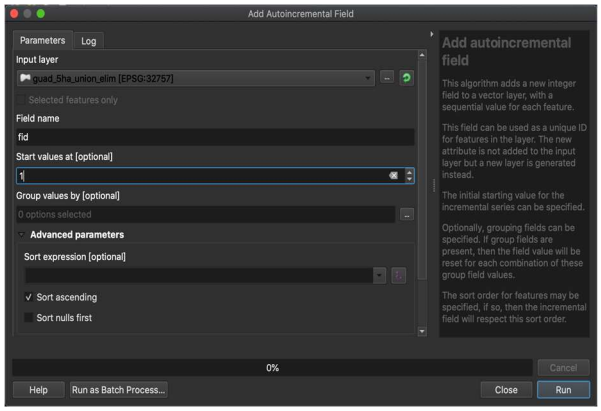
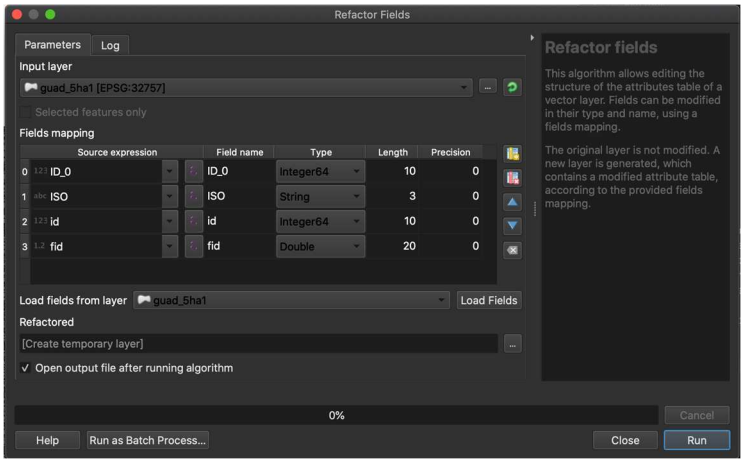
1. fid

***It is needed to “fid” column in case that they already have “fid” field.**

1. Put serial number as fid with “Add Autoincremaental Field”
Field name: fid, Start values: 1

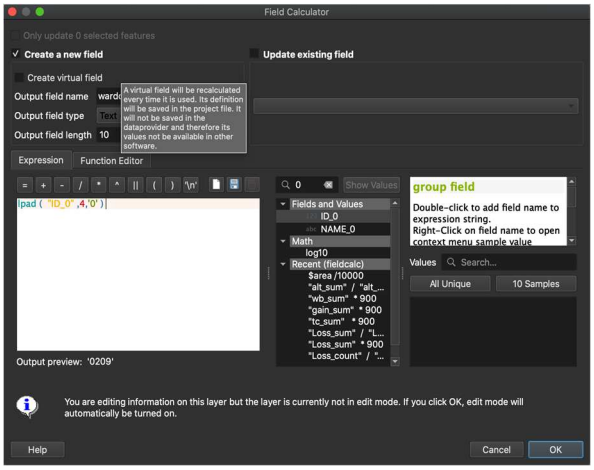


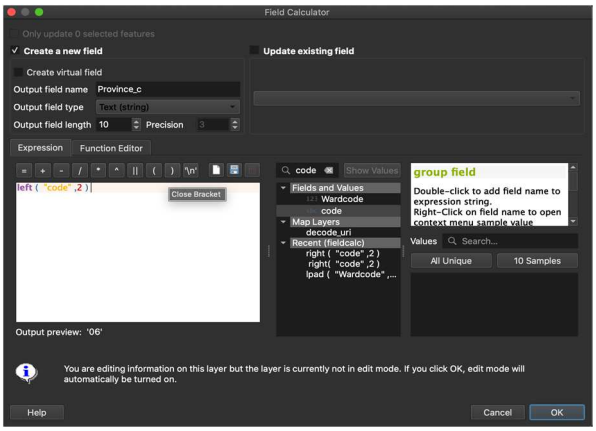
Refactor
1. Change field order with “Refactor field”

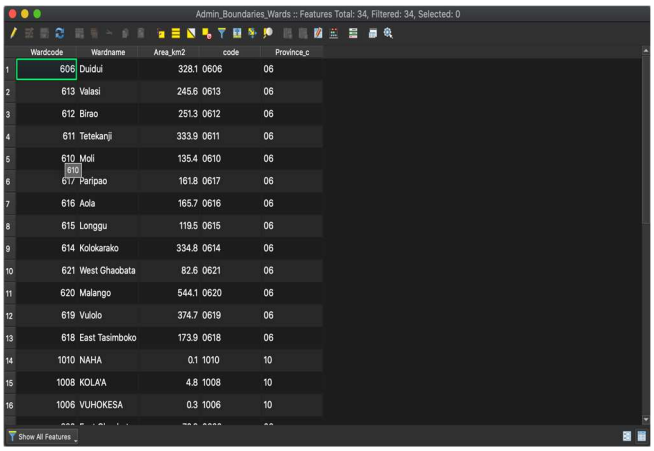


2to5. Province and Ward

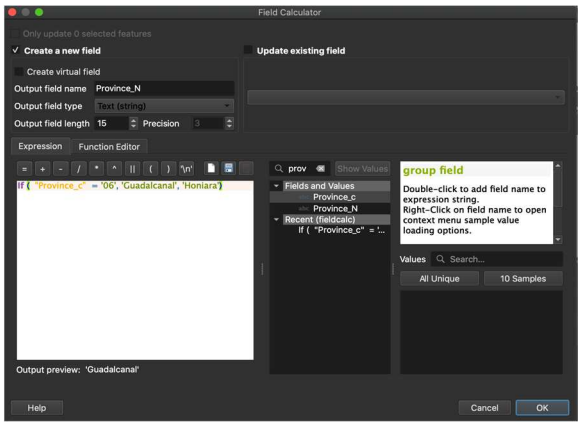
1. **Open Attribute of “Admin Boundary_Wards”.**
2. **Open Field Calculator.**
3. **Convert “Wardcode” into the expression like “0000” with “Field Calculator” Numbers shall have ‘0’s as 4 digits’ text.**
4. **Make up “Provincial code” with “Field Calculator” like image.**
   Expression: left ("code" ,'2')



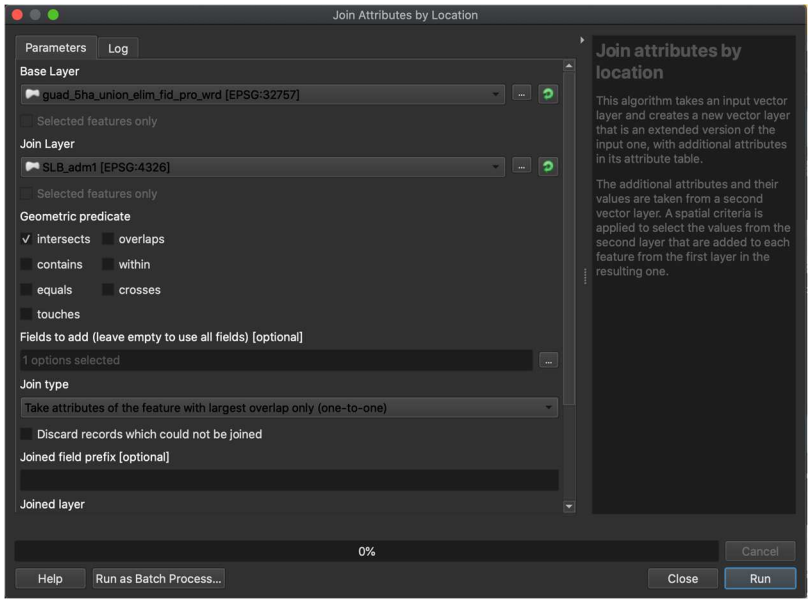




5. Add “Province Name” with “Field Calculator” like image
Expression: If (‘Province_c’ = '10', 'Honiara', ‘Guadalcanal’).



6. Add “Province Code and Name”, “Ward Code and Ward name” field with “Join Attributes by Location” using “intersects”
7. Parameters are the following image
8. They are added on Attribute Table
9. Add “Province Name” with Field Calculator.



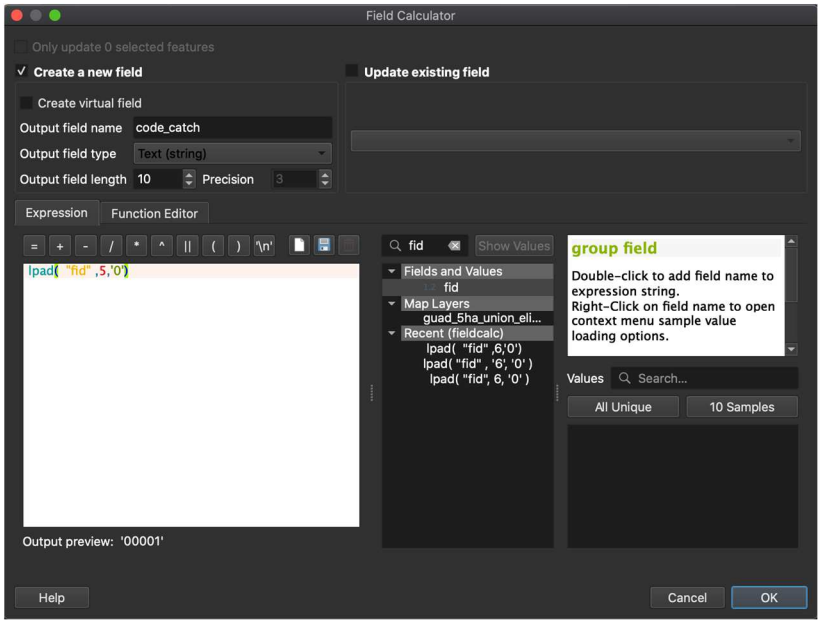
8. Catchment Code

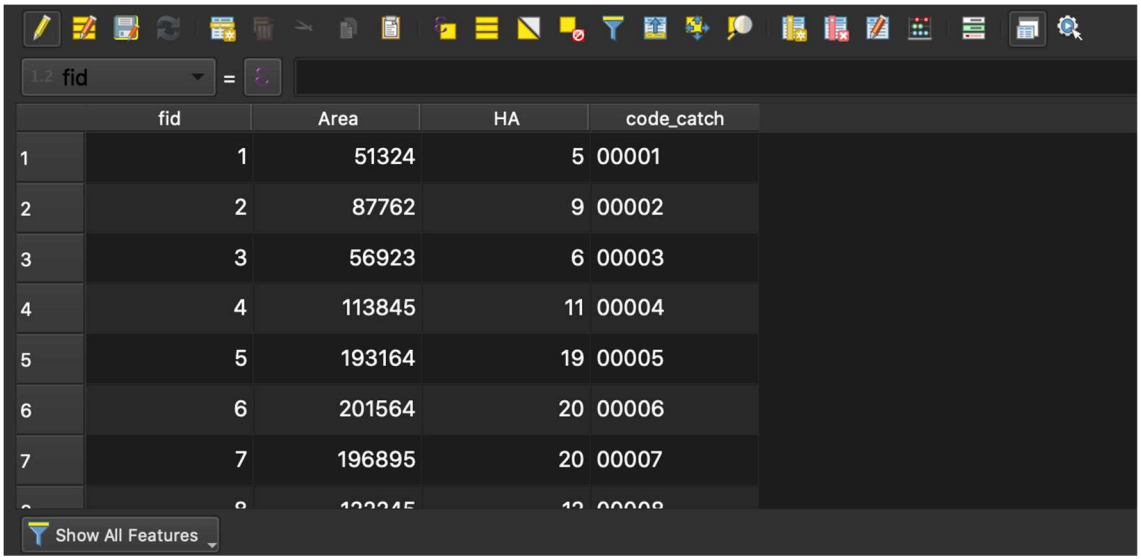
***basin and watershed code are on other instruction**

1. **Open Attribute Table of FMU**
2. **Open Field Calculator**
3. **Create a new field as text with expression like image lpad ("fid" ,5,'0')**

Means fid➔Catchment Code

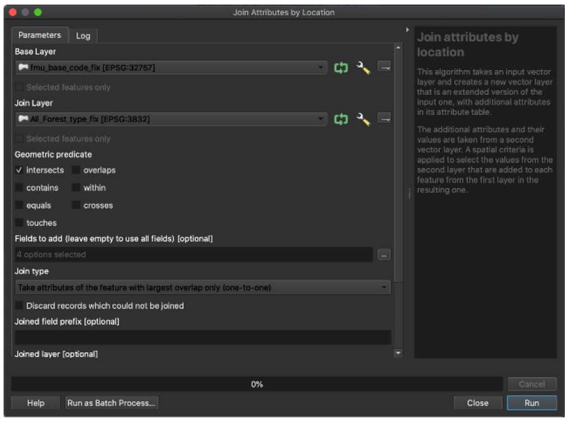
4. **Numbers shall have '0's as text**

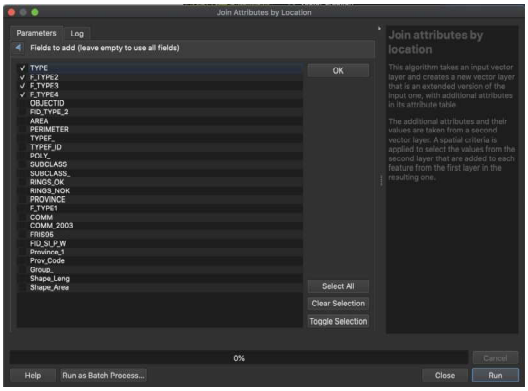




12-15. Forest Type

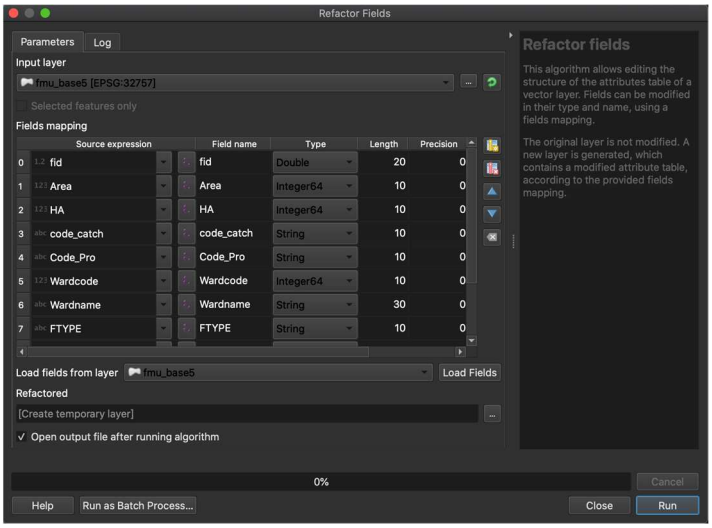
1. **Join the field from Forest Type Map**
   ***Use the original**
2. **Add the field with "Join Attributes by Location"**
3. **Parameters are the following image**
   ***Use join type"Take attributes of the feature with largest overlap only (one to one)"**





Organize Attribute Table

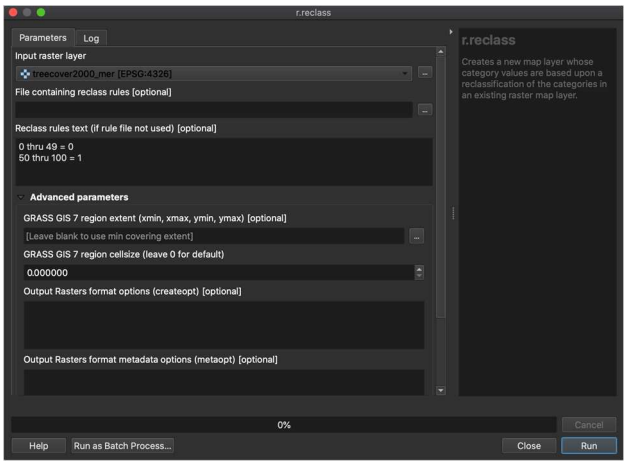
1. **Open "Refactor fields"**
2. **Select field row and click "arrow" buttons to change the order**
3. **The "Field name" or "Length" can be changed**



16. Treecover Area

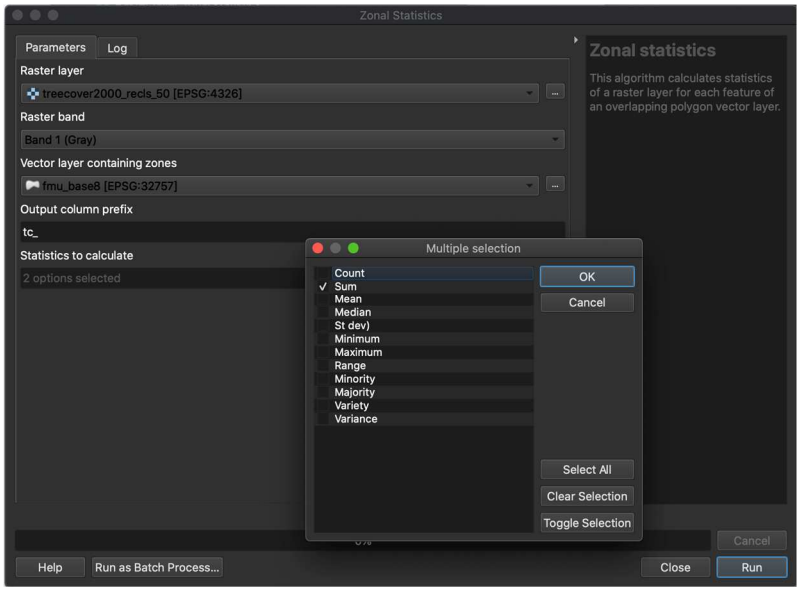
1. **Open treecover2000**
   ***Use 2019 version**
2. **Merge and reclass this**
3. **Set parameters like image**
   0 thru 50 = 0
   50 thru 100 = 1

***means counting**
forest >=50%



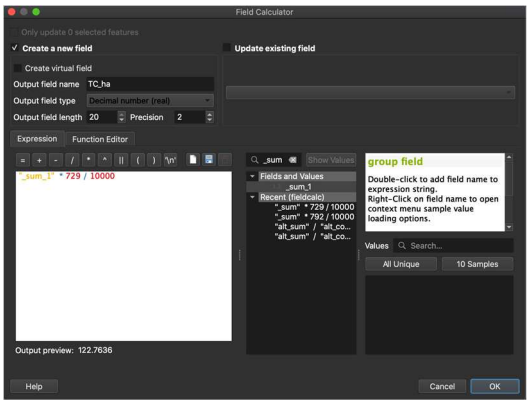
Zonal Statistics

1. **Open reclassed treecover2000 and FMU file.**
2. **Open "Zonal Statistics"**
3. **Set parameters like images**
4. **The results come up in the atrribute table**



5. Open Attribute Table.
And Make it to Area with “Field Calculator”
Expression: “_sum” * 729m2 /10,000

Then, eliminate tc_sum column.



17. Loss year

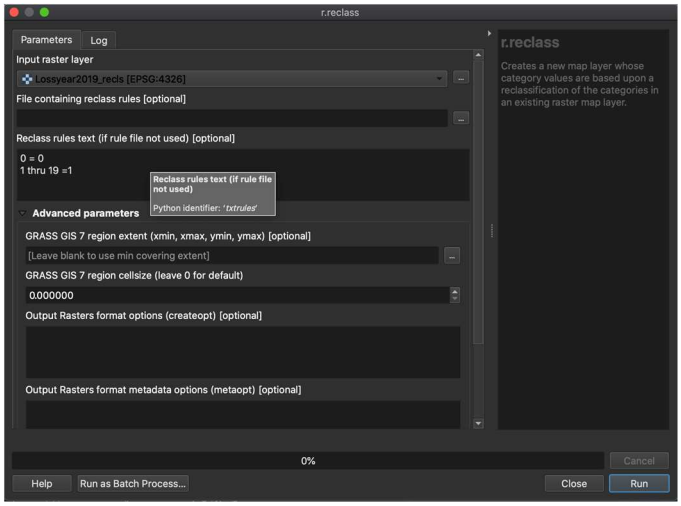
Reclass Loss year data * use 2019 version

1. Open Hansen loss year

2. Reclass like image to calculate “Loss area”

0 = 0

1 thru 19 = 1



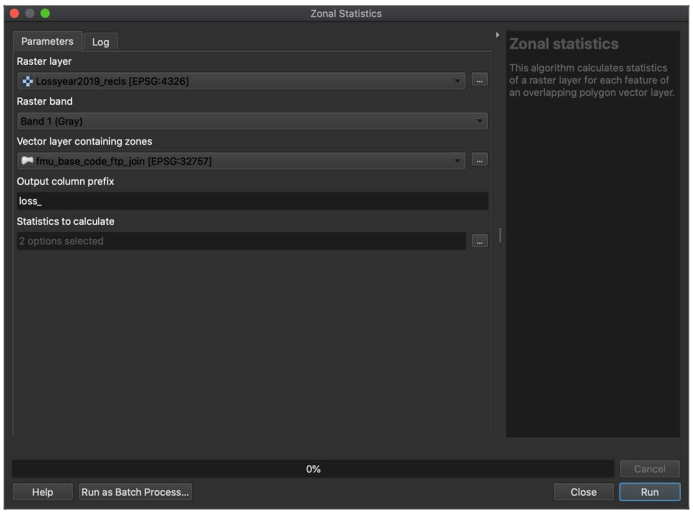
Zonal Raster Statistics

1. Open reclassed loss year and FMU file.

1. Open “Zonal Raster Statistics”

2. Set parameters like images

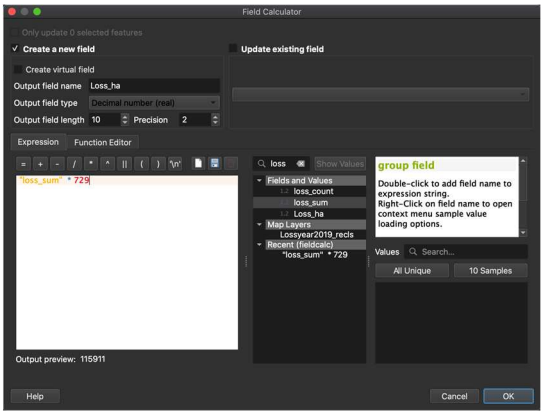
3. The results come up into Attribute



Loss_count	Loss_sum
5	5
11	11
0	0
4	4
17	17
7	7
0	0
3	3
4	4
12	12

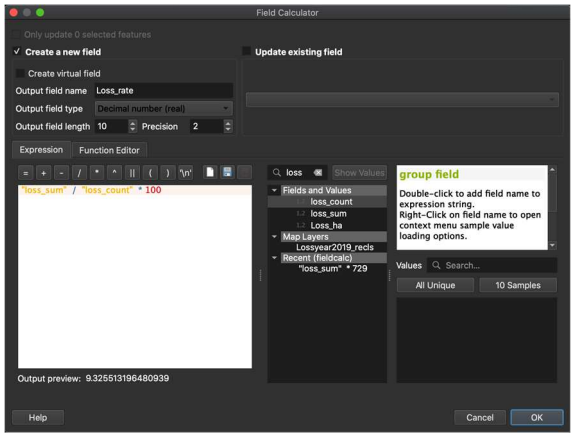
4. Open “Field Calculator”

5. Set parameters like image to calculate Area (one cell to 729m2)



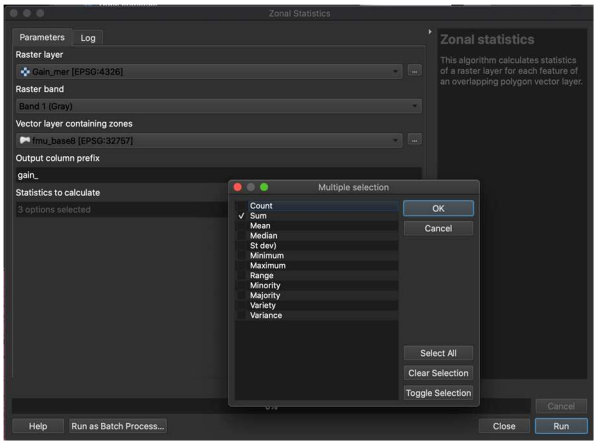
18. Loss rate

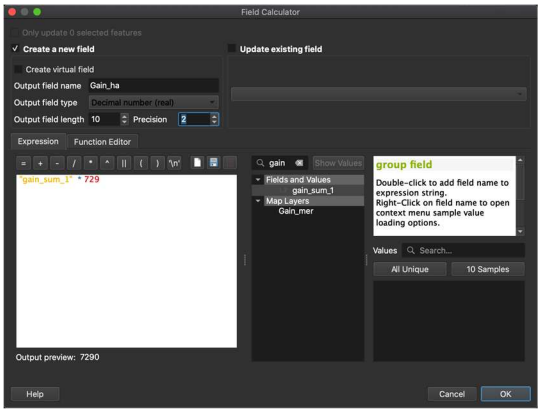
6. Consequently, Set parameters like image to calculate loss rate
7. Remove “loss_sum” and “loss_count ” column



19. Gain area

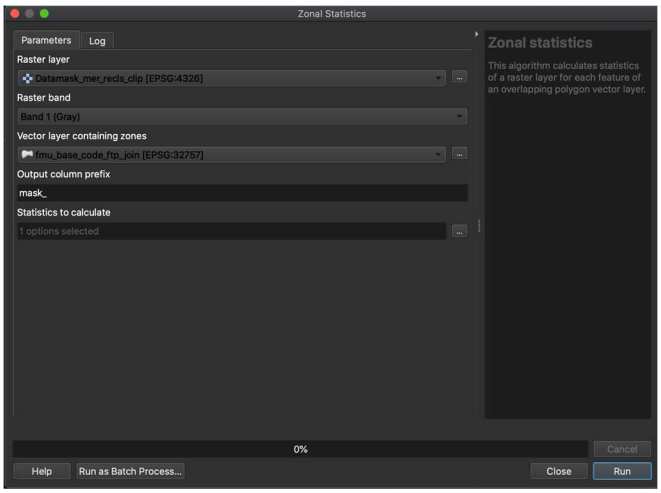
1. **Merge “Hansen gain”**
2. **Open “FMU”**
3. **Open “Zonal Statistic”**
4. **Set parameters like image**
5. **Convert to Area with “Field Calculator” as well**
6. **Remove “gain_sum” column**

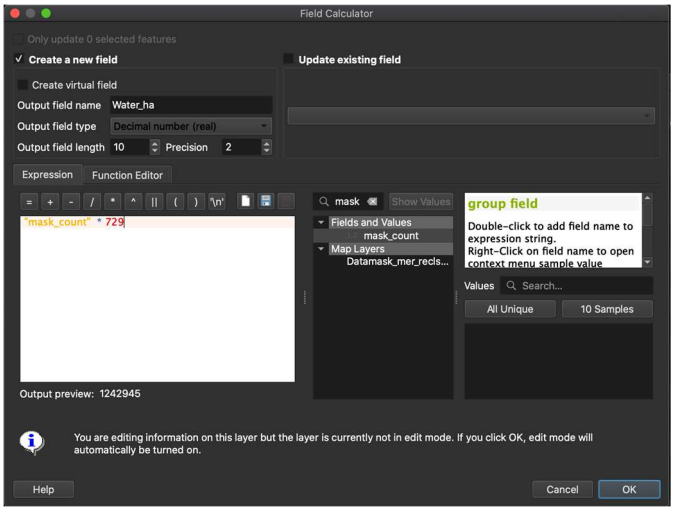




20. Water area

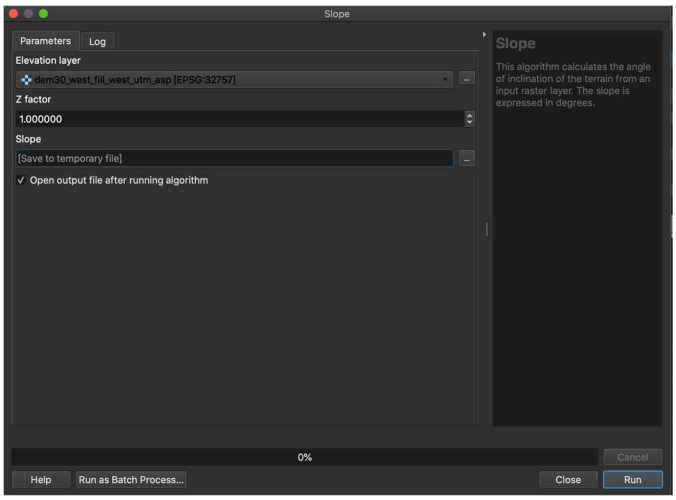
1. Open Hansen datamask
2. Merge and Reclass this
3. Set parameters like the following
   0 thru 1 = 0
   2 = 1
4. Clip data with administrative boundary
5. Open “Zonal Statistic”
6. Set parameters like image
7. Convert to Area(ha) with “Field Calculator”
8. Remove “mask_count” column





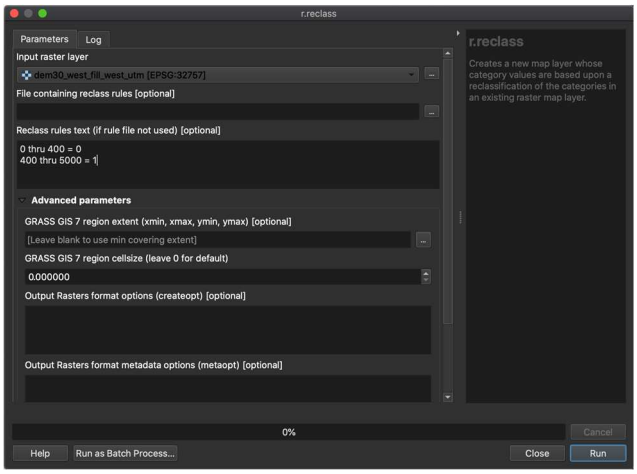
21 to 24. Elevation, 400>rate, Slope, Aspect

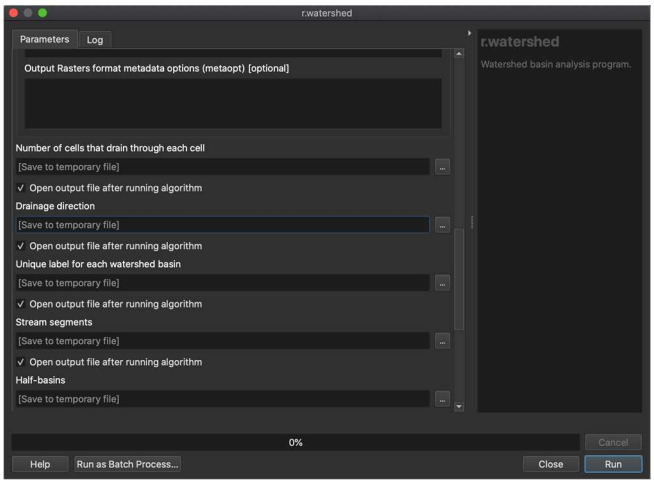
1. Convert from SRTM30
2. Open SRTM30 which is converted to filled and UTM projection
3. Open “Slope” to create slope map
4. Set parameters like image



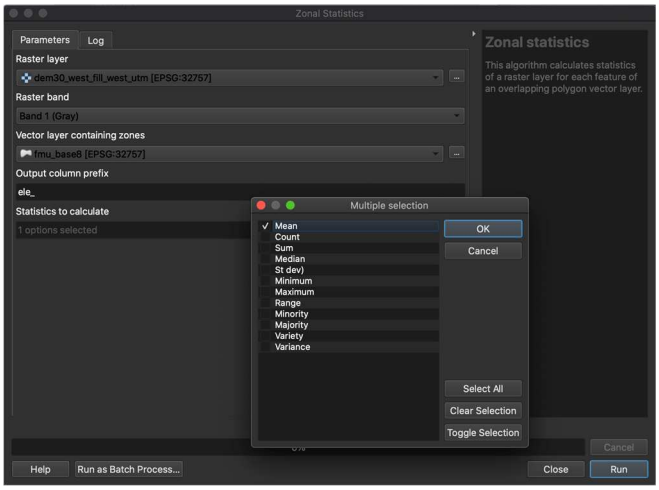
5. Open “r.watershed> Drainage direction” to create aspect
6. Set parameters like image

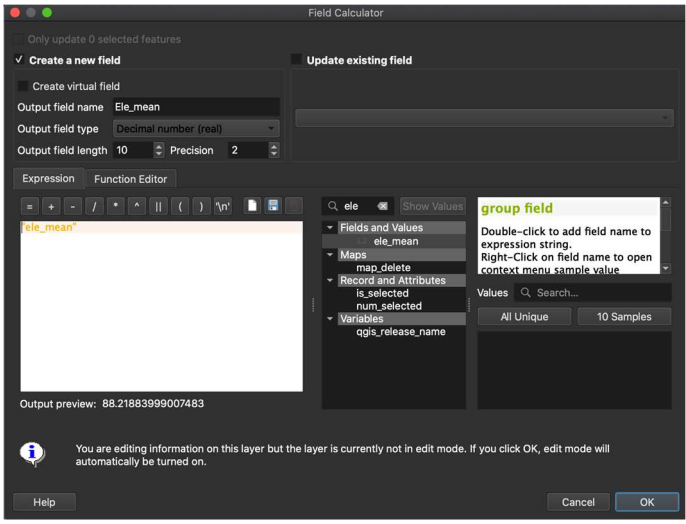
6. Reclass SRTM30 to (0, 1) with the following expression:
   0 thru 400 = 0
   400 thru 5000 = 1



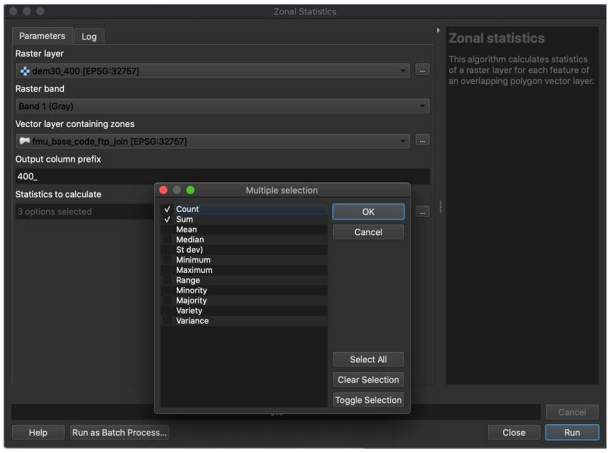


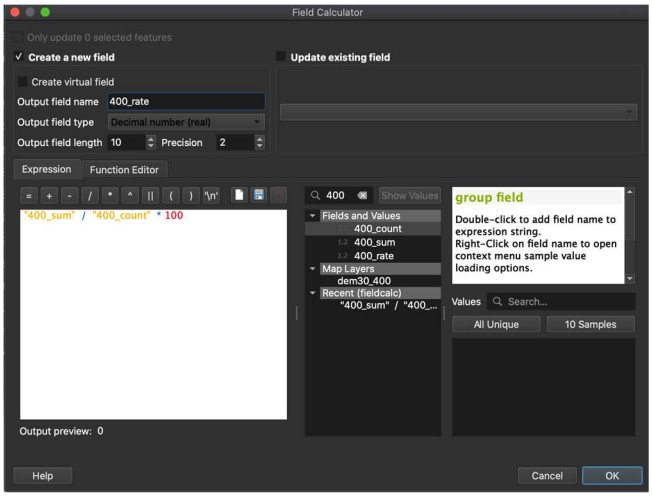
6. Open “Zonal Statictis”
7. Set parameters like image (Dem30_utm and FMU shp)
Use “Mean”
8. Convert ele_mean to Ele_mean by field calculator like the following
9. Remove “ele_mean” column



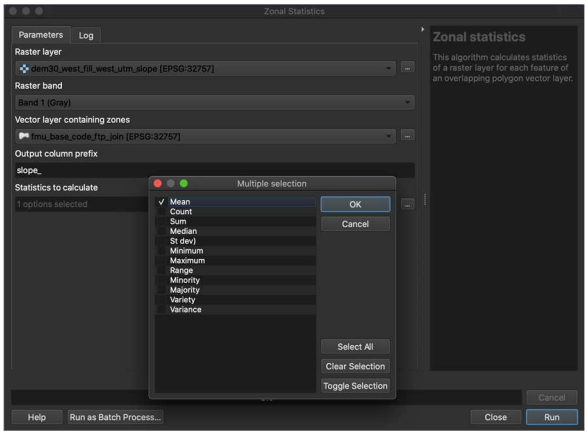


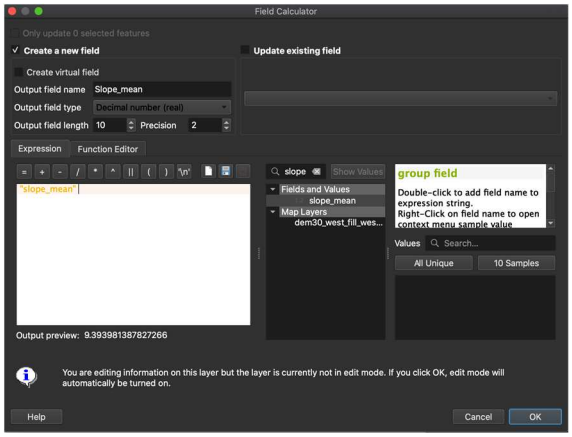
10. Open Zonal Statics
11. Set parameters like image (dem30_400 and FMU shp)
Use “Count and Sum”
12. Open field calculator and calculate the rate as following expression





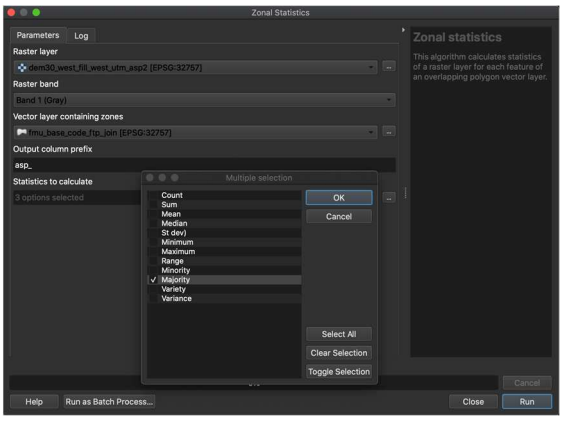
8. For “Slope”, use Zonal statics
Use “Mean”
9. Open field calculator and make this to defined style like image

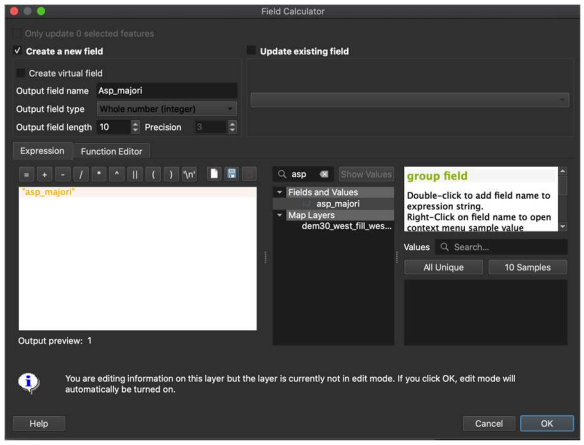




10. Remove slope_mean as usual.

11. For Aspect: Open Zonal Statistics
12. Set parameters like image
***Use majority**
13. Set into defined style with field calculator



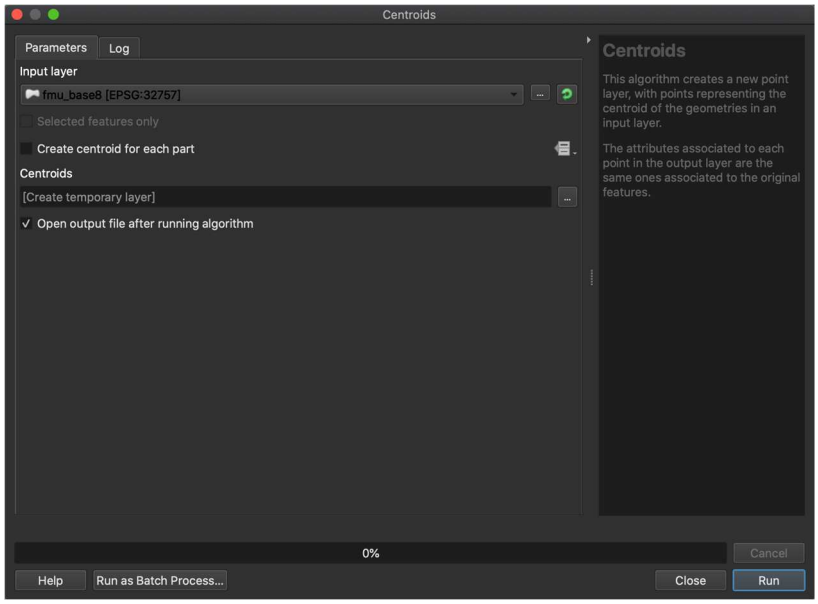


3	2	1
4		8
5	6	7

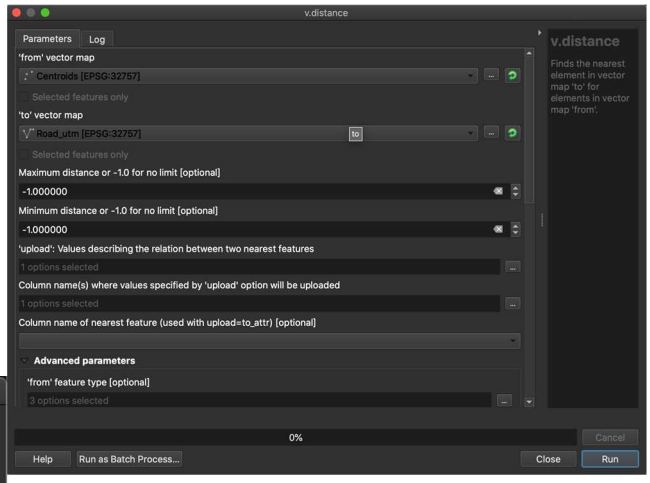
Direction number *0 = no data

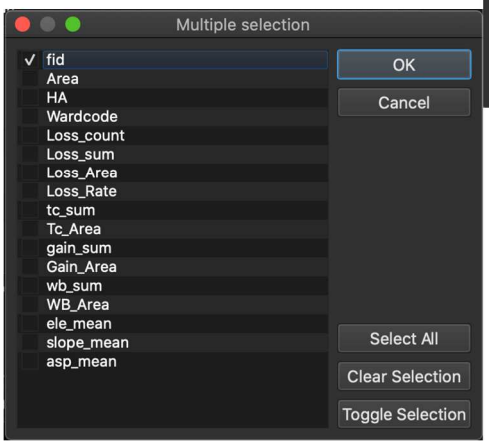
25-26. Distance from Main Road and Main River

1. Calculate distance from the centroid of "FMU" to existing "road data" from Base map
2. Create centroids from "FMU" with "Centroids"
3. Set parameters like image

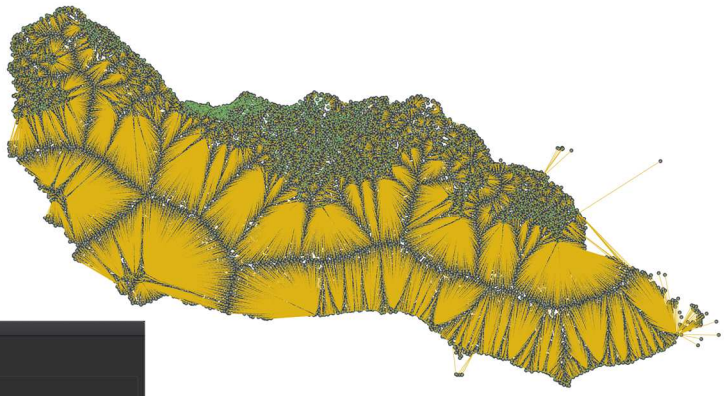


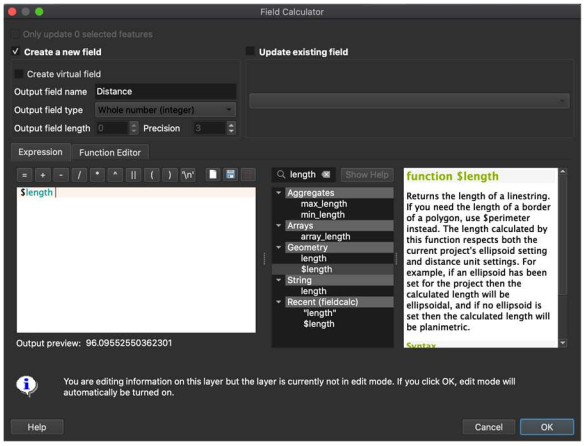
4. Open "v. distance"
5. Set parameter like image and create output as temporary file. Automatically name as "Distance"
***Use UTM and gpkg data**
6. Select "Area" as column name



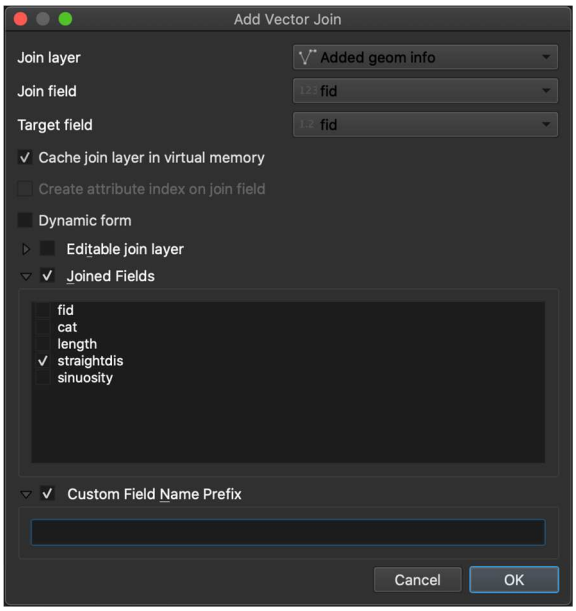


7. Output shall be like image
8. Calculate distance with “Field Calculator>$length”





9. Open FMU and go to Layer Properties
10. Select Join and click + button
11. Set parameters like image
12. Save this as a new file



13. Calculate distance from watercourse similarly
***Polygons are needed to convert to line**